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February 22, 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 – Responses to Intervener Information Request No. 3

Please find attached FortisBC's responses to Information Request No. 3 from the British Columbia Sustainable Energy Association (BCSEA), Keith Miles, Andy Shadrack, and the West Kootenay Concerned Citizens (WKCC).

Sincerely,

Dennis Swanson
Director, Regulatory Affairs

cc: Registered Interveners

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.

Response:

Confirmed.

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?

Response:

No, FortisBC was not aware of, and therefore did not rely upon, the cited reports when making decisions that resulted in the selection of the proposed AMI system. As noted in section 4.2.2 of the Application (Exhibit B-1), the RFP did not specify the type of meter-to-collector communication technology to be used for the AMI system, however all proposals received by FortisBC use RF communication (wireless) technology.

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?

Response:

Agreed. The data presented serves to highlight the fact that a cost per meter metric is affected by many factors including technology selection, functionality implemented, types of metering included or excluded, costs included or excluded, electrical distribution infrastructure, communications infrastructure, meter density and implementation date to name a few. As such, cost per meter does not provide a reliable measure of the actual cost or cost-effectiveness of advanced meters systems for comparison purposes.

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

Response:

Confirmed.

"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." [underline added]

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

Response:

In order to "normalize" the cost per meter data, FortisBC would have to factor out the cost differences driven by the factors outlined in the response to BCSEA IR3 Q107.1 in order to present cost per meter on a comparative basis. FortisBC does not have that information that would identify those differences in factors driving cost per meter, and therefore cannot "normalize" the data.

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?

Response:

FortisBC believes that any PLC-based proposals to the RFP issued by FortisBC would be at higher cost based on:

1. The information regarding PLC provided in Exhibit B-1, Section 7.3;
2. The FortisBC response to BCUC IR2 Q32.2.1, which estimates the cost of implementing the FortisAlberta PLC system at FortisBC; and
3. The fact that FortisBC did not receive any PLC-based responses to its RFP, despite sending the RFP to four vendors providing wired solutions, including Alcara, the supplier of the Idaho Power PLC system, ten vendors providing wireless solutions, and two integrators. FortisBC notes that it did not issue an RFI to any vendors.

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.

Response:

A competitive procurement process would provide greater certainty with respect to how much an advanced meter system will cost for a particular utility in a particular location at a particular

time. However, FortisBC is confident that costs would be higher for a PLC-based AMI system as articulated in the response to BCSEA IR3 Q107.4.

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)?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, please refer to the response to CEC IR1 Q40.1.

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?

Response:

The referenced PikeResearch document states that the world market (excluding China) is about 68% RF Mesh and 26% PLC, with the balance being "other". It goes on to state that the Chinese market is virtually entirely "basic" smart meters without hourly intervals or reliable two-way communications. Further definition is not provided.

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.

Response:

Broadband over power line and power line carrier are different implementations of the same concept. Both BPL and PLC systems modulate information onto a carrier frequency and inject/couple this signal onto the power line. The differences are in the carrier frequency used.

BPL systems use carrier frequencies in the MHz, whereas PLC systems use frequencies up to several hundred KHz. Since propagation distances decrease with frequency and higher frequencies allow for greater bandwidth, BPL is characterized by high data rates but requires many repeaters, especially on long distribution feeders with many branches. Conversely, PLC systems have low data rates but can carry a signal much longer distance before a repeater is required.

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 PLC2. There are no planned installations in Canada using PLC AMI3." [underline added]

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

Response:

According to the PikeResearch Smart Grid Deployment Tracker 2Q12, there are no planned installations in Canada using broadband over power line 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 20127."

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?

Response:

The practicality of using PLC backhaul for data gathered from wireless gas and water meters would depend on the PLC bandwidth available to the utility after accounting for transmitting any other higher-priority data.

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

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

Response:

FortisBC is not the author of this statement, but speculates that Marc Goldsmith and Associates LLC is using the term "infrastructure costs" to refer to non-metering AMI communication infrastructure. If this is true, PLC "infrastructure costs" may be higher because of the relative cost of substation communication equipment (such as PLC injectors) for a PLC system as compared to the communication equipment (such as collectors) required for an RF mesh 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?

Response:

For a communications network, latency is the time it takes for a communications signal to travel from the source to the destination and be processed on each side. A low line bit rate and network congestion are major factors contributing to increased latency.

In general PLC systems have higher latency due to a lower line data rate (it takes longer to put 100 bits on a line at 100 bits a second – 1 second, then it does to put 100 bits on a line at 100 kbps – 1 millisecond). This lower data rate also affects bandwidth since the transmission medium (air for wireless and the line for PLC) will need to be occupied longer to transmit the same amount of data. The result is that there is more congestion on a PLC network and this can significantly increase the time a device may need to wait for the medium to be clear before transmitting. In some systems, the medium can be unavailable for long periods of time during scheduled read events.

High latency, though undesirable as it increases the response time for communicating with all devices on the network, is not a significant problem for all applications using an AMI network because most applications are not delay sensitive. Applications such as a meter reading and remote disconnects (presuming that they are appropriately scheduled to minimize latency) are not adversely affected by long delay times, at least until these delays become very large.

Congestion can become an issue on very low bandwidth PLC systems when there are a significant number of endpoints, as additional bandwidth may not be available to transmit data during scheduled reading events. This can negatively impact non-scheduled data requirements requiring near real time endpoint responses such as conservation voltage reduction and outage management. In other words, high latency becomes a problem due to the system not having excess capacity for concurrent scheduled and unscheduled transmissions.

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?

Response:

Please refer to the response to BCSEA IR3 Q111.2.

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?

Response:

Line noise is not an issue for RF systems as signals are much lower power and are not injected into the power system.

FortisBC considers several potential sources of line noise important to an AMI system:

- Electrical Noise from sources outside the distribution network (typically caused by customer electronic devices) ingress into the system and interfere with the proper reception and demodulation of the carrier signal, thereby causing errors, re-transmissions and general degradation of the AMI communications system.
- RF Noise from the PLC carrier radiates from the electrical distribution grid and causes disturbances to RF devices. There have been many documented cases of PLC systems interfering with radio systems in the amateur and other radio service bands.

- Electrical noise caused by a high power carrier signal injected on a distribution line, or direct modulation of the 60 Hz sine wave will enter customer premises and consequently proper operation of equipment connected to electrical outlets may be disrupted.

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?

Response:

The Goldsmith report confirms PikeResearch's analysis.

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?

Response:

"Field-area network (FAN)", "Neighborhood-area network (NAN)", and "Local-area network (LAN)" are interchangeable names describing the meter to meter to collector communications grid. FortisBC has used the LAN terminology in its Application.

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."

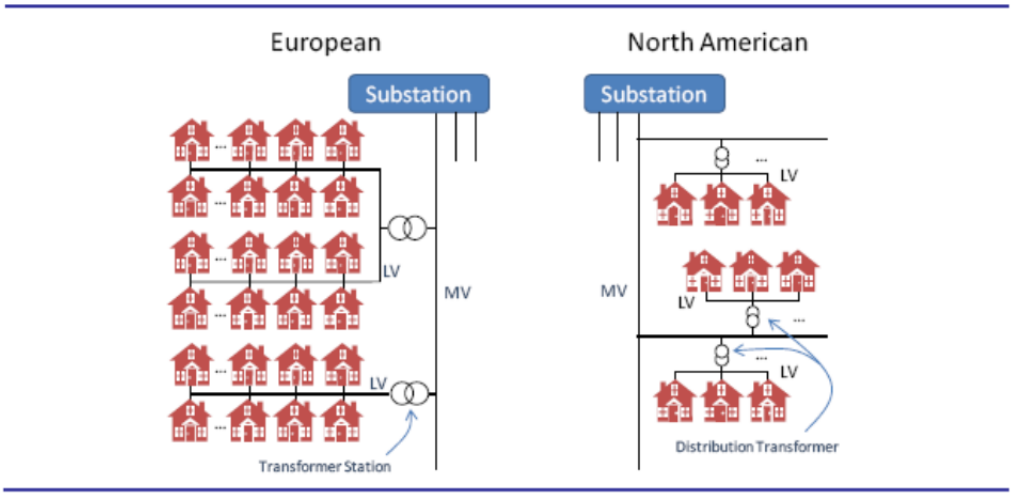
113.1 Please confirm that the following is text and graphic from the PikeResearch report immediately preceding the text quoted in Exhibit B-23 that may clarify how the different power system architecture in Europe compared to North America affects the comparative costs of PLC and wireless metering systems:

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)

Response:

Confirmed.

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

Response:

Confirmed.

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

Response:

The reference is to the average ratio of meters per MV/LV transformer in the North American system. As more fully described in the referenced PikeResearch document, the North American system typically makes more use of Medium Voltage (MV) lines with Low Voltage (LV) lines dropped to fewer meters. The result is the greater requirement for transformation than that experienced in the European system model. In North America the average ratio of meters to transformer is ~4.5 to 1.

1. On page 2, 7.2.4 Other Communication Technologies, FortisBC Inc. presented that, "Utilities have been using phone lines and fibre optic protocols for many years." I would like to understand why, as additional known alternatives and other than simply considering "low cost solutions", fibre optic data collection, ADSL style phone line communications, and cable data transmission networks that already exist are not being utilized?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC is unable to speculate on what alternatives to wireless technology vendors may have considered (but not proposed) when replying to the technology-agnostic FortisBC RFP.

2. I believe from the RF AMI solution evidence already presented to date that the required data information to be transmitted and received is relatively minimal. Fibre optics networks, for example, support, in my view, bandwidths far greater than any RF distribution network. Why do you suggest that the bandwidth is not adequate in these proven alternate methods using direct connections to various required servers?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC has not claimed that fibre optic networks do not have sufficient bandwidth for AMI.

3. Telus has supported ADSL phone line communications in our area for years. Why would you not consider residential data collection via existing similar networks that could be consolidated, perhaps, into more remote area hubs from which you could utilize wireless transmission in a manner that would not subject home users to RF exposure?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot speculate on what alternatives vendors may have considered (but not proposed) when replying to the technology-agnostic FortisBC RFP.

4. Is cost, as mentioned in your exhibit B-23, the single determining factor for an AMI solution? Are you attempting to minimize any risk factors that may be present in an RF distribution solution simply to reach a low-cost solution?

Response:

Cost was not the single determining factor used by the Company to select the proposed AMI system. The RFP for the AMI system, provided as Appendix BCSEA IR1 8.1, details the evaluation criteria used to evaluate the proposals received. These criteria include general AMI system requirements, performance service levels, scalability, security, and price.

FortisBC notes that its proposed AMI system has been certified for use in Canada by Industry Canada, which considers any applicable requirements including those of Health Canada's

Safety Code 6 with respect to RF emissions. As such, FortisBC does not believe there are any "risk factors" that could be or have been minimized as part of this Application.

5. It would seem to me that the specific business case for this region could have multiple solutions. How is it that generalized comments such as, "the North American System" and "popular in North American markets" apply to the specific service area in which we live where you prefer to propose the RF solution?

Response:

FortisBC cannot speculate on what alternatives to wireless technology vendors may have considered (but not proposed) when replying to the technology-agnostic FortisBC RFP.

6. You demonstrate in exhibit B-23, page 5, table 1, that widely variable per-meter costs have been accepted by various commissions in many locations and, one would assume, via the public process. Do you have any reservations about your BCUC application undertaking that applying for a wired public solution to avoid unproven risk factors and existing public controversy at a slightly higher cost would be or would have been problematic?

Response:

FortisBC has no reservations regarding its proposed AMI system. It is important to note that FortisBC did not specify any particular communications technology for its AMI RFP, but rather specified only the required functionality based on business needs. It is not common practice to include restrictions that do not reflect business requirements in competitive procurement processes. In the case of communications technologies, FortisBC believes it was prudent and appropriate to ensure that all proposals complied with the applicable Canadian legal framework.

Deployment Costs Compared

1. FortisBC has stated:

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 system serving 475,000 electric customers. The project cost was $94 million, or $197 per meter (13) (B23-3, last paragraph page 3) .

Courtenay Waites, in Direct Testimony filed with the Idaho Public Utilities Commission, reports that estimated costs for the total deployment of PLC-AMI was $70,864,902 over three years (C13-17-1/3-Idaho Power Company-Direct Testimony, Exh. 4 - C.Waites).

Mark Heintzelman in an email response, on January 23rd, 2013, confirmed that 485,000 PLC-AMI meters were deployed over a three year period, noting that a total cost for meters, labor, backhaul and IT was about $74 M (C-13-18).

This confirmed Mark Heintzelman's earlier statement:

The overall cost of the system including software and data management systems divided by meter endpoints is approximately $152 (C13-9, Appendix 1, question 6).

FortisBC's estimated costs and comparison for deployment of its smart meters in BC are:

Fortis BC: 115,000 meters, $47,700,000 = $414.78

British Columbia BC Hydro: 1,800,000 $1,000,000,000 = $555.56

FortisBC/Itron: wired 115,000 meters, $66,000,000 = $573.91 (C13-10)

With the Idaho Power Company Ltd capital deployment PLC-AMI costs at $152 per meter, how can FortisBC's deployment of AMI RF Mesh at $414.78 be in the best interests of its customers?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

However, FortisBC agrees that the Idaho Power Company Ltd. costs appear unusually low compared to the FortisBC and BC Hydro costs, as well as FortisAlberta and the majority of the other utilities that Mr. Shadrack himself provided in Exhibit C13-10 (although, in his words, "without knowing the veracity of what is attributed and whether appropriate cost comparisons can be made").

The estimated cost of the AMI project was determined in part through a robust, competitive and comprehensive RFP process, ensuring that the best value was obtained for customers.

FortisBC concludes that costs would be higher for a PLC-based AMI system that is functionally equivalent to that proposed in this Application based on:

1. The information regarding PLC provided in Exhibit B-1, Section 7.3;
2. The FortisBC response to BCUC IR2 Q32.2.1, which estimates the cost of implementing the FortisAlberta PLC system at FortisBC; and
3. The fact that FortisBC did not receive any PLC-based responses to its RFP, despite sending the RFP to four vendors providing wired solutions, including Alcara, the supplier of the Idaho Power PLC system, ten vendors providing wireless solutions, and two integrators. FortisBC notes that it did not issue an RFI to any vendors.

FortisBC believes that the AMI project as a whole, including all costs and benefits, is in the public interest.

2. Can FortisBC please justify the $30,220,000 increased cost of its proposed RF AMI system over the PLC-AMI system deployed by Idaho Power Company?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

However, FortisBC notes that there is no verifiable evidence that the PLC-AMI system installed at the Idaho Power Company would cost less or provide the same functionality as the proposed FortisBC AMI system.

FortisBC concludes that costs would be higher for a PLC-based AMI system that is functionally equivalent to that proposed in this Application based on:

1. The information regarding PLC provided in Exhibit B-1, Section 7.3;
2. The FortisBC response to BCUC IR2 Q32.2.1, which estimates the cost of implementing the FortisAlberta PLC system at FortisBC; and
3. The fact that FortisBC did not receive any PLC-based responses to its RFP, despite sending the RFP to four vendors providing wired solutions, including Alcara, the supplier of the Idaho Power PLC system, ten vendors providing wireless solutions, and two integrators. FortisBC notes that it did not issue an RFI to any vendors.

Technological Capability Compared

3. FortisBC has suggested that PLC-AMI is not well suited to North American utilities:

   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.

   ...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.

   ...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 (B-23, Attachment 1, AMI Communications Technologies, page 2).

Are FortisBC's technical reasons for not deploying PLC-AMI summed up in its original application as follows:

...designates limited functionality available from solution

Hourly meter readings for All Customers

Home Area Network

Load Control

Conservation Voltage Reduction

Distribution Automation Device Support

Supports Provincial Energy Objectives (B-1, 7.00 Alternatives, Table 7.5.d, page 123, line 3, July 26, 2012)

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, the reasons FortisBC selected the proposed AMI system are articulated in the Application, and have been clarified through the regulatory process.

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

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot answer this question without speculating on PLC functionality since it did not receive any PLC-AMI responses to its RFP.

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

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot answer this question without speculating on PLC functionality since it did not receive any PLC-AMI responses to its RFP.

6. Would FortisBC please list and describe the enhanced capabilities requiring more expensive PLC infrastructure to which it referred in B-6 BCUC IR#1 106.3 (page 247, lines 17 to 19)?

   i. Is Fortis BC, for example, implying that no PLC-AMI/Non-RF system has the capability to meet FortisBC's needs?

   ii. Is FortisBC, for example, implying that Itron's PLC-AMI meter, when available, would have the capability but would automatically be more expensive?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot answer the question since FortisBC did not receive any responses from AMI PLC vendors to its RFP.

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:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired"

market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC notes that the benefits derived from the proposed FortisBC AMI system have been extensively explored throughout the regulatory process.

8. In Direct Testimony Mark Heinztelman answered the following question:

...Q. Could you please describe how Idaho Power selected the TWACS power line carrier technology from Aclara Power-Line Systems Inc. ("Aclara") for the system wide deployment of AMI technology?

A. The Company's experience with the TWACS system goes back to 1998, when it deployed a pilot program consisting of 1,000 meters in the Idaho City area. The purpose of this program was to evaluate the system's ability to read meters in remote locations and determine the feasibility of deploying what was then Automated Meter Reading ("AMR") to reduce operating costs by automating the monthly meter reading process in low customer density areas. In 2004, Idaho Power deployed the TWACS technology in the Emmett and McCall areas in conjunction with the Phase One Implementation Plan filed with the Commission in Case No. IPC-E-02-12. The Company also utilized this technology in its Energy Watch and Time-of-Day pilot programs for the Emmett Valley. With these programs the Company was able to evaluate the system's ability to gather hourly energy use data from all endpoints in support of dynamic time-of-use ("TOU") rate applications and evaluate the system's functionality related to direct load control through an air conditioner cycling program (C13-17-1/2-Idaho Power Company-Direct Testimony-D.Heinztelman, page 2, line 21 to page 3, line 20).

Mr Heinztelman's testimony later continues:

Aclara's proposed solution demonstrated superior system performance at scale, the functional capability to retrieve hourly data at scale, and the proven ability to deliver successful system performance economically in low customer density applications (Ibid, Heinztelman, page 5, lines 6 to 11).

Could FortisBC please describe how long it has had a working relationship with Itron and what field tested pilot programs it has undertaken with Itron to test the equipment it is proposing to deploy?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

9. Could FortisBC please state whether or not PLC-AMI systems have the capability to gather hourly energy-use data and comparable load control capability?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot answer this question without speculating on PLC functionality since it did not receive any PLC-AMI responses to its RFP.

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:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot answer the question since it did not receive any responses from AMI PLC vendors to its RFP.

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:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

12. FortisBC has stated:

Lower meter density negatively impacts the economics of an RF mesh solution relative to a PLC solution since RF mesh technologies rely on meter-to-meter communication (B6, BCUC IR1 #113.1.2, page 277, lines 32 and 33).

Please describe in detail the negative economic causes and effects of lower meter density.

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

13. Mr Heintzelman's testimony continues:

> *...Q. Could you generally describe the AMI system being implemented by Idaho Power and how it works?*
>
> *A. The TWACS AMI system uses the electrical distribution system as the path for two-way communications between the TWACS substation communications equipment and the endpoint communications modules installed internally in the customers' electric meters or load control devices. The software for the AMI System is hosted on the Idaho Power network. It consists of proprietary software applications, a hardware operating system, backup and test applications, communications applications and servers, and database applications and servers. The software application will be connected to the substation control equipment through our existing internal network or through the phone system. 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.*
>
> *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." (Heinztelman, page 9, line 5 to page 10, line 16, and 20 to 22).

...Q. Could you give a brief description of how the AMI two-way automated communications system works?

A. Yes. Please refer to Exhibit No.3 to my testimony for a simplified diagram of how the system is connected. Once the components of the system are installed, communications take place starting with the software initiating communications commands, typically on a predetermined schedule. The commands are processed through a communications server and sent out through our internal network or through a phone service provider to the appropriate distribution substation. At the substation, the communications command is received by the TWACS station equipment and sent out on the electrical distribution system. Each endpoint communications module (located in the meter) is uniquely identifiable and responds to requests for data only when specifically addressed by the system. When a communications module is addressed by the system, it will respond to the request by delivering the data requested in a predetermined format. There are typically data retrieval schedules for daily meter reads, predetermined blocks of hourly energy use data, and monthly billing reads. Once the substation control equipment has the information back from the individual communications modules, the data will automatically be sent back over the phone or network system to the TWACS network software. The data is then validated and moved to the system database. The TWACS system has built in features to continually optimize the communications process, and in cases where you are retrieving hourly energy use information, it is best not to interfere with the systems automatic operations by making frequent direct unscheduled data requests from individual communications modules. Direct unscheduled communications will be limited to troubleshooting and necessary maintenance communications. This will allow the system to optimize communications and data retrieval performance (Ibid, Heintzelman, page 10, line 23 to page 12, line 10).

In contrast FortisBC has stated:

...FortisBC is not aware of specific non-PLC, non-RF AMI implementations, so has not monitored the progress and results from any implementations.

...FortisBC is not aware of any broadly-deployed AMI solution that uses third-party telephone lines for the LAN, so has not evaluated the cost.

...FortisBC used the term "broadly-deployed" to differentiate the implementation of a telephone-based AMI system from downloading consumption data from a small number of large-power customer meters using telephone or cellular lines.

FortisBC is not aware of any utilities that have implemented AMI using third party telephone lines as an alternative to an RF mesh LAN solution, so has not evaluated the cost.

..The Company respectfully submits that it did answer the question. FortisBC is unaware of any third-party telephone line based AMI systems or implementations, so there is no point in evaluating any theoretical barriers (B-15 CSTC IR2# 12, 13 and 14, page 9, lines 24 and 25, page10, lines 2 and 3, 9 to 13, and 26 to 28).

Yet on January 22nd, 2013 FortisBC, in its submission, uses a quote from a report that states:

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 (B-23, page 2).

Further, 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).

Is FortisBC responding with regard use of telephone lines for collection of data from the meter or endpoint to the substation, or is FortisBC including backhaul use of telephone lines and/or fibre optic from the substation back to the data collection center where billing is undertaken?

Response:

FortisBC is responding that it is unaware of telephone line-based AMI systems, meaning an AMI system in which telephone lines are used to transmit data from a significant proportion of meters and collection points (the LAN portion of the network). FortisBC (and other utilities) have used telephone lines and fibre optics to transmit data between meters and collection points on a small scale, generally for large industrial metering.

14. Please describe in detail why telephone line and fibre optic use are not suitable for backhaul of data from a substation to a data centre where billing is undertaken?

Response:

FortisBC notes that this question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, please refer to the response to Shadrack IR3 Q13. FortisBC considers both telephone lines and fibre optic cable as valid media for the backhaul of data.

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:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired"

market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot answer the question as it did not receive any responses from AMI PLC vendors to its RFP.

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?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot answer this question without speculating on PLC functionality since it did not receive any PLC-AMI responses to its 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?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot answer this question without speculating on PLC functionality since it did not receive any PLC-AMI responses to its 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:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot answer the question as it did not receive any responses from AMI PLC vendors to its RFP.

19. at BCUC IR2 #31.2 FortisBC states:

Please note that the customer density figures provided in the response to BCUC IR No.1 Q113.1.2 were based on incorrect data from the Canadian Electricity Association. That data has since been corrected. The correct values are 2.3 meters per square kilometre for FortisAlberta and 6.4 meters per square kilometer for FortisBC. These corrected figures do not affect the original response (B-14, BCUC IR2 #31.2, page 65, lines 6 to 10)

Please describe the significance and compare the consequences of a customer density of 11.2 meters per square kilometre (FortisAlberta) vs FortisBC density of 38.6 meters per square kilometre, and why a change to 2.3 meters and 6.4 meters per square kilometer does not affect FortisBC's original hypothesis?

Response:

This question is not within the scope of the third round of information requests. Nevertheless, FortisBC provides an answer here since the question relates to an error made and corrected by FortisBC.

Although the “meters per square kilometer” figures were corrected, they still indicate that the FortisAlberta service territory is considerably less densely populated by meters than FortisBC. FortisBC speculated that (among other things) the lower meter density at FortisAlberta may be a reason for the competitiveness of PLC in their service territory. The basis of this speculation has not changed with the revised numbers.

20. At C13-9 confirmation is requested as to the meter density for Idaho Power Ltd:

Can Idaho Power confirm that they currently serve 495,570 customers across 24,000 square miles (62,160 square kilometers) at an average density of 20.65 meters per square mile (7.97 meters per square kilometer)? We currently have just over 500,000 with 522,000 meters installed over 24,000 sqmi (C13-9, Appendix 1, Question 10, December 7, 2012).

FortisBC stated:

FortisBC cannot definitively say why Idaho Power chose a PLC system. However, several factors may have contributed when Idaho power filed its regulatory application in 2008 for a PLC-based AMI system: 1) PLC technology

was more cost competitive at lower meter densities per square kilometer when the system was selected,...(B-11, R#1, 2, page 1 lines 24 to 27).

If FortisAlberta has deployed PLC-AMI meters at 2.3 per square kilometre and Idaho Power Ltd has deployed them at a density of approximately 8.4 meters per square kilometre, at the 6.4 meters per square kilometer density upon which FortisBC has based its current application, does meter density remain a limiting issue for RF Mesh AMI or PLC-AMI alternatives, and, if so why?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, please refer to the response to Shadrack IR3 Q19 for further explanation of the corrected meter density figures.

21. In Order 30726, the Idaho Public Utilities Commission observes that:

Staff emphasized the importance of providing "real time" usage information to customers. Accordingly, Staff recommended that the Company inform customers of the availability of power cost monitors such as the Blue Line, Aztech and Energy Detective devices. Id. at 15-16. These commercially available devices enable customers to acquire "information on energy usage and the associated cost on a real time basis Id (C13-17-1, Idaho Power Company-CPCN Application AMI Installation, Order 30726, paragraph 2, page 7).

The Commission further stated:

We find that deployment of AMI technology will also offer substantial future benefits by providing an essential platform for remote connect-disconnect capabilities (Ibid, Order 30726, page 8, second paragraph).

Mark Heintzelman also acknowledges that the deployed PLC-AMI could add remote disconnect/reconnect functionality (C13-9, Appendix 1, response question 3, December 7, 2012).

FortisBC has stated, however, in response to Keith Miles in IR#1 that:

2) Idaho Power did not require HAN functionality, 3) Idaho Power did not require remote disconnect/reconnect functionality (B-11, R#1, 2, page 1 lines 27 and 28).

Is it true that retrieval of real time energy usage information and remote disconnect/reconnect functionality are obtainable with PLC-AMI deployment and if not, please explain why?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot answer the question as it did not receive any responses from AMI PLC vendors to its RFP.

22. Mark Hentzelman's email of January 23rd, 2013 to Area D states Itron was one of three RFP deployment bids of smart meters in Idaho Power Company's service area in 2008 (C13-18).

Was this bid for deployment of AMI-PLC or RF-AMI?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC cannot answer the question since it is not familiar with the Idaho Power Company RFP.

Deployment on Non-RF Meters Compared

23. On behalf of Area D I submit information provided by Bill Weber, Director, Account Management, Aclara Technologies LLC to a request by RDCK Area D for comments on FortisBC's submission of January 22nd, 2013 in which it stated:

...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).

...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. There are no planned installations in Canada using PLC AMI.

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 (B-23, Attachment 1, page 1).

In contrast Bill Weber of Aclara Technologies reports:

We have 361 TWACS customers with 13M [13 million] TWACS devices. Twelve of these customers are outside of the US and Canada and are located in Mexico, South America, Asia and the Caribbean (see Appendix 1 below).

Can FortisBC please explain the basis of its claim that only 16 non RF deployments have occurred in the US and Canada, when Aclara reports that they have deployed their non-RF AMI meter with 113 utilities between 2008 and 2012 alone (see Appendix 1 below)?

Response:

FortisBC clearly indicated the source of its data (Pike Research Smart Grid Deployment Tracker 2Q12). FortisBC cannot definitely explain the difference between the Pike Research figures and those from Aclara. However, from Appendix 1 below, FortisBC notes that Aclara said the following with respect to the North American deployments:

Another 12 TWACS customers are IOUs in the US and Canada. The remaining customers are Electric Cooperatives and Municipals in the US.

FortisBC speculates that Pike Research may have excluded the numerous (at least 337[1] based on Aclara figures) small Electric Cooperative and Municipal electric utilities from its figures.

24. Given that Aclara is one of the top 10 smart grid vendors in North America, did FortisBC consider a TWACS system for deployment in its service area?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC notes that it did not provide a complete list of vendors to which the RFP was sent in the response to Shadrack IR2 Q14. For clarity, a list detailing all vendors who received the FortisBC AMI RFP is provided below, which clearly shows that Aclara received the FortisBC RFP.

[1] 361 claimed utility installations less 12 outside North America less 12 Investor-Owned Utilities

Table Shadrack IR3 Q24

Invited	Technology	Response
Aclara	PLC and RF	Declined to submit proposal
Cooper Power Systems	PLC, Cellular, RF	Declined to submit proposal
Echelon	PLC	No response
Elster Metering	RF	Proposed RF solution
Itron Canada	RF	Proposed RF solution
Sensus (KTI Ltd)	RF	Proposed RF solution
Landis & Gyr	PLC and RF	Proposed RF solution
Silver Springs Networks	RF	Proposed RF solution
Smart Synch	Cellular	Proposed cellular solution
Tantalus Systems Corp	RF	Proposed RF solution
Trilliant Networks	RF	No response
AC Global Systems Ltd	Integrator	No response
General Electric	Integrator	No response

25. Did FortisBC consider the possibility of a TWACS system in the design of its RFP proposal?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

26. How many of the top 10 smart grid vendors did FortisBC send out its RFP to?

Response:

Lacking a definition of "the top 10 smart grid vendors", FortisBC references the PikeResearch Smart Grid Deployment Tracker 2Q12, which notes the following meter manufacturer vendor selection share:

- Landis&Gyr - 24%
- Itron - 21%
- GE Energy - 18%
- Sensus - 18%
- Elster - 6%
- Echelon - 1%, and
- "other" 12%

As noted in the response to Shadrack IR3 Q24 above, the RFP was sent to all of the vendors explicitly identified above.

27. What is the meter reading performance rate of the proposed Itron RF system?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

Regardless, FortisBC is unclear of the meaning of "meter reading performance rate". The proposed FortisBC AMI system is designed to allow hourly read data to be downloaded several times a day from all connected meters. The capabilities of the system could allow more frequent meter reads (sub-hourly) and more frequent downloads if required.

28. From what source did FortisBC get the information that gas and water meter read data was not being transmitted along power lines?

Response:

FortisBC did not state that gas and water meter read data was not being transmitted along power lines. It stated that "RF meters are also the only form of remote gas and water metering in North America".

FortisBC is not aware of any non-wireless gas and water AMI meters. However, data from a wireless RF gas or water meter could be transmitted from the wireless collection point back to the utility through a variety of means, including power line carrier.

1. How many buildings in the Fortis BC coverage areas? Can Fortis please adjust the unit costs per wireless meter to accommodate the costs for each and every building hit by the EMFs? The frequency interaction with the buildings will put the buildings in violation of Part 4 of BC Building Code.

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

2. Can Fortis adjust the unit cost of wireless meters to accommodate health costs and liability from adverse health effects including death of the humans inside the coverage area?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

3. What types of agriculture, farming, industries and businesses exists in the coverage areas? Can Fortis adjust the unit costs per meter to incorporate the production losses and other costs to these industries?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

4. Are there timber leases or lumber mills in the coverage areas and can Fortis adjust the costs per wireless meter to affect losses of industry?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

5. Will Fortis please adjust the unit costs per wireless meter to reflect the infrastructure losses to every municipality and over the coverage area for accelerated corrosion from frequency interaction?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

6. Can Fortis adjust the unit cost per wireless meter to reflect the costs of adversely affecting everything in the ecosystems within the coverage areas?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

7. Can Fortis and their estimators incorporate any other direct or indirect costs associated with radiating the entire coverage area and everything the frequencies hit?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.

8. Frequencies hitting anything in 17,000 could create an electrical charge waiting for a discharge in volatile areas, can Fortis adjust the unit costs per meter for the insurance?

Response:

This question is not within the scope of the third round of information requests. As provided in Order G-17-13:

> Intervener requests for a third round of Information Requests is granted, limited to the information provided in FortisBC's January 22, 2013 evidentiary filing on the "wired" market, the absence of a formal request for proposal process and comparative North American project cost estimates.