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October 26, 2021

B.C. Sustainable Energy Association
c/o William J. Andrews, Barrister & Solicitor
70 Talbot Street
Guelph, ON
N1G 2E9

Attention: Mr. William J. Andrews

Dear Mr. Andrews:

Re: FortisBC Energy Inc. (FEI)

Project No. 1599211

Application for a Certificate of Public Convenience and Necessity (CPCN) for Approval of the Advanced Metering Infrastructure (AMI) Project (Application)

Response to the B.C. Sustainable Energy Association (BCSEA) Information Request (IR) No. 1

On May 5, 2021, FEI filed the Application referenced above. In accordance with the regulatory timetable established in British Columbia Utilities Commission Order G-302-21 for the review of the Application, FEI respectfully submits the attached response to BCSEA IR No. 1.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

cc (email only): Commission Secretary
Registered Parties

1.0 Topic: Project Need

Reference: Exhibit B-1, Application, p.27 (pdf p.41); Appendix A, Util-Assist Report, pdf p.179

FEI states:

> "Maintaining a manual meter reading process will result in FEI lagging behind its peers. This has implications in both customer expectations and market availability of meter reading contractors. There is value in remaining aligned with common industry standards and technologies because it allows FEI to gain insight and knowledge on best practices that support the experience of customers and the effective and efficient operation of the system as well as meet the evolving expectations of customers." [p.27 (pdf p.41), underline added]

The Util-Assist Report states that "...gas AMI is not deployed in many jurisdictions [within North America]." [pdf p.179, underline added]

1.1 By proposing AMI rather than Advanced Meter Reading (AMR), does FEI risk getting ahead of its peer utilities?

Response:

Where FEI has referred to its peers in the above preamble and throughout the Application, FEI means all utility peers, including electric and water, many of which have adopted AMI technology. Therefore, FEI believes that adopting AMI technology would not put FEI ahead of its peer utilities, but rather would put FEI in line with those of its utility peers that have adopted AMI technology (in particular its utility peers in BC) and potentially ahead of others that have previously adopted AMR technology. More importantly, as described in Section 4.2.2.3 of the Application, adopting AMR technology would lock FEI into a commitment to a technology that is currently trending towards obsolescence and therefore would not resolve FEI's concerns of lagging behind peers.

2.0 Topic: Project Need

Reference: Exhibit B-1, Application, pp.18-19 (pdf pp.32-33)

FEI states:

> "In the context of this Application, and subject to Measurement Canada regulations, the complete replacement of the meter fleet for residential and most commercial customers to support Automation will mean that the meter testing and exchange process will not thereafter be required for residential and most commercial customers for several years." [p.18 (pdf p.32), underline added]

FEI also states:

> "As shown below, FEI's meter reading needs have been gradually increasing to the point where FEI now requires over 12,000,000 reads per year, averaging over 1,000,000 manual meter reads per month." [p.19 (pdf p.33), underline added]

2.1 Does FEI consider the several-year pause in the meter testing and exchange process to be a benefit of the Project?

Response:

If the Application is approved, FEI will be able to suspend the Measurement Canada mandated meter compliance sampling program that would otherwise be required under the Baseline case. As the suspension of the compliance sampling program results in a net reduction in activity levels over the life of the Project, it would be a benefit of the Project.

2.2 Will all the new meters have the same nominal expiry date?

Response:

Please refer to the response to BCUC IR1 4.2.

2.3 Upon the resumption of the meter testing and exchange process (i.e., after several years), will all the new meters require testing in the same year?

Response:

Please refer to the response to BCUC IR1 4.2.

2.4 More generally, will implementation of the AMI Project result in substantial year-to-year variations in the number of meters tested? If so, is this a problem?

Response:

Please refer to the response to BCUC IR1 4.2.

2.5 Why does FEI have the meters read monthly rather than, say, using a two-month billing cycle?

Response:

FEI assumes the question to be asking about a one-month meter reading schedule versus a two-month meter reading schedule. FEI believes there are advantages to a one-month meter reading schedule (with a monthly billing cycle) over a two-month meter reading schedule (with either a one or two-month billing cycle) which include:

- Reduced number of estimates, all else equal, resulting in greater accuracy of timely energy use information available to customers;
- The expectation that customers are better able to manage their household budgets with monthly bills, particularly during seasonal periods when energy bills can be a larger portion of total household expenses;
- Bills are a communication tool and more frequent billing cycles allow for more regular communication with customers; and
- If an estimate does occur with a monthly meter reading and billing cycle, there is likely less of a compounding impact on bill payment challenges that may arise once an actual read is obtained.

2.6 Would moving to a two-month billing cycle be a feasible and effective way to reduce meter reading costs, as an alternative to the AMI Project?

Response:

Moving to a two-month billing cycle (with corresponding two-month meter reading cycle) is not a feasible alternative to the AMI Project. More specifically, moving to a two-month billing cycle does not address any of the four drivers of the AMI Project as set out in Section 3 of the Application.

In addition, while there is uncertainty on the costs of future manual meter reading services, the current cost of manual meter reading is not a driver for the AMI Project in and of itself. If FEI were to move to a two-month billing cycle that required manual meter reading every two months, it is expected that the cost per read would increase and the overall cost decrease of a lower volume of reads may not be as significant as a result. Most importantly, moving to a two-month billing cycle would leave customers dependent on manual meter reading and its inherent cost and service risks.

With respect to service expectations, moving to a two-month billing cycle would be a reduction in the services already provided to customers. Customers would have less access than today to accurate and timely energy use information by having only six meter reads per year instead of twelve. In addition, customers would receive fewer bills per year, requiring them to reconsider their household budgeting to allow for timely payment of higher bills.

3.0 Topic: Project Need, Outsourced Meter Reading

Reference: Exhibit B-1, Application, 3.1.1.6 FEI Has Outsourced its Meter Reading Service, p.20 (pdf p.34)

FEI states:

> "FEI has outsourced its meter reading for the majority of FEI customers since 1988 and for all customers since 2006. FEI has used its current third-party service contractor, Olameter, since 2013.[13] The current contract term expires December 31, 2022; however, the contract includes the ability to extend services for four additional terms of one year each through to December 31, 2026."

3.1 Please explain how the AMI Project relates to the continuation and potential renewal of FEI's service contract with Olameter. Is the AMI Project being proposed in order to strengthen FEI's negotiating position with Olameter? Would FEI cancel or defer the AMI Project if FEI reached a satisfactory contractual agreement with Olameter? Please respond publicly to the extent possible; otherwise confidentially if necessary.

Response:

FEI is not currently in contract negotiations with Olameter; the Company's current contract with Olameter was signed in 2020 and is in effect until December 31, 2026.

The reasons for FEI's decision to seek approval for the AMI Project are not related to FEI's current manual meter reading services contract with Olameter. However, as described in Section 3 of the Application (particularly Sections 3.2 and 3.3), they are directly related to FEI's concern about the long-term, ongoing viability of manual meter reading services.

3.2 Is Olameter's workforce for the FEI meter reading service subject to a collective agreement? If so, what is the union. Is it the same as the union(s) representing FEI workers? Please explain how management/labour relations affect the AMI Project. Please respond publicly to the extent possible; otherwise confidentially if necessary.

Response:

FEI confirms that Olameter is the employer of the workforce responsible for providing FEI's manual meter reading services. These Olameter employees are not subject to a collective agreement. Please also refer to the response to CEC IR1 85.1.

4.0 Topic: Project Need

Reference: Exhibit B-1, Application, Table 3-3: Manual Meter Reading Performance Standards, page 21 (pdf p.35); Table 3-5: Olameter Estimated Meter Reads by Reason 2016-2020, page 23 (pdf p.37); Table 3-6: Total FBC Estimated Meter Reads 2014-2020, page 24 (pdf p.38); Table 3-8: Number of FBC Customer Complaints Received for Manual Meter Reading (2013-2020), page 26 (pdf p.40); FEI Annual Review for 2019 Rates, Exhibit B-2, p.145 (pdf p.154) at https://www.bcuc.com/Documents/Proceedings/2018/DOC_52169_B-2-FEI-Annual-Review-2019-Rates-Appl.pdf

FEI defines "meter reading window distribution" as:

> "The number of monthly meter reads obtained in each workday within the meter reading window. The performance level is to be obtained on the first two workdays in the meter reading window." [page 21 (pdf p.35)]

4.1 Please elaborate on the meaning of "meter reading window."

Response:

"Meter Reading Window" is defined in the agreement between FEI and Olameter as the scheduled meter reading day and the two days following. It is a concept that provides Olameter with some flexibility to achieve its performance obligations while still ensuring that meters are read in a consistent and timely manner.

4.2 Please specify the year for the data in Table 3-3.

Response:

The manual meter reading performance standards identified in Table 3-3 took effect January 1, 2020. They remain in effect until the end of the current contract term, which is December 31, 2026.

All of these standards, except for one, have been the same since January 1, 2013. The exception is the standard relating to Monthly Reading Window Distribution. As explained in footnote 16 of the Application, this standard has been updated twice: in 2016 the standard was expanded to a three-day window and in 2020 to 80 percent. Prior to 2020, the distribution percentage was 95 percent.

In the Annual Review for 2019 rates, FEI stated:

> "The Company started tracking gas Meter Reading Accuracy in 2013 when the Gas monthly meter reading function was moved to a new third party meter reading vendor." [Exhibit B-2, p.145 (pdf p.154)]

4.3 Please provide a table showing the yearly data for meter reading performance standards for 2013 to present. Please note factors such as COVID-19.

Response:

Please refer to the table below in which FEI has indicated whether Olameter met the relevant performance standard for each year for 2013 through September 30, 2021. Please note that 2013 performance reflected the stabilization of the new contract and provider, 2017 was impacted by weather and wildfire events, and performance in both 2020 and 2021 have been impacted by the COVID-19 pandemic.

Performance Standard	2013	2014	2015	2016	2017	2018	2019	2020	2021 YTD
Meter Reading Accuracy	Met	Met	Met	Met	Met	Met	Met	Met	Met
Meter Reading Completion	Did Not Meet	Met	Met	Met	Met	Met	Met	Did Not Meet	Did Not Meet
Monthly Reading Window Distribution	Did Not Meet	Met	Met	Met	Did Not Meet	Did Not Meet	Did Not Meet	Did Not Meet	Did Not Meet
Accuracy – Off-Cycle Reads	Met	Met	Met	Met	Met	Met	Met	Met	Met
Completion – Off-Cycle Reads	Met	Met	Met	Met	Did Not Meet	Did Not Meet	Met	Did Not Meet	Did Not Meet
Resolution – Customer Escalations	Met	Met	Met	Met	Met	Met	Met	Met	Met

FEI has also provided the annual percentage completion of meter reads from 2013 through to September 30, 2021 in the table below. Please note that these annual percentages represent the annual Meter Reading Accuracy Service Quality Indicator for FEI and as such reflect both monthly and off-cycle read completions as a percentage of total requested reads each year.

	2013	2014	2015	2016	2017	2018	2019	2020	2021 YTD
Meter Reading Accuracy SQI	92.5%	97.0%	97.5%	96.9%	96.2%	95.4%	95.2%	89.2%	89.3%

4.4 Table 3-6: Total FBC Estimated Meter Reads 2014-2020 shows that for FBC (electric) estimated meter reads as a percentage of total declined noticeably after the implementation of AMI in 2016. Please provide a table for FBC (electric) showing estimated meter reads by reason. If possible, please include the reasons indicated in Table 3-5: Olameter Estimated Meter Reads by Reason 2016-2020 as well as reasons associated with AMI difficulties or radio-off meter reads.

Response:

FEI is unable to provide the data as requested because FBC does not identify reason codes for estimated reads, largely because the volume of manual and estimated meter reads is relatively low. Anecdotally, similar reasons for estimates would apply to FBC as what is experienced for FEI with respect to access issues to property, seasonal conditions and animal presence at the manual meter reading site.

4.5 Please provide a version of Table 3-5: Olameter Estimated Meter Reads by Reason 2016-2020 showing the percentage of total for the bottom row (Total Estimated Meter Reads).

Response:

The information requested is already provided in Table 3-5.

There are two rows of data for each reason in the column titled, “Summary by Reason”. The first row provides the number of estimates by reason, and the second row shows that number as a percentage of the total number of estimated reads.

For example, for the year 2020, Olameter estimated 58,804 meter reads for the reason “Customer Prevented Access”. This number equates to 4.23 percent of 1,389,226 meter reads, which is the total number of estimated reads in 2020 captured in the bottom row of the table.

4.6 Please discuss the similarities and differences between FEI (natural gas) and FBC (electric) in terms of the factors that influence the impact of replacing manual meter reading with automated meter reading on performance in terms of the numbers and percentage of estimated meter reads. To what extent should it be expected that the FEI experience will be similar to the FBC experience?

Response:

FEI's manual meter reading process is described in Section 3.1.1.4 of the Application. The circumstances under which meter reads are estimated are further described in Section 3.1.2. Both the process and the reasons that meter reads are estimated apply regardless of whether the meter being read manually is a natural gas meter or an electric meter.

As further noted in Section 3.1.2 of the Application, "[…] FEI expects that its estimates would be in a similar range as FBC as a percentage of meter read requests, and fall within the range of one to two percent per year."

4.7 For each of the reasons for estimated meter reads shown in Table 3-5, please discuss the likely impact of introducing AMI on the number and percentage of estimated meter reads.

Response:

Where customers choose to have their meters turned to radio-off, FEI expects that the reasons for estimated meter reads following implementation of AMI will be the same as the reasons that meter reads are estimated now, which are set out in Table 3-5. However, the overall number of meter reads being estimated will drop to be in the range of one to two percent per year of total reads;[1] therefore, there will be fewer estimated meter reads for each of the reasons listed. FEI expects that overall, each of the reasons will maintain approximately the same ratio as a percentage of the total as they are currently.

In addition, after the introduction of AMI, meter reads will be estimated in some cases because a meter (that is not radio-off) is not communicating. However, FEI expects the rate at which this occurs to be low.

[1] Section 3.1.2, page 24, lines 10-11.

4.8 What does FEI expect will be the reasons for estimated meter reads following implementation of AMI (assuming AMI is approved)?

Response:

Please refer to the response to BCSEA IR1 4.7.

4.9 With reference to Table 3-8: Number of FBC Customer Complaints Received for Manual Meter Reading (2013-2020), please clarify if the numbers shown for 2015 to 2020 include complaints reading any aspect of meter reading, i.e., including manual meter reading, AMI meter reading, and radio-off AMI reading.

Response:

FEI confirms that the numbers shown in Table 3-8 for the years 2015 to 2020 include complaints related to all aspects of FBC meter reading.

5.0 Topic: Project Need, In-House Meter Reading

Reference: Exhibit B-1, Application, p.35 (pdf p.49); p.104 (pdf p.118)

FEI states:

> "In-house meter reading would be more costly than the current outsourced model but would bring with it certainty over levels of service and future expenses." [p.35 (pdf p.49), underline added]

FEI also states:

> "FEI has included in the Baseline scenario the future costs associated with bringing manual meter reading in-house. The capital required to bring meter reading in-house includes one-time technology set up costs, vehicle purchase, and mobile computing hardware that will be used by meter readers." [p.104 (pdf p.118)]

5.1 Why would in-house meter reading be more costly than the current outsourced model? Is it because of the one-time capital costs?

Response:

The cost advantage of an outsourced model for manual meter reading is largely attributable to economies of scale. The inherent fixed cost categories of providing the service, such as administration and capital costs, are largely the same whether the service is provided in-house or outsourced; however, an outsourced model has the advantage of recovering those fixed costs over multiple utility customers. As noted in the Application, this is one of the reasons that FEI believes that an outsourced model may not be sustainable over the longer term. That is, with fewer customers in the market for these services as the market continues its transition to automation, the recovery of costs from an outsourced provider will be left to a smaller base and thus rates to organizations such as FEI will be higher all else equal.

6.0 Topic: Project Need, Timing

Reference: Exhibit B-1, Application, p.42 (pdf p.56)

FEI summarizes four key drivers of the AMI Project and states, "Together, these drivers provide a compelling need for FEI to move towards Automation now." [p.42 (pdf p.56), underline added]

6.1 Why is the AMI Project needed now, as opposed to some years in the future?

Response:

The AMI Project is needed now to support all of the drivers described in Section 3. To summarize: automation is rapidly becoming the industry standard and as a result, is changing market conditions today; meter reading automation will alleviate the cost and service risks of manual meter reading that are present today; meter reading automation will provide operational opportunities that support the safety and resiliency of the gas distribution system; and automation will allow FEI to meet the expectations of customers about their energy information and the experience they are looking for today.

Continuing to read meters manually for an indeterminate period of time would delay automation, but would not remove the need for it. The longer that FEI waits to automate, the more vulnerable FEI and its customers are to having access to continuous meter reading at a competitive market price while also continuing to face service risks.

Further, as described in the response to BCUC IR1 22.3, there is uncertainty around the future of manual meter reading. FEI is uncertain of being able to continue outsourcing manual meter reading in the future. FEI is also uncertain of the future costs of outsourcing manual meter reading even if the option is available. In addition, the transition to an in-house model would take time and require FEI to make a significant, short-term investment in a manual meter reading solution that is trending toward obsolescence. This would in turn increase rate impacts while FEI implements a cost-effective automated solution. As such, FEI believes that this uncertainty should be addressed today to mitigate the cost risk to customers in the future.

Automation will also provide operational benefits that support the safety, resiliency and efficient operation of the gas distribution system and will better equip FEI to enable operational opportunities that automation brings to the benefit of customers. Continuing to delay the introduction of these benefits results in FEI being unable to provide transformational change in these areas. With reference to addressing resiliency in particular, as AMI is complementary as a demand side response to the supply side resilience provided by the TLSE Project, delaying the AMI Project will leave the system without these important demand side benefits for a longer period of time.

While uncertainty about the future market conditions for manual meter reading remains, it is certain and clear that the industry is moving towards automation. Given the benefits to FEI customers described in Section 4 of the Application, and in consideration of the minimal expected

1 rate impacts of automation, proceeding with the AMI Project now is prudent and in the public
2 interest.

3

7.0 Topic: Project Need, Reduction of Gas Loss

Reference: Exhibit B-1, Application, Table 3-9: Summary of Established and Emerging Meter Reading Automation Drivers in North America, p.28 (pdf p.42); Util-Assist Report, pdf p.177

FEI states that "reduced gas lost" is one of the established drivers of meter reading automation in North America. FEI also states that "Leak detection and pipeline monitoring" is one of the emerging drivers of meter reading automation in North America.

The Util-Assist Report states:

> "AMI offers several methods for reducing gas losses resulting from leaks or theft. AMI meters and/or sensors can detect tampering, leaks or pressure changes at endpoints or along the pipeline system, and offer data to help identify areas where gas is being lost or unaccounted for." [pdf p.177]

7.1 Roughly how much natural gas is lost as a percentage of throughput. By how much would that loss be reduced by AMI?

Response:

Unaccounted For Gas (UAF), also referred to as Lost and Unaccounted For Gas, refers to gas that is not specifically accounted for in the energy balance of receipts, deliveries, and operations use. UAF includes measurement variances and line loss of gas that is flowing in FEI's transmission and distribution systems. Sources of UAF include, but are not limited to, system leakage, lost gas (i.e., gas lost as a result of utility and third party activities, including gas theft), and aggregate measurement tolerances.

The table below summarizes the recorded annual UAF percentage for each of the latest available five years (2016 to 2020).

FEI - Mainland and Vancouver Island Service Area
2016-2020 Recorded Annual UAF Percentages

	2016	2017	2018	2019	2020
Recorded Annual UAF *(as a percentage of delivered quantity)*	**0.62%**	**0.67%**	**1.00%**	**0.38%**	**0.38%**

FEI's advanced meters will meet the same Measurement Canada accuracy specification as the existing diaphragm meters (+/-1 percent). Consequently, FEI cannot predict the advanced meter's impact on UAF.

During the advanced meter deployment, over 1.1 million meter sets will be tested for leaks. Any leaks found will be corrected before the meter set is returned to normal operation. Without the AMI Project, these leaks would not have been detected at all or as quickly; consequently, the AMI

Project will have a positive impact on UAF but again, the extent of these have not been quantified. Finally, please refer to the response to CEC IR1 18.6 for a discussion of the potential for AMI to reduce gas loss due to theft.

FEI has not included the value of any reduced gas losses due to AMI in the benefit-cost analysis of the Project. Although FEI cannot currently quantify how much of an impact AMI will have on UAF, when the AMI Project is implemented and FEI has gained experience with AMI technology FEI will determine any opportunities to reduce lost gas and any impacts on UAF will be captured in FEI's annually reported UAF percentage.

7.2 Please explain how AMI can be used to reduce gas losses.

Response:

Please refer to the response to BCSEA IR1 7.1.

7.3 To what extent does FEI anticipate implementing methods of reducing gas losses from leaks or theft, if the AMI Project is completed?

Response:

Please refer to the responses to BCSEA IR1 7.1 and BCUC IR1 13.6 to 13.8.

7.4 Has FEI included the value of reduced gas losses due to AMI in the benefit-cost analysis of the AMI Project? If so, please provide the references in the filed evidence.

Response:

Please refer to the response to BCSEA IR1 7.1.

8.0 Topic: Project Need, Conservation and DSM

Reference: Exhibit B-1, Application, Table 3-9: Summary of Established and Emerging Meter Reading Automation Drivers in North America, p.28 (pdf p.42); page 57 (pdf p.71); Appendix A, Util-Assist Report, pdf p.178

FEI lists "Conservation and demand side management enabler" as an emerging driver of meter reading automation in North America. [p.28 (pdf p.42)]

The Util-Assist Report states:

> "Gas AMI can enable a more efficient distribution system with reduced losses and conservation potential, and can offer expanding use cases and opportunities for the future. Regulatory bodies in both Canada and the United States have begun exploring and encouraging demand side management (DSM) initiatives for natural gas, including plans for demand response (DR) programs to reduce gas demand in peak periods. These initiatives align with both environmental and conservations goals, as well as with the pursuit of strategies or resources to accommodate growth while deferring or avoiding costly gas infrastructure investments. These strategies and resources are referred to as non-pipeline alternatives. In this context, gas AMI and the conservation programs it can enable are being explored as opportunities to meet growing gas demand in the short-term without necessitating new gas infrastructure that would be at risk of becoming stranded assets that will not be needed in the future, imposing substantial costs to gas utilities and their customers." [pdf p.178]

FEI states:

> "AMI would be used to further enhance programs within the DSM portfolio, potentially resulting in customer energy savings. Lack of energy use awareness can prevent customers from taking advantage of cost-effective measures or behavioural opportunities to save energy. AMI would help inform customers and FEI about energy usage and patterns. The availability of hourly consumption data to customers and FEI would open up new opportunities for DSM programs, including:
>
> - Near real-time consumption reports to enhance commercial and industrial energy assessments, home energy reports for residential customers, measurement and verification activities and DSM program evaluation;
> - Increased customer awareness of energy consumption on an end-use or time-of-day perspective may cause them to use less energy;
> - Providing customers with the ability to identify their estimated usage for the billing cycle in advance would enable proactive opportunities to reduce use;

- Providing FEI with data to better characterize customer segments in order to make even more informed decisions when planning for future DSM programs. For instance, this data would help better inform the Residential End Use Study, Commercial End Use Study and Conservation Potential Review; and
- Gas AMI devices may be used to gather real-time data when conducting pilots and demonstrations for new natural gas saving technologies rather than FEI being required to purchase separate data loggers for this purpose." [page 57 (pdf p.71), underline added]

8.1 What DSM opportunities does FEI anticipate with AMI? Does FEI expect to change the design of any of its DSM programs and offerings if it implements AMI?

Response:

The opportunities noted in the preamble are the DSM opportunities that FEI currently anticipates AMI will enable. Other opportunities may emerge as AMI data becomes available and/or as industry best practices evolve in this area.

FEI expects to amend the design of its DSM programs and offerings where AMI data can be leveraged to enhance the customer experience (i.e. where more granular data is beneficial to the customer's energy efficiency efforts) and/or where AMI can be used to improve research and evaluation data to improve program design (i.e. through the aforementioned customer segment research, program evaluations and pilot evaluations).

8.2 How much additional energy conservation does FEI anticipate might be achieved if AMI is implemented?

Response:

At this time FEI is not able to quantify how much additional energy conservation might be achieved if AMI is implemented. Please refer to the response to BCUC IR1 6.1 for further explanation.

8.3 Please describe FBC's experience with the effects of AMI on its DSM programs and offerings and customer conservation. Is this experience transferrable to FEI's case?

Response:

FBC routinely uses AMI data to support measurement and verification and evaluation of its commercial and industrial DSM programs. AMI has allowed FBC to observe meter-level changes (International Performance Measurement & Verification Protocol Option C – Whole Facility) from DSM interventions and evaluate interactive and rebound effects. FBC will be using AMI data to assess the effectiveness of a residential and commercial demand response pilot with over 100 participants by comparing the demand response event data with actual changes observed with AMI.

It is expected that the FBC DSM experience with AMI will be generally transferrable to FEI's DSM programs if FEI implements AMI.

9.0 Topic: Project Need, Avoided Pipeline Corrosion

Reference: Exhibit B-1, Application, Table 3-9: Summary of Established and Emerging Meter Reading Automation Drivers in North America, p.28 (pdf p.42); p.62 (pdf p.76); p.69 (pdf p.89); Appendix A, Util-Assist Report, pdf p.177

FEI lists "timely and efficient maintenance" as an established driver of meter reading automation in North America. [p.28 (pdf p.42)]

FEI states:

> "AMI would allow FEI to deploy cathodic protection sensors on its gas network for remote monitoring purposes. These remote monitoring sensors would provide near real-time visibility on the performance of the cathodic protection system that helps maintain the integrity of FEI's distribution system gaslines. If this cathodic protection system experiences a failure, this near real-time monitoring capability will allow FEI to quickly investigate the failure, resolve it and then reactivate the affected cathodic protection system, which is a critical component of maintaining FEI's overall system integrity management plan." [p.62 (pdf p.76), underline added]

FEI also states that "The Project will also include the installation of communication modules on infrastructure and pipeline assets enabling the remote collection of information on FEI's gas system integrity." [p.69 (pdf p.89]

The Util-Assist Report states:

> "AMI can be used to collect data from sensors as part of cathodic protection monitoring systems, which help identify pipelines at risk of corrosion. Readings from these sensors have traditionally been collected manually, and are typically only collected on a quarterly or even yearly basis. AMI allows readings to be collected with greater frequency or on demand, allowing utilities to perform more efficient and timely maintenance, with lower monitoring costs."

9.1 When FEI refers to the AMI Project allowing "the installation of communication modules on infrastructure and pipeline assets enabling the remote collection of information on FEI's gas system integrity" is this broader than cathodic monitoring sensors?

Response:

The reference to "the installation of communication modules on infrastructure and pipeline assets enabling the remote collection of information on FEI's gas system integrity" is broader than just cathodic monitoring sensors. As discussed in Section 4.3.2.4.7 of the Application, sensors would be installed on different assets on the distribution system to strategically monitor pipe pressures and temperatures as well as odourant tank levels. This information would contribute to increased

resiliency by providing near real-time field information to allow safe, reliable and efficient operations of the system and better inform asset management decisions.

9.2 Doesn't FEI already have cathodic protection monitoring systems in place? With the AMI Project, would FEI add additional cathodic monitoring sensors? Or would the AMI Project allow installation of better communications modules with existing remote cathodic monitoring sensors?

Response:

FEI already has cathodic protection monitoring systems in place. The proposed AMI technology would allow these sensors to be deployed at reduced capital and operating costs, thereby allowing more sensors to be installed without incremental costs.

9.3 Are there financial implications (costs or savings) of using the AMI system to enhance FEI's cathodic protection monitoring system and/or its gas system integrity monitoring more broadly? If so, please explain or provide a reference in the filed evidence.

Response:

FEI confirms that the cathodic protection costs and benefits are included in the financial analysis. The expected cathodic protection baseline costs are included in Appendix G2 Schedule 4. Cathodic protection costs under the AMI scenario are included in Appendix G1 as follows:

- Hardware and installation costs are embedded in non-meter capital Schedule 6 lines 1, 2, 3 and 5;
- Software costs are embedded in Schedule 5 line 1; and
- O&M costs are embedded in Schedule 12 under network O&M and Software O&M

10.0 Topic: Project Need

Reference: Exhibit B-1, Application, p.29 (pdf p.43); CGA Insights Matter Survey, pdf p.284

FEI states:

> "The results of the CGA Insights Matter Survey, provided in Appendix C, indicate that approximately 2,000,000 meters out of an estimated 7,000,000 total gas meters in Canada have already been migrated to some form of Automation. The remaining approximately 5,000,000 meters that are not automated are attributable to FEI and two other utilities – Enbridge and Manitoba Hydro – both of which are cited in the study to be currently investigating the installation of some form of Automation in the near future." [pdf p.43]

10.1 What is the source of the estimate of 7,000,000 total gas meters in Canada?

Response:

The source data was retrieved from the Canadian Gas Association website *Natural Gas Facts, How many homes businesses and other facilities use natural gas in Canada*.[2]

10.2 Please provide the table by Insights Matter on pdf p.286 modified to include FEI.

Response:

The requested modified table is provided below.

RESPONDENT	Total Gas Meters (REPORTED BY UTILITY)	MANUAL	AUTOMATIC METER READING (AMR)	ADVANCED METER INFRASTRUCTURE (AMI)	OTHER (SCADA)	% OF UTILTIY TOTAL GAS METERS USING AMI/AMR/ OTHER	% OF UTILITY TOTAL GAS METERS USING MANUAL	METHOD USED FOR COLLECTING MANUAL READS
ATCO	1,200,000	300	1,199,700	0	0	99.98	0.03	IN-HOUSE
CITY OF MH	90,000	0	0	90,000	0	100.00	0.00	N/A
MB HYDRO	310,100	310,000	0	0	100	0.03	99.97	SUBSIDARY(MHUS)
SASK	399,000	2,793	0	396,207	0	99.30	0.70	SUBSIDIARY (SASK POWER)
ENBRIDGE	3,700,000	3,570,000	130,000	0	0	3.51	96.49	VENDORS: UMS, MET, G-TEL
ENERGIR	229,464	675	228,789	0	0	99.71	0.29	IN-HOUSE

[2] https://www.cga.ca/natural-gas-statistics/natural-gas-facts/

RESPONDENT	Total Gas Meters (REPORTED BY UTILITY)	MANUAL	AUTOMATIC METER READING (AMR)	ADVANCED METER INFRASTRUCTURE (AMI)	OTHER (SCADA)	% OF UTILTIY TOTAL GAS METERS USING AMI/AMR/ OTHER	% OF UTILITY TOTAL GAS METERS USING MANUAL	METHOD USED FOR COLLECTING MANUAL READS
HERITAGE	8,000	0	8,000	0	0	100.00	0.00	N/A
AB FED	110,000	30,000	80,000	0	0	72.73	27.27	IN-HOUSE & CUSTOMER
PNG	41,200	40,000	1,200	0	0	2.91	97.09	IN-HOUSE
ALTA GAS	85,000	100	84,900	0	0	99.88	0.12	IN-HOUSE
FEI	1,079,523	1,075,123	4,500	0	0	0.42	99.59	VENDOR: OLAMETER
TOTAL	7,252,287	5,028,991	1,737,089	486,207	100			
% TOTAL METERS	**100.00**	**69.32**	**23.95**	**6.7**	**0.00**	**30.66**	**69.34**	

1

11.0 Topic: Project Need

Reference: Exhibit B-1, Application, Cover letter, pdf p.1; page 36 (pdf p.50); Figure 3-5: FBC Energy Use Information Available to Customers Today, page 39 (pdf p.53)

In the Application cover letter, FEI says "The [FEI] AMI system will also allow customers to access their hourly consumption information through a secure and private online customer information portal." [Application, pdf p.1]

In section 3.4 FEI says:

> "[Automation] also provides the opportunity to meet current and evolving expectations around details of customers' energy use. Customer feedback has indicated the importance of detailed consumption information is high on the list of customer priorities for their bill from FEI and FBC (FortisBC)." [page 36 (pdf p.50)]

11.1 Please describe the information on their natural gas usage that FEI customers would be able to access on their online customer information portal, with implementation of the proposed FEI AMI Project. Please include a description of the time lag factors.

Response:

FEI anticipates that customers will be able to access hourly consumption data; however, finalization of the details to be included in the customer information portal will take place during the Define phase of the Project implementation (as described in Section 5.5.1.2 of the Application).

11.2 How will the FEI customer's energy use information compare with the information available to FBC customers as shown in Figure 3-5: FBC Energy Use Information Available to Customers Today?

Response:

Finalization of the details to be included in the customer information portal will take place during the Define phase of the Project implementation. In the finalization of these details, and as set out in Section 4.3.2.2, FEI expects that the information available to customers from AMI will result in several benefits and opportunities for customers, including near real-time consumption reports, improved awareness on an end-use or time of day perspective and identification of estimated usage of the billing cycle in advance.

As details still need to be determined, FEI is not able to provide at this time a detailed comparison of the information available to FBC electric customers to what will be available to gas customers. However, as set out above, FEI is confident that information comparable to what is provided to FBC customers will be available to gas customers as a result of AMI.

12.0 Topic: Project Need

Reference: Exhibit B-1, Application, page 26; Appendix A, Util-Assist Report, p.13 (pdf p.172)

With a footnote to Util-Assist Report, Appendix A, p. 13 (pdf p.172), FEI states:

> "Over the last 20 years, the advanced metering technology available to utilities has continued to advance while the cost of the technology has declined." [page 26 (pdf p.40)]

12.1 Please clarify where the Util-Assist Report addresses a decline in the cost of advanced metering technology over time.

Response:

The Util-Assist Report (Appendix A to the Application) states the following in Section 2.2.2 at page 13: "…gas hardware costs have begun to drop in recent years".

13.0 Topic: Project Alternatives, AMI v. AMR

Reference: Exhibit B-1, Application, p.44 (pdf p.58); p.4 (pdf p.18)

FEI concludes that "the preferred alternative is AMI because it is the only alternative that would fully support all the drivers of the Project need to automate the meter reading process." [p.44 (pdf p.58)]

FEI states:

> "To address the Project need for Automation as described in Section 3, FEI compared the two Automation technologies available in the gas metering industry. Those are:
>
> - Partial Automation of meter reading using AMR technology to enable drive-by meter reading; and
> - Full Automation of meter reading using AMI technology characterized by a fixed two-way communication network.
>
> A comparison of these alternatives determined that while AMR could partially satisfy some of the drivers of the Project need, only by implementing AMI would customers and the Company realize the full value of Automation. Based on the financial analysis undertaken as described further in Section 4.4, the many additional benefits offered by AMI could be achieved with a delivery rate impact that is estimated to be less than half a percent higher than AMR." [p.4 (pdf p.18)]

13.1 Please explain why AMI would have only a slighter higher delivery rate impact than AMR, given the additional functionality of AMI over AMR and the higher cost of AMI over AMR.

Response:

The statement referenced in the preamble which says the delivery rate impact of AMI is estimated to be less than half a percent higher than AMR is referring to the difference between the levelized delivery rate impact (Table 4-5 of the Application) of 0.125 percent for AMI and -0.286 percent for AMR (i.e. 0.125 percent – (-0.286 percent) = 0.411 percent)).

This is driven by the fact that the incremental capital cost of AMI in present value is approximately 50 percent[3] higher than AMR, and the incremental O&M of AMI in present value is approximately 15 percent[4] higher than AMR.

[3] Table 4-5, ($186.1 - $123.8) / $123.8 = 0.50.
[4] Table 4-5, ($158.8 - $134.5) / $158.8 = 0.15.

The increased functionality of the AMI solution enables O&M savings in other areas besides just meter reading. The AMR solution results in O&M savings only in meter reading and the AMI solution provides O&M savings in meter reading as well as operations and customer service activities.

The table below summarizes the rate impact for FEI's customers between AMR and AMI. FEI notes the absolute difference is small at less than half a percent and is less than $2 per year for a residential customer. Given the additional functionality of AMI over AMR for this level of increase in delivery rate, the AMI alternative is the better long-term solution for FEI's customers.

	AMR	AMI	Difference (AMI – AMR)
Levelized Delivery Rate Impact (%)	-0.286%	0.125%	0.411%
Effective Delivery Rate Increase ($/GJ)	-$0.014/GJ	$0.006/GJ	$0.02/GJ
Equivalent Annual Bill Impact to Average Residential Customer (90 GJ/yr)	-$1.26	$0.54	$1.80

14.0 Topic: Project Alternatives

Reference: Exhibit B-1, Application, page 56 (pdf p.70)

"AMI would allow for remote reading of advanced meters, which provides several benefits including: ... Enabling FEI to address customer billing inquiries in a timely manner using on demand meter reading..." [page 56 (pdf p.70), underline added]

14.1 Does "on demand meter reading" mean that a customer service representative would be able to cause a customer's Sonix IQ gas meter to take and send (over the network) an up-to-the-minute meter read that could be used, for example, in the representative's discussion with the customer? Or would the customer service representative be accessing the same information that would be available to the customer in the customer's online information portal?

Response:

Finalization of the details of the functionality available to FEI's Customer Service Representatives (CSRs) will take place during the Define phase of Project implementation (as described in Section 5.5.1.2 of the Application). FEI expects CSRs will have access to the latest automated reads (maximum of 4 to 6 hours old). While up-to-the-minute meter reads are a capability of the Sensus FlexNet system, FEI has not yet determined if this functionality will be enabled for CSR access.

"AMI would allow for remote reading of advanced meters, which provides several benefits including: ... Allowing for remotely managing and monitoring service disconnections and reconnections..." [page 56 (pdf p.70), underline added]

14.2 Would remote disconnections and reconnections be the norm for meters that have network capability?

Response:

FEI expects remote disconnections will be the norm for meters that have network capability.

Please refer to the response to BCUC Confidential IR1 1.13 for a discussion regarding the potential for remote reconnection.

"AMI would allow for remote reading of advanced meters, which provides several benefits including: ... Allowing for remotely managing vacant premises and service interruptions." [page 56 (pdf p.70), underline added].

14.3 Does "service interruptions" here mean intentional temporary suspensions of service (e.g., customer away from home for several months), or inadvertent disruption of service (e.g., pipeline shut-down for repair)?

Response:

The ability of AMI to allow for advanced meters to be read remotely affords FEI the opportunity to remotely manage any type of service interruption, regardless of whether that service interruption is intentional or inadvertent. Examples of service interruptions that FEI and the customer would benefit from managing remotely might include meter reads related to move-ins and/or move-outs, as well as meter reads related to evacuations due to weather (or other natural emergencies such as floods or forest fires).

"Finally, AMI would provide environmental benefits by reducing vehicle usage. Overall, vehicle usage would decrease by approximately 90 percent as meter readers driving to collect regular meter reads and off-cycle reads would be replaced with the collection of meter reads through a fixed network. This reduction in vehicle usage is estimated to create a net reduction in GHG emissions by 1,100 tC_O2e." [page 57 (pdf p.71), underline added]

14.4 Please confirm that "1,100 tCO_2e" here is per year.

Response:

Confirmed.

14.5 Please confirm that the approximately 90 percent decrease in vehicle usage takes into account the manual meter reads that "would still need be collected manually to accommodate customers that choose to have their advanced meter read manually (estimated to be 2 percent) or for those meters that are located in areas where it is not economically feasible to install a fixed network (estimated to be 1.5 percent)." [page 56 (pdf p.70)]

Response:

Confirmed.

15.0 Topic: Project Alternatives

Reference: Exhibit B-1, Application, 4.3.2.2, Automation Is Becoming the Industry Standard, Thereby Changing Both Market Conditions and Customer Expectations, page 57 (pdf p.71)

FEI states:

> "The availability of hourly consumption data to customers and FEI would open up new opportunities for DSM programs, including: ... Near real-time consumption reports to enhance commercial and industrial energy assessments, home energy reports for residential customers, measurement and verification activities and DSM program evaluation..." [page 57 (pdf p.71), underline added]

15.1 What would be the time lag (or range of time lags) between meter readings and the information appearing on a customer's online account page? In other words, how timely will the customer consumption data be when the customer accesses the online information?

Response:

Finalization of the details to be included in the customer information portal, including the time lag (or range of time lags) between meter readings, will not take place until the Define phase of the Project implementation (as described in Section 5.5.1.2 of the Application). However, FEI expects meter reading information will appear on a customer's online page by the following day.

FEI states:

> "The availability of hourly consumption data to customers and FEI would open up new opportunities for DSM programs, including: ... Increased customer awareness of energy consumption on an end-use or time-of-day perspective may cause them to use less energy..." [page 57 (pdf p.71), underline added]

15.2 Does FEI have information from FBC's AMI system, or other utilities that have implemented AMI systems, that would support, or ideally quantify, the relationship between AMI and reduced energy use?

Response:

As discussed in the response to BCUC IR1 6.1, FEI has found no direct evidence from other utilities that AMI generates energy savings impacts in its own right. However, FEI has found that in other utilities AMI has been used to enable and support DSM programs across commercial, industrial, and residential sectors. AMI has been used at other utilities to enhance standard DSM

programs such as home energy reports, energy audits, and retro-commissioning and building-optimization type programs.

FEI states:

> "The availability of hourly consumption data to customers and FEI would open up new opportunities for DSM programs, including: ... Providing customers with the ability to identify their estimated usage for the billing cycle in advance would enable proactive opportunities to reduce use ..." [page 57 (pdf p.71), underline added]

15.3 Please explain how AMI would provide customers with the ability to identify their estimated usage for the billing cycle in advance. Would this be a software function that would provide in effect a customer-specific load forecast for the next billing period?

Response:

The data provided by AMI will allow customers to access hourly consumption data and as a result, customers will be in a much better position to accurately estimate their natural gas usage in advance of receiving their bill. Customers who take advantage of the opportunity to examine their usage as it is taking place may be able to take steps to reduce their usage during the billing cycle.

Predictive analytics available to customers based on their consumption data, such as that suggested in the question, is an example of one potential future opportunity that the AMI platform could enable with respect to additional benefits and experience enhancements for customers.

FEI states:

> "The availability of hourly consumption data to customers and FEI would open up new opportunities for DSM programs, including: ... Providing FEI with data to better characterize customer segments in order to make even more informed decisions when planning for future DSM programs. For instance, this data would help better inform the Residential End Use Study, Commercial End Use Study and Conservation Potential Review ..." [page 57 (pdf p.71), underline added]

15.4 Does FBC anticipate being able to link specific customers' responses to the REUS and CEUS surveys to the customer's own consumption data. Please confirm that FEI would not obtain this information without the customer's consent.

Response:

No, FBC does not anticipate being able to link specific customers' responses to the REUS and CEUS surveys. Data collected from REUS and CEUS studies are anonymized and not linked to specific customer account data. Should FBC or FEI amend its approach to REUS and CEUS in the future by comparing responses with customer consumption data, FBC and FEI will obtain customer consent.

FEI states:

> "The availability of hourly consumption data to customers and FEI would open up new opportunities for DSM programs, including: ... Gas AMI devices may be used to gather real-time data when conducting pilots and demonstrations for new natural gas saving technologies rather than FEI being required to purchase separate data loggers for this purpose..." [page 57 (pdf p.71), underline added]

15.5 Can FEI provide examples from FBC or other utilities that have AMI systems of the AMI devices being used to gather real-time data when conducting pilots and demonstrations?

Response:

FBC used AMI data to assess the effectiveness of cold-climate heat pumps in a pilot run jointly with BC Hydro, the BC Ministry of Energy, Mines, and Low Carbon Innovation, and Natural Resources Canada. FBC will be using AMI data to assess the effectiveness of its residential and commercial demand response pilot. FBC is anticipating using AMI to assess the effectiveness of several conservation voltage reduction (CVR) pilot projects completing in 2022.

FEI states:

> "In addition, AMI will provide better information for use by FEI in its COS Analyses for the purposes of rate design. [page 58 (pdf p.72), underline added]

15.6 Please explain how information from AMI would be used in COS Analyses for the purposes of rate design.

Response:

Both Cost of Service Analysis (COSA) and rate design are dependent on the collection and analysis of customer usage data. Improved granularity and accuracy of the data that informs these activities lead to more accurate cost allocation results and the ability to develop rates that, without such data, would not be possible.

AMI is intended to provide a real-time communications link between customers and FEI that will eliminate the sampling error associated with basing COSA inputs on information estimated without full population data, and provide more insight into customer usage patterns.

AMI would also allow FEI to explore more advanced rate designs based on actual utilization information and better customer segmentation. The effectiveness of such rate designs may be dependent on the ability to model future anticipated consumption characteristics for various groups of customers and to send timely price signals to customers.

16.0 Topic: Project Alternatives

Reference: Exhibit B-1, Application, page 58 (pdf p.72)

"AMI would allow FEI to eliminate the risk associated with procuring diaphragm meters at a reasonable price. Furthermore, as the meter manufacturers continue to transition to ultrasonic meters, FEI would not be exposed to the risk of a shrinking meter supply over the long-term." [page 58 (pdf p.72)]

16.1 Would this factor also apply to Advanced Meter Reading (AMR) technology?

Response:

AMR devices are physically attached to diaphragm meters. As such, an AMR solution would not eliminate the risk of a shrinking diaphragm meter supply.

16.2 Please confirm that AMR meters are not "diaphragm meters."

Response:

As discussed in the response to BCSEA IR1 16.1, the reference in the above preamble to AMR meters are modules attached to existing diaphragm meters.

17.0 Topic: Project Alternatives

Reference: Exhibit B-1, Application, 4.3.2.4.1 AMI Would Enhance FEI's System Resiliency, pp.59-69 (pdf p.73-74)

FEI says AMI would complement the proposed Tilbury LNG Storage Expansion Project in terms of enhancing FEI's system resilience.

17.1 Please confirm that "pressure collapse" means the same as "hydraulic collapse." If not, please explain the difference.

Response:

Confirmed. "Pressure collapse" means the same as "hydraulic collapse".

17.2 Please explain how AMI would prevent or reduce the risk of pressure collapse. In the event of a gas supply shortage, could FEI remotely shut off service at certain customer meters as an alternative to shutting off the flow upstream?

Response:

AMI will provide FEI with a technology platform that will allow the economic installation of additional midpoint pressure and flow sensors, and tail-end pressure sensors. With this technology, FEI will be able to monitor, in near-real time, the performance of all stations throughout FEI's system. To support monitoring and forecasting the total system demand, AMI will provide FEI with the ability to monitor, in near real-time, all customer consumption. This means all meters[5], no matter the size, will be connected to the AMI network. As customer consumption information is collected throughout each hour, FEI will aggregate the total system demand and will be able to determine the granular demand in specific parts of the system. This near-real time aggregated total demand on the system of interest, and supply performance, will be used by FEI to determine which parts of FEI's system are vulnerable to a pressure collapse.

With this knowledge, AMI will also provide FEI with the ability to conduct targeted remote disconnects to residential and small commercial customers, in order to decrease the possibility of a pressure collapse. With an accurate understanding of current and forecasted demand on the system, FEI can be precise in the number of meters that would need to be disconnected so the number of customers impacted would be minimized. Large commercial and industrial customer meters will not be equipped with remote shutoff valves, and so FEI will continue to rely on slower, manual processes to curtail these customers.

[5] Except for a small number of non-communicating meters as explained in the AMI CPCN Application.

If required, by allowing FEI to strategically disconnect customers in a timely manner, AMI will also decrease the possibility of a pressure collapse and allow for critical customers to remain connected. However, AMI alone will not stop a pressure collapse from occurring in all scenarios and is best used as a complementary resiliency solution with TLSE.

17.3 In the event of a gas supply shortage requiring FEI to use the AMI capability to remotely shut off customer meters, would FEI be able to remotely restart the customer meters using the AMI capability? Or, would manual restarting be required?

Response:

Please refer to the responses to BCUC Confidential IR1 1.11 and 1.13.

If FEI enables remote reconnects and expands its application to include post recovery from emergencies, FEI expects customers may elect to be remotely reconnected. However, FEI expects many other customers may not be comfortable relighting their own appliances; consequently, during a large gas supply emergency, customers would likely have to wait for a field technician to attend to the customer's premises and relight the appliance(s).

18.0 Topic: Project Alternatives

Reference: Exhibit B-1, Application, page 60 (pdf p.74); page 61 (pdf p.75)

FEI states:

> "The AMI alternative would also support FEI's response to other major emergencies such as earthquakes, wild fires, flooding, system damage and other hazardous operating conditions. In each situation, the AMI alternative would enable detection of any customer with gas service that is directly impacted by the emergency and support a timely response for customer safety including a temporary disruption of service if necessary through either remote shutoff by FEI or automatic shutoff due to high gas flow detected by the advanced meter." [page 60 (pdf p.74), underline added]

FEI also states:

> "The remote shut-off capabilities of AMI would provide FEI with the ability to enhance safety for customers, the public and employees when responding to emergencies such as gas leaks or structure fires. Advanced meters can detect large leaks downstream of the meter and be programmed to automatically shut off the internal valve, eliminating any potential for the development of a hazardous situation. The advanced meter would provide an alarm to FEI indicating the meter's internal valve has closed because of a high flow rate. Customers could be notified about the alert and may be able to safely remain in their homes while they wait for FEI to investigate the alert." [page 61 (pdf p.75)]

18.1 Please describe the remote and automatic shut-off capabilities of the AMI system that FEI proposes to implement. Does the automatic shut-off capability include a range of sensitivities? Does FEI intend to implement these features? Please clarify if these features require additional spending.

Response:

The advanced meter can be shut off automatically at the meter for preprogrammed conditions, and can remotely shut off the flow of gas by the utility sending the meter a shut off command.

AMI's remote shut off capability will allow FEI to close an advanced meter's internal valve via the AMI network. As explained in Section 4.3 of the Application, FEI expects to implement this functionality into the following processes:

- Vacant premise management;
- Non-payment disconnects;
- Emergency disconnects in support of system damage, natural disasters, structural fires, gas leaks downstream of the meter and gas supply interruptions; and

- Gas theft.

The advanced meter also has the ability to automatically close its internal valve in a number of situations, including:

- Excessive gas flow;
- Air in Meter;
- Reverse Flow;
- High Temperature;
- Low Pressure; and
- High Pressure.

The advanced meter's automatic shut off feature relies exclusively on the meter's firmware and does not involve a manual action. When a certain threshold (as described in the above) is detected by the meter, the meter's firmware will automatically stop the flow of gas by closing the meter's internal valve. FEI expects to implement the automatic shutoff feature for excessive gas flow. Please refer to the responses to BCUC IR1 2.1 and 2.4 for more information on FEI's approach to this application.

During the Define phase of Project implementation (as described in Section 5.5.1.2 of the Application), FEI will consider the additional automatic shut off options and determine their suitability for implementation. No additional Project costs will be incurred to enable the remote and automatic shutoff functionality.

The advanced meter also has the capability to turn the flow of gas back on following a shut off. Turning the gas back on can be done locally or remotely. Please refer to the responses to BCUC Confidential IR1 1.11 and 1.13 for more information on FEI's remote reconnect approach.

19.0 Topic: Project Description

Reference: Exhibit B-1, Application, page 77 (pdf p.91)

FEI says that "Sensus SonixIQ™ advanced meters: customer meters that comprise the majority of the Project End Points."

19.1 Please provide a description of the Sensus SonixIQ™ advanced meters and how they work. How does the shut-off and turn-on valve work?

Response:

Sensus provides the following response:

Sonix IQ is a residential and small commercial ultrasonic gas meter that uses high frequency sound waves to measure the flowrate of gas moving through the meter. It combines the sustained accuracy of ultrasonic technology with integrated two-way FlexNet network communications and remote capabilities to give better insight into and control over gas distribution systems.

It is the first commercially-available residential ultrasonic meter to meet rigorous North American standards – the result of Sensus' 25 years of ultrasonic meter design and production experience. It has no moving measurement parts to wear out over time, delivering high levels of accuracy over the life of the meter. It includes advanced features, including optional pressure monitoring, meter health diagnostics and remote shut-off. This feature set is contained within a smaller, lighter meter that is half the size and weight of a mechanical meter plus radio.

The remote shut-off and turn-on valve is built into the meter and would be controlled by FEI locally or remotely using secured commands over the FlexNet network.

20.0 Topic: Project Description, In-Home Device

Reference: Exhibit B-1, Application; FBC AMI CPCN Application, Exhibit B-1, page 43 (pdf p.52) at https://www.bcuc.com/Documents/Proceedings/2012/DOC_31286_B-1_FortisBC-Advanced-Metering-Infrastructure-CPCN-Application.pdf

The FEI AMI application does not mention "home-area network" or the Internet of Things (IoT). However, in the 2012 FBC (electric) application for approval of an AMI system the Company noted that AMI is capable of supporting an in-home display through a home-area network.

FBC said at page 43 (pdf p.52) of the FBC AMI application:

> "One of the benefits of an AMI solution is the capability to allow customers to take a more active role in monitoring, controlling and moderating personal electric use. Customers can easily view the amount and timing of their electric use through the HAN and/or customer information portal. One of the requirements of the procurement process was that vendors be able to meet emerging industry standards for IHDs using the Zigbee[8] communications protocol. Initially the meters will use Zigbee Smart Profile v1.1, which is supported by a wide variety of commercially available IHDs."

20.1 Please confirm, or otherwise explain, that FBC's request for proposals did require capability for in-home connectivity whereas the FEI request for proposals did not.

Response:

Confirmed. FBC's RFP required in-home display (IHD) connectivity whereas FEI's RFP did not. FEI did not include this requirement due to the potential impact on battery life of the advanced meter, which is an important consideration for gas meters but not for electric meters.

20.2 Do the Sonix IQ gas meters that FEI proposes to use support connectivity with an in-home device?

Response:

No, the Sonix IQ gas meters FEI proposes to use as part of the FEI AMI Project will not support connectivity with an IHD.

20.3 Is FBC currently utilizing the capability of the FBC AMI system to support an in-home display through a home-area network?

Response:

FBC is currently using the home-area network capability in its advanced meters to facilitate customers using IHDs.

21.0 Topic: Project Description, Radio-Off Program

Reference: Exhibit B-1, Application, p.30 (pdf p.44); p.95 (pdf p.109); Decision and Order C-7-13 at https://www.bcuc.com/Documents/Proceedings/2013/DOC_35184_C-7-13_FBC-AMI-ProjectDecision-WEB.pdf

In its 2013 Decision and Order C-7-13 approving FBC (electric)'s AMI Project the BCUC directed FBC to apply for approval of an opt-out program based on the following principles:

- "Customers may choose to opt-out of accepting a wireless transmitting meter.
- Customers who choose to opt-out will be provided with an AMI meter that has the wireless transmit functions disabled. Transmit functions on these meters will remain disabled until the individual chooses to opt back in to the AMI program; in the event that the customer moves to a new property, the opt-out choice will move with the customer.
- The incremental cost of opting-out of the AMI program will be borne by the individual choosing to opt-out." [p.148 (pdf p.156)]

FEI says that if the FEI AMI Project is approved it would apply to the BCUC for amendments to FEI's General Terms and Conditions and Rate Schedules, including regarding a Radio-off AMI Meter Option and the process and fees for a customer to opt out of the AMI Solution. [p.95 (pdf p.109)]

FEI says it "expects to file an application for the necessary tariff changes at least six months prior to the Project's first regional deployment." [p.95 (pdf p.109)]

21.1 Please confirm, or otherwise explain, that the Sonix IQ gas meter that FEI proposes to use is capable of being operated in a radio-off mode.

Response:

Confirmed, the Sonix IQ gas meters proposed in the FEI AMI Project are capable of having their radio turned off.

21.2 Please discuss whether a Radio-Off program would interfere with the desired benefits of the FEI AMI Project.

Response:

Customers who elect to enroll in a Radio-Off program will not fully realize the desired benefits of the AMI Project and the capabilities provided by the AMI meter. In addition, FEI and customers

who elect Radio-Off would lose the capability and associated benefits of remote meter reading, remote shut off, and remote turn on, to the extent that option becomes available in future.

However, given that both BC Hydro and FBC offer a Radio-Off Program for customers, FEI has anticipated and forecast that some customers may choose a Radio-Off option. Based on the experience of BC Hydro and FBC, FEI anticipates there will be a similarly small number of customers who may choose the Radio-Off program. It is FBC's experience, as noted in the response to CEC IR1 67.1, that 1.45 percent of FBC's customers have chosen the Radio-Off option as of September 2021. For customers who elect to enroll in the Radio-Off program, FEI will require additional resources and exception management practices for these customers, such as manual meter reading and dispatching of service personnel for manual shut off and turn on. FEI has projected that it may experience a similarly small percentage of customers who elect the Radio-Off program and expects that the impact to realization of desired benefits from the FEI AMI Project would be minimal in comparison to the overall benefits for all customers.

21.3 If the BCUC issues a CPCN for the FEI AMI Project would FEI object to a condition requiring FEI to apply to the BCUC for approval of a Radio-Off Program and the associated fees?

21.3.1 In FEI's view, should such a direction also address the basis for setting the customer fee for opting out?

Response:

Given FEI has already confirmed its intent to implement a Radio-Off Program, FEI would not object to a condition in the decision requiring FEI to do so. Further, FEI views the three principles of an opt-out program as set out the BCUC's Order C-7-13 regarding FBC's AMI Project, including the third principle which sets out the basis for setting the customer fee for opting out, as reasonable given that FBC has not experienced any issues in managing its opt-out program under these principles.

21.4 Recognizing that the BCUC is not legally bound to follow previous decisions, what is FEI's view regarding the three principles of an opt-out program set out by the Panel in Decision and Order C-7-13 regarding FBC's AMI Project.

Response:

Please refer to the response to BCSEA IR1 21.3.

22.0 Topic: Project Costs

Reference: Exhibit B-1, Application, p.97 (pdf p.111), p.100 (pdf p.114)

FEI states:

> "Post-deployment – the time period from 2027 to 2046. This is the time period over which the new AMI meters are expected to be in service, based on the estimated useful life of the new AMI meters of 20 years. The majority of the financial benefits of the Project, consisting primarily of reduced meter reading costs, will be realized over this phase." [p.97 (pdf p.111), underline added]

FEI also states:

> "The meter capital cost is the largest portion of Project capital costs. The AMI Solution meter capital cost is estimated at $536.3 million[70] which is $377.3 million[71] higher than what is estimated to be spent in the Baseline estimate of $159.1 million[72]. This incremental cost is offset by an estimated $344.4 million[73] in meter capital savings in the Post-deployment period driven by the decreased volume of meter exchanges." [p.100 (pdf p.114), underline added]

22.1 Does FEI acknowledge that while the new AMI meters will not likely need replacement over the first 20 years there will be relatively large tranche of AMI meters requiring replacement after 20 years?

22.1.1 If so, does limiting the Post-deployment analysis period to the estimated useful life of the AMI meters (20 years) skew the benefit-cost results by including the cost-savings years and excluding the extra-costs years? How FEI's financial analysis take into account the extra cost of a large tranche of meter exchanges after 20 years? Is the impact effectively erased by the Discount Rate [p.111 (pdf p.125)]?

22.1.2 If not, please explain why not.

Response:

Yes, there will be a relatively large tranche of AMI meters requiring replacement after 20 years but limiting the post-deployment analysis period to 20 years does not skew the benefit-cost results. Please refer to the response to BCUC IR1 32.1 that discusses the reasons for including only one cycle of meter replacement in the financial analysis.

23.0 Topic: Project Costs

Reference: Exhibit B-1, Application, p.97 (pdf p.111

FEI states:

> "Only the costs in the Pre-deployment and Deployment phases are classified as the cost of the Project. The costs and savings in the Post-deployment phase are provided to evaluate the financial impact of the Project over the financial analysis period." [p.97 (pdf p.111)]

23.1 Do the "costs of the [AMI] Project" exclude the Post-deployment AMI costs because the applied-for CPCN excludes the Post-deployment AMI costs?

Response:

FEI is seeking approval of the Project as being in the public interest and not specifically looking for approval of cost. The analysis in the Application includes both the forecast cost through deployment of the Project and the forecast costs post deployment. For purposes of providing a cost estimate for the Project, FEI has identified the costs through deployment ending in year 2026 as the cost of the Project.

23.2 Please provide a rate impact estimate over the 26-year period including the costs and benefits during the Post-deployment phase.

Response:

The 0.125 percent is the incremental levelized delivery rate impact of the Project over the 26-year analysis period including the costs and benefits during the Post-deployment phase. The annual rate impacts for the 26-year analysis period are provided in Confidential Appendix G-5, Schedule 10, Line 28.

24.0 Topic: Project Costs

Reference: Exhibit B-1, Application, p.97 (pdf p.111), p.117 (pdf p.131)

FEI states:

> "As shown in Table 6-1, the AMI Solution capital cost is estimated at $638.4 million59 compared to the Baseline capital cost of $162.4 million[60] with the incremental capital cost of the Project estimated as $476.0 million61. Additionally, there is an estimated incremental O&M reduction over the Pre-deployment and Deployment phases of $4.7 million[62].
>
> During the Post-deployment phase, FEI estimates reduced capital spending of $355.0 million[63]. FEI also estimates Post-deployment incremental O&M savings of $318.6 million[64].
>
> When considering the entire life cycle of the Project, there is an estimated reduction in costs of $197.6 million[65]." [p.97 (pdf p.111), underline added]

FEI also states:

> "The estimated incremental delivery rate impact expected over the 26-year analysis period for the AMI Project is 0.125 percent when compared to 2021 rates. In 2027, the year after full AMI deployment, the cumulative delivery rate impact would be at its highest level of 4.79 percent, resulting in a cumulative annual average bill increase of $21 dollars for a residential customer consuming 90 GJs per year. Each year thereafter, the cumulative delivery rate impact would decrease resulting in an overall average of 0.125 percent per year over the 26-year analysis period. The year 2033, the year after the proposed "Existing Meters Cost Recovery" deferral account has been fully amortized, will be the first year the incremental delivery rate impact will be a decrease." [p.117 (pdf p.131), underline added]

24.1 What is the total cumulative average bill increase for a residential customer consuming 90 GJs per year?

Response:

The incremental levelized delivery rate increase of 0.125 percent over the 26-year analysis period would result in an average annual bill increase of $0.56 for a residential customer consuming 90 GJs per year, or cumulatively approximately $14.56 over the 26-year period.

24.2 Please confirm, or otherwise explain, that "the overall average of 0.125 percent per year over the 26-year analysis period" takes into account that after the year 2033 the incremental delivery rate impact will be a decrease.

Response:

Confirmed.

25.0 Topic: Project Costs

Reference: Exhibit B-1, Application, p.107 (pdf p.121)

FEI states:

> "Based on FBC's experience with electric AMI meters, FEI has included the conservative assumption that 1.5 percent of the AMI meters will have network connectivity issues and will require a manual read." [p.107 (pdf p.121)]

25.1 Does "1.5 percent of the AMI meters will have network connectivity issues" include Radio-off meter reads? If not, would including Radio-off meter reads make a material difference financially?

Response:

The 1.5 percent of AMI meters that are conservatively estimated to have network connectivity issues do not include radio-off meter reads.

FEI is proposing to recover the cost of collecting radio-off meter reads from those customers who request that service and are therefore designed to be self-funded; as such, the costs associated with collecting radio-off reads have no material impact on the AMI financial analysis.

Please also refer Section 5.8.5 in the AMI Application for further details.

26.0 Topic: Project Costs

Reference: Exhibit B-1, Application, 6.3.3 Estimated Delivery Rate Impact

Line 1 of Table 6-12: In-House Meter Reading Scenario Delivery Rate Impact Sensitivity indicates that under the Continuation of current embedded costs assumption the Incremental Impact of AMI on rates over the 26-year period would be 0.325%. This compares with an average rate impact of 0.125% assuming the Future in-house meter reading low case, which FEI characterizes as "effectively rate neutral". [p.118 (pdf p.132), underline added]

For reference, Table 6-12 is reproduced below.

Table 6-12: In-House Meter Reading Scenario Delivery Rate Impact Sensitivity

Line	Meter Reading Costs Scenario	Baseline Impact	AMI Impact	Incremental Impact
1	Continuation of current embedded costs	0.000%	0.325%	0.325%
2	Future in-house meter reading low case	0.200%	0.325%	0.125%
3	Future in-house meter reading high case	0.770%	0.325%	-0.445%

26.1 Would FEI characterize an Incremental Impact of AMI on rates over the 26-year period of 0.325% as "effectively rate neutral"?

Response:

FEI described the **low case scenario** for future meter reading costs as effectively rate neutral. In the scenario where FEI would be able to continue in-house meter reading at current embedded costs, the incremental levelized delivery rate impact of 0.325 percent results in an annual bill increase for an average residential customer consuming 90 GJs per year over the 26-year analysis period of $1.47. FEI considers this amount to be relatively small considering the benefits of the AMI Project; and given that these increases are as compared to 2021 rates (and not the future rates that will be in place over the next 26 years). Therefore, FEI would still consider this to be effectively rate neutral.

However, as discussed in Section 3.3.3 of the Application, there is no reason to believe FEI will be able to continue the current embedded costs for meter readings, and as such, FEI considers the current embedded cost scenario to be unlikely. FEI believes the low case scenario of future in-house meter reading as shown in Table 6-12 is more realistic. At an incremental levelized delivery rate impact of 0.125 percent, the annual bill increase for an average residential customer consuming 90 GJ per year over a 26-year analysis period would be $0.56 when compared to 2021 rates.

26.2 Please discuss whether, in FEI's view, the result of the rate impact analysis hinges on whether "Continuation of current embedded costs for meter reading" is realistic or not.

Response:

As discussed in Section 3.3.3, it is unlikely and unrealistic to believe the current meter reading costs can be continued long-term given the limited number of service providers available and the trend towards automation within the utility industry that will further reduce the likelihood of new and viable manual meter reading service providers. As such, the more realistic and viable scenario long-term would be to repatriate the meter reading function in-house. When this scenario is compared to AMI, the incremental levelized delivery rate impact would be 0.125 percent. This is equivalent to an annual bill impact of $0.56 over the 26-year analysis period for the average residential customer consuming 90 GJs per year.

However, in FEI's view, the result of the rate impact analysis does not hinge on whether or not the continuation of current embedded costs for meter reading is realistic or not, given the discussion provided in the response to BCSEA IR1 26.1.

27.0 Topic: Project Costs

Reference: Exhibit B-1, Application, Appendix A, Util-Assist Report, pdf p.159

The Util-Assist Report provides the costs of various AMI and AMR projects in a $CAD per meter format.

27.1 What is the Total Project Cost Per Meter for the proposed FEI AMI project, for comparison with the figures in the Util-Assist Report?

Response:

The following table shows FEI's calculated total non-NPV costs of $770 million using a similar method to that shown in the Util-Assist Report. FEI has also provided the expected total non-NPV O&M savings of $587 million. Combining the costs and savings, the net non-NPV costs are $183 million. FEI notes these costs are included in the financial analysis for this Project and as provided in Confidential Appendices G-1 and G-2 of the Application.

Item	Amount ($ millions)	Reference
AMI Meter Hardware & Installation	474	Appendix G-1, Summary Total Line 3 + Line 4
AMI Project Management & Development	54	Appendix G-1, Summary Total Line 11 + Line 22
AMI Software & Network Capital	34	Appendix G-1, Summary Total Line 12 + Line 13
AMI O&M	208	Appendix G-1, Summary Total Line 33
Total Costs	**770**	Sum of above
Baseline O&M	786	Appendix G-2, Summary Total Line 21
AMI O&M	199	Appendix G-, Summary Total Line 34 less AMI O&M in Total Costs
AMI O&M Savings	**587**	Baseline O&M Less AMI O&M

As shown in the table above, the total costs are $770 million and the total O&M savings are $587 million. The total AMI meters are 1.39 million[6], which results in a per meter cost of $555 and a per meter O&M savings of $424.

27.2 In FEI's view, is $CAD per meter an appropriate measure with which to compare the FEI AMI Project with other AMI and AMR projects?

Response:

No, in FEI's view $CAD per meter is not an appropriate measure with which to compare the FEI AMI Project with other AMI and AMR projects. As discussed in the report referenced in the question, there are few gas AMI deployments to compare against in North America, and no projects completed using ultrasonic meters in North America. This means that both costs and

[6] Appendix G-1, Schedule 1 sum of line 5 2023-2040 + sum of line 16.

benefits will be higher than other projects. For this reason, FEI believes the only appropriate way to measure the proposed AMI Project is by judging the merits of the Application and the evidence filed during this process.

28.0 Topic: Consultation

Reference: Exhibit B-1, Application, Chapter 7; Appendix H-1 Consultation, Engagement and Communications Plan (pdf p.524); Appendix H-2 Consultation Log

The Consultation Log records a November 18, 2019 meeting between FEI and Paul Wieringa – Executive Director, Electricity Branch, Katherine Rowe - Director, Jennifer Davison – Policy Analyst - Ministry of Energy, Mines and Petroleum Resources. The Summary states:

> "The meeting was part of a larger FEI major projects discussion. Questions from the Ministry focused on meter technology and resiliency, such as the ability to remotely shut-off meters in the event of an emergency and potential for remote reconnection as well. The meeting was positively received and no further follow-up meetings were scheduled to discuss the Project. No further follow-up at this time."

28.1 Does FEI have more-recent information from BC government officials regarding their questions and opinions about the FEI AMI Project? If so, please summarize it.

Response:

FEI does not have more recent information or feedback from BC government officials in this regard; however, FEI expects to continue to engage with the Ministry as it develops the Project.

29.0 Topic: Consultation

Reference: Exhibit B-1, Application, 7.2.8 FEI Has Responded to Questions and Concerns Raised by Customers and Stakeholder Groups, p.131 (pdf p.145)

FEI describes its responses to concerns about Health aspects of the AMI Project as follows:

> "Concerns regarding the new network generally pertained to perceived health effects related to radiofrequencies (RF), and concerns about how the Project could exacerbate perceived pre-existing sensitivity to wireless technology (Section 5.8.1).
>
> FEI's responses generally included discussions regarding:
>
> - Emissions from the proposed technology would fall well below Health Canada's Safety Code 6 standards for RF fields. More details are provided in Section 5.8.1;
> - FEI would be proactively offering a radio-off option; and
> - That the new meters only send information over the wireless network at intervals and for generally less than a few seconds a day (Section 5.8.1)." [p.131 (pdf p.145)]

FEI also states:

> "... FEI acknowledges that there are some members of the community that remain opposed to the Project due largely to perceived health issues associated with the new meters' RF and the increased use of wireless technology in general. One of the key ways FEI has sought to address RF-related concerns is by communicating that customers can select a radio-off option from the outset of the Project.
>
> FEI will continue to consult with the public as the Project progresses, including continuing to look at ways to address or respond to future concerns raised." [p.132 (pdf p.146)]

29.1 What feedback did FEI receive regarding the radio-off option from customers and stakeholder groups concerned about health aspects of the AMI Project?

Response:

Generally customers who expressed concern about perceived health issues related to the RF technology expressed appreciation for the radio-off option. Other customers, including those concerned with the increase of wireless technology in general, remain opposed to the advanced meters.

29.2 In its responses to customers and stakeholder groups regarding health aspects of the AMI Project, what if anything did FEI say about the basis for determining the fee for the radio-off option?

Response:

FEI advised customers who have expressed an interest in a radio-off option that they would need to pay additional fees to cover the cost of that service. This information is also publicly available on the Project's webpage under the FAQ section, and specifically, '*Can I choose not to upgrade my meter?*' Advanced gas meters (fortisbc.com)

30.0 Topic: Provincial Government Energy Objectives

Reference: Exhibit B-1, Application, p.139 (pdf p.153)

FEI states:

> "These energy objectives provided in the CEA [*Clean Energy Act*] placed focus on demand-side management measures and advanced metering. The Project implements AMI technology and provides a foundation to support and enable natural gas conservation and efficiency primarily through the provision of improved natural gas consumption information for customers. Improved consumption data will support natural gas conservation by providing consumers with actionable insight on their consumption further enabling the implementation of demand side measures to reduce consumption. Finally, reducing customer consumption of natural gas will contribute to lowering GHG emissions in BC and is consistent with climate action plans which are described in greater detail below." [p.140 (pdf p.154), underline added]

30.1 If possible, please quantify the estimated BC GHG emissions reductions per year due to the FEI AMI Project reducing customer consumption of natural gas through the provision of improved natural gas consumption information for customers.

Response:

At this time FEI is not able to quantify how much additional energy conservation and hence BC GHG emissions reductions might be achieved if AMI is implemented. Please refer to the response to BCUC IR1 6.1 for further explanation.

31.0 Topic: Provincial Government Energy Objectives

Reference: Exhibit B-1, Application, p.140 (pdf p.154); BCUC Decision and Order C-3-20 (https://www.ordersdecisions.bcuc.com/bcuc/decisions/en/item/488403/index.do)

FEI states:

> "The provincial government explicitly stated its support for advanced metering solutions, mandating BC Hydro to install advanced meters by the end of 2012 and establish a program to install and put into operation a smart grid by the end of 2015 as provided in the CEA and the Smart Meters and Smart Grid Regulation (2010). The provincial government also demonstrated its support for advanced metering for utilities other than BC Hydro. Section 17 (6) of the CEA provides:
>
> > (6) If a public utility, other than the authority, makes an application under the Utilities Commission Act in relation to smart meters, other advanced meters or a smart grid, the commission, in considering the application, must consider the government's goal of having smart meters, other advanced meters and a smart grid in use with respect to customers other than those of the authority.
>
> FEI submits that the implementation of AMI supports British Columbia's energy objectives as cited above and meets the government's goal of having advanced meters and a smart grid (as defined in the CEA and in the related regulation) in use for FEI customers." [p.140 (pdf p.154)]

Section 17(1) of the CEA defines "smart grid" and "smart meter" as follows:

> "smart grid" means the prescribed equipment;
>
> "smart meter" means a meter that meets the prescribed requirements, and includes related components, equipment and metering and communication infrastructure that meet the prescribed requirements.

The Smart Meters and Smart Grid Regulation, BC Reg. 405/2012, provides the prescribed requirements. FEI states

> "FEI has examined the regulation, and although the regulation is clearly "electricity utility" focused, there is much that applies to natural gas as well. FEI has determined that its proposed Project is aligned with many of that regulation's requirements. A summary table of the regulation requirements, adapted for a natural gas utility focus, is provided below." [Exhibit B-1, p.141 (pdf p.155)]

In its November 9, 2020 Decision and Order C-3-20 approving PNG's application for a CPCN for an AMR project, the Panel discussed the applicability of section 17(6) of the CEA to natural gas meters as follows:

> "The prescribed requirements under the Smart Meter Regulation for a smart meter do not apply to gas metering. However, section 17(6) of the CEA requires the BCUC when considering an application by a public utility to consider the BC government's goal of having "other advanced meters" in use with respect to customers other than those of the authority [BC Hydro]. As such, while the proposed automated meters are not within the definition of smart meter in the Smart Meter Regulation, the Panel is of the view that the legislation is broad enough to include the proposed AMR meters as "advanced meters" within the meaning of section 17(6) of the CEA." [Order C-3-20, Appendix A, p.19, underline added by the BCUC Panel]

31.1 In FEI's view does section 17(6) of the CEA require the Panel determining FEI's AMI Project CPCN Application to consider the BC government's goal of having advanced meters in use?

Response:

Yes. Although the Smart Meters and Smart Grid Regulation under the *Clean Energy Act* (CEA) is generally applicable to BC Hydro, section 17 (6) of the CEA also states:

> If a public utility, other than the authority, makes an application under the Utilities Commission Act in relation to smart meters, other advanced meters or a smart grid, the commission, in considering the application, must consider the government's goal of having smart meters, other advanced meters and a smart grid in use with respect to customers other than those of the authority.

This section applies to the present circumstance. FEI is a "public utility, other than the authority [BC Hydro]" and has made an application under the UCA in relation to "smart meters, other advanced meters or a smart grid". Section 17(6) provides that the BCUC "must", in this circumstance, "consider the government's goal of having smart meters, other advanced meters and a smart grid in use with respect to customers other than those of the authority". The "must" indicates that section 17(6) requires the Panel to consider the BC government's goal of having advanced meters in use. Please refer also, more generally, to Section 8.2 of the Application.

32.0 Topic: Provincial Government Energy Objectives

Reference: Exhibit B-1, Application, p.142 (pdf p.156)

FEI states:

> "The Project is aligned with the CleanBC Plan and FortisBC's Clean Growth Pathway as follows:
>
> - the proposed advanced meters are compatible with certain renewable gases, such as hydrogen and biomethane;
> - the proposed advanced meters provide detailed data which can enhance energy efficiency programs and help customers to better manage their gas consumption; and
> - the proposed advanced meters substantially eliminate manual meter reading thereby avoiding GHG emissions associated with meter reading vehicles as described in Section 4.3.2.1." [p.142 (pdf p.156)]

32.1 If not addressed in the response to BCUC IR 34, please confirm, or otherwise explain, that the proposed advanced meters are compatible with all of the types of renewable gases that FEI contemplates acquiring.

Response:

The response to the referenced IR set addresses the question. Please refer to the responses to BCUC IR1 34.1 and 34.2.

33.0 Topic: Project Description

Reference: Exhibit B-1, Application, section 5.81 Radiofrequency Electromagnetic Fields, page 91; Appendix F-1, Exponent RF Technology Report, pdf p.309;

The Exponent RF Technology Report states:

> "The Sonix IQ gas meter is a residential gas meter that operates using ultrasonic sound to measure gas flow and has an integrated communication system, an enclosed battery, and an automatic shutoff option." [pdf p.334, underline added]

> "Since these are battery-powered units [Gateways], the limiting factor in transmission schedule is battery lifetime. A unit that transmits once per hour will have a lifetime between 8.7 and 12.25 years (depending on how many sensors are connected). A unit that transmits once per minute will have a lifetime of between 2 to 3 months." [footnote 18, pdf p.336]

33.1 What is the battery lifetime for the Sonix IQ gas meter? How often will they require replacement?

Response:

The Sensus products considered for both the AMI and AMR alternatives are designed for a 20-year service life. The batteries used in each application are different according to the physical size of the equipment and the application. Sonix IQ meters use two "D" sized cells, while Residential Meter SmartPoints use one "C" sized cell, and Commercial Meter SmartPoints use one "D" sized cell. The batteries are not a replaceable component and Sensus does not plan to change this attribute.

33.2 Please describe the features of the "automatic shutoff option." Can the utility send a signal telling the Sonix IQ gas meter to shut off the flow of gas (or does shutoff occur 'automatically' in preprogrammed situations)? Can the Sonix IQ gas meter turn the flow of gas back on after a shut-off? For a Sonix IQ gas meter, is "automatic shutoff" the same as manual shutoff except that the source of the instruction is remote rather than on-site?

Response:

Please refer to the response to BCSEA IR1 18.1.

The Exponent RF Technology Report also states:

> "The FlexNet communication network operates on a dedicated licensed radio spectrum, which differs from some other network architectures, such as the FEI electric meter network, that operate using a mesh network. Among other benefits, the use of a dedicated licensed portion of the radio spectrum limits external interference sources and limits how often data need to be communicated from individual meters. Each individual meter or module (collectively referred to as End Points) communicates directly with a base station (i.e., it does not relay messages from one device to another) and messages from the meter or module to the base station or vice versa are sent using very brief transmissions." [pdf p.331, underline added]

33.3 Please confirm, or otherwise explain, that "the FEI electric meter network" should read: "the FBC electric meter network."

Response:

Confirmed.

33.4 Please explain why FEI chose an AMI system that uses a dedicated licensed radio spectrum rather than a mesh network.

Response:

Please refer to the response to BCUC IR1 14.4.

The Exponent RF Technology Report states:

> "FEI monitors the operation of safety systems, called cathodic protection, installed to protect gas pipelines from corrosion using SentryPoints. The purpose of these units is to measure and collect data at points of installation to provide that data to central monitoring locations that can evaluate the data and check on the operation of the protective voltage cathodic protection system." [pdf p.334]

33.5 Please explain what is existing and what is proposed regarding cathodic protection monitoring and SentryPoints.

Response:

At the time of filing the Application, FEI had 1,128 cathodic protection (CP) test points. For these test points, 114 are connected to satellite communications, 565 to 3G cellular, and 449 to 4G cellular.

As part of the AMI Project, FEI expects to replace all 3G and satellite test points with SentryPoint CP test points due to bandwidth costs (satellite) and technological obsolescence (3G), as well as add an additional 500 SentryPoint CP test points to the system. FEI expects to replace the existing 4G CP test points with SentryPoint CP test points when their service life expires after deployment of the AMI Project is complete (2027 and 2032). In addition, Sensus SentryPoint head-end software would be installed in the Software as a Service environment for FEI use.

The Exponent RF Technology Report states:

> "Gateways are battery-powered communication devices that will be attached to sensors or other units in the field and serve as a hub to connect those sensors (for instance in locations without a power source) to the FlexNet network so that the data provided are available without sending personnel to read the instruments. Gateways are capable of transmitting and forwarding alarms to utility systems or individuals." [pdf p.335]

33.6 Is the function performed by the Gateways in the FlexNet network new, or is it replacing (fully or partially) an existing functionality?

Response:

The function performed by the gateways in the FlexNet network is new as they are adding remote data collection capabilities that were previously desired but were not considered cost-effective to implement on a standalone basis due to the ongoing monthly data charges when using third-party wireless providers.

The Exponent RF Technology Report states:

> "SmartPoints are communication devices that can be mounted directly on existing gas meters in cases where the existing meter will not be replaced with a Sonix IQ gas meter. SmartPoints generally will be located outside residences or other buildings and will operate on the FlexNet version 1 protocol, but will otherwise operate almost identically to the Sonix IQ gas meters with an hourly read schedule

and a 4-hour transmission schedule. Approximately 24,000 existing gas meters are expected to need a SmartPoint rather than being replaced with a Sonix IQ gas meter." [pdf p.336]

33.7 Do the SmartPoints have the same shutoff and turn-on functionality as the Sonix IQ gas meter? Please explain any differences.

Response:

SmartPoints do not have shut off and turn-on functionality as they do not directly interact with the gas system.

SmartPoints are battery-operated electronic devices that are hardwired to existing gas meters. SmartPoints collect the customer's hourly gas consumption and periodically transmit this information to FEI via the AMI network.