BRITISH COLUMBIA UTILITIES COMMISSION

IN THE MATTER OF THE *Utilities Commission Act*, RSBC 1996, c.473

and

FortisBC Inc.
Application for a Certificate of Public Convenience and Necessity for the Advanced Metering Infrastructure Project

BCUC Project No. 698682

WRITTEN ARGUMENT OF INTERVENORS B.C. SUSTAINABLE ENERGY ASSOCIATION and SIERRA CLUB BRITISH COLUMBIA

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April 25, 2013

Part I. Introduction

1. This is the final argument of the intervenors B.C. Sustainable Energy Association (BCSEA) and Sierra Club British Columbia (SCBC) concerning the application by FortisBC Inc. (FortisBC or FBC) for a Certificate of Public Convenience and Necessity (CPCN) for the Advanced Metering Infrastructure (AMI) Project pursuant to sections 45 and 46 of the *Utilities Commission Act,* RSBC 1996, c.473 ("*Act*").

A. Requested remedy

2. BCSEA-SCBC respectfully request that the Commission Panel issue a CPCN for the proposed Advanced Meter Initiative Project, subject to

   (a) an optional wireless opt-out tariff based on disablement of the two radios in the Itron meter (LAN and ZigBee), manual meter reading, and a cost-based charge for installation and meter reading,

   (b) a requirement that FortisBC configure the ZigBee board in the meter to communicate only to an in-home display or gateway,

   (c) a requirement that FortisBC obtain Commission approval to implement SEP 2.0 rather than SEP 1.x.

   (d) a requirement that FortisBC file semi-annual Project progress reports.

B. Main points

3. The need for a FortisBC AMI project is well established. Doing nothing is not an option, due to the impending Measurement Canada requirements.

4. The AMI project is financially cost-effective. It would save money for ratepayers. The financial benefits are mainly from theft reduction and reduced meter reading costs. Theft reduction financial benefits have a high degree of uncertainty, but even so the project provides financial (and non-financial) benefits to ratepayers.

5. The AMI project has substantial non-financial benefits to do with energy efficiency and conservation, customer service benefits and operational efficiencies.

6. The evidence is that the AMI Project would not cause adverse health effects. The actual RF exposure from AMI meters is extremely low; lower even than limit proposed in the *2007 BioInitiative Report*. Health concerns are sincerely expressed; and BCSEA-SCBC propose an RF opt-out tariff.

7. A hypothetical wired alternative would be more expensive than the proposed wireless AMI system. If the Commission finds that the proposed system would cause adverse health effects that should be the end of the matter; there is no basis for trying to compare the health effects of the proposed wireless system to those of a hypothetical wired system.

8. AMI system support for home area networks is a valuable platform for conservation and efficiency measures. However, customer security concerns warrant limiting the meter to communicating only with an in-home display or gateway. SEP 2.0 is not finalized and very different than SEP 1.x. Commission approval should be required before FortisBC implements SEP 2.0.

9. If the AMI Project is approved, BCSEA-SCBC support an RF opt-out tariff to allow customer choice.

10. If the AMI Project is approved, BCSEA-SCBC recommend semi-annual Project progress reports.

C. BCSEA-SCBC

11. BCSEA is a non-profit association of citizens, professionals and practitioners committed to promoting the understanding, development and adoption of sustainable energy, energy efficiency and energy conservation in British Columbia. BCSEA has eight chapters across B.C. and approximately seven hundred individual and corporate members. Many of BCSEA's members are customers of FortisBC. BCSEA's goals include sustainable energy, energy efficiency and energy conservation in British Columbia.[1]

12. SCBC is a non-profit organization of British Columbians from all walks of life who care about a broad range of environmental issues including climate change and

[1] Exhibit C4-1.

clean energy. SCBC has over 5,000 members and supporters across the province, many of whom are ratepayers of FortisBC who want the electricity they purchase to come from a sustainable electricity system.[2]

13. BCSEA-SCBC's participation in the current proceeding is in the context of BCSEA and SCBC having recently participated in the Commission's review of FortisBC's 2012-2013 Revenue Requirements Application and 2012 Integrated System Plan. Previously, BCSEA participated in the Commission's review of FortisBC's Residential Inclining Block Rate Application. BCSEA and SCBC participated in the Commission's review of FortisBC Inc.'s 2011 Capital Expenditure Plan and FortisBC Inc.'s Net Metering Tariff Application.[3]

(a) BCSEA-SCBC interests and objectives in the proceeding

14. BCSEA-SCBC's interests in the AMI Application are as non-profit public interest environmental and energy policy organizations, and as representatives of their members' interests as ratepayers.

15. BCSEA-SCBC participated fully in the current proceeding. Their focus has been on

    (a) the cost-effectiveness of the advanced metering proposal,

    (b) whether and how the AMI project would contribute to increased energy efficiency and conservation,

    (c) the potential for the advanced metering system to support conservation- and efficiency-oriented use of in-home devices and home area networks by those customers who choose to do so, including security and privacy issues,

    (d) human health concerns, and other issues such as security, privacy and safety, and

    (e) helping to ensure that the proceeding itself is fair, transparent, thorough and efficient, taking into account the differing needs, interests, access to resources of the various intervenors, interested parties and public commentators, as well as of the proponent FortisBC, the Commission staff and the Commission panel.

[2] Exhibit C4-1.
[3] Exhibit C4-1.

16. BCSEA-SCBC have participated fully in this proceeding. They:

(a) reviewed the application (Exhibit B-1) and other evidentiary filings of FortisBC,[4]

(b) retained an expert consultant (Ludo Bertsch) to analyze technical aspects of the AMI,

(c) submitted Information Requests (IRs) on all aspects of the AMI application, with a focus on technical aspects of the AMI and actual and potential energy conservation benefits,

(d) reviewed the IR responses of FortisBC to BCSEA-SCBC, BCUC and the other intervenors,

(e) reviewed the procedural filings of the Commission, FortisBC and the other parties, and addressed the various procedural issues that arose,

(f) reviewed the evidence filed by other intervenors, with a particular focus on the health-related evidence filed by CSTS,

(g) filed IRs on the evidence of the other intervenors and reviewed the intervenors' IR responses to BCSEA-SCBC and other parties,

(h) attended the oral hearing and cross-examined all the witness panels of FortisBC and the Citizens for Safe Technology Society (CSTS), addressing: health issues and the quality of evidence bearing on that issue; radiofrequency exposure issues; and technical issues with the ZigBee chip and Smart Energy Profile (SEP) 1.x and 2.0, and their relationship to customer security and privacy,

(i) reviewed the undertakings arising from the oral hearing,

(j) reviewed FortisBC's Final Submission, and

(k) are filing this final argument addressing what they consider to be the most important issues.

[4] Exhibit B-1-1, application errata; Exhibit B-1-2, City of Kelowna (CoK) purchase evidence; Exhibit B-1-3, CoK net present value analysis; Exhibit B-1-4, CoK addendum; Exhibit B-2, AMI net present value analysis; Exhibit B-11-1, supplemental filings re the CoK purchase.

D. The AMI Project

(a) Project description

17. FortisBC filed this Application for a CPCN for the AMI Project on July 26, 2012. The estimated capital cost of the Project is $51.2 million, with the inclusion of customers of the City of Kelowna electrical utility[5] that was recently acquired by FortisBC with Commission approval.

18. The Project includes the following major components:

- procurement of AMI system hardware and software including the meters, network devices, head-end system (HES), and meter data management system (MDMS),
- design of the AMI system including the communications network and wide area network (WAN) backhaul,
- information technology (IT) integration (connecting existing FortisBC systems to the HES and MDMS),
- deployment of the communications network infrastructure,
- deployment of the AMI meters to replace existing meters (some analogue; some digital), and
- development and implementation of a customer information portal on the internet at which the customer can receive consumption information for conservation and cost-saving purposes.[6]

19. The Project also includes software and hardware in the meter that would enable FortisBC to implement a program allowing customers, at the customer's sole discretion, to receive customer-specific real-time electricity consumption information electronically through Home Area Network (HAN) communications to an In-Home Display (IHD) that would be purchased by the customer. The customer's IHD could be a device communicating directly to the meter or it could communicate to the meter through a gateway maintained by the customer. By receiving this real-time electricity consumption information, the customer would be able to make better-informed energy consumption decisions, either manually or by customer-programmed devices. The home area network aspect of the Application raises issues concerning security, privacy and efficacy that BCSEA-SCBC address below.

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[5] FortisBC final argument, page 96.
[6] Exhibit B-1, pp.6-7.

20. The advanced meter contains two radios: one for communication with FortisBC, the other (referred as the ZigBee radio) for optional communication at the customer's discretion with the customer's in-home display or home-area network. By default, the meter would be installed with the ZigBee radio in a non-transmitting mode.

21. To be clear, the proposed AMI system does not include what is called "demand response control," in which signals are sent by the utility to the customer's premises to control a customer's appliances usually for peak shaving purposes. The proposed AMI system could technically support a demand response control program. However, such a program would require Commission approval and is not proposed by FortisBC at this time.

22. The geographic scope of the Project includes the entire FortisBC service territory in south central B.C. The AMI Project will, if approved, apply to the new FortisBC customers who were formerly City of Kelowna customers.

23. The AMI Project involves replacement of customers' existing meters with advanced ("smart") meters for virtually all residential and commercial customers, with the exception of a small number of large customers that already have meters with two-way communication.

24. The bulk of the Project is comprised of a contract between FortisBC and Itron Canada ("Itron") for the sale and deployment of the meters and the communications network. FortisBC selected Itron as the result of a competitive request for proposals (RFP) process.

25. The RFP laid out detailed requirements but did not specify whether proposals had to use "wireless" or "wired" advanced metering systems. As it happened, all of the responses to the RFP, including the Itron system that was ultimately selected, contemplated wireless systems.

26. The Itron system selected by FortisBC and proposed in the Application is generally the same type of system as BC Hydro has contracted with Itron to implement within BC Hydro's service territory.

27. Unlike FortisBC's existing analogue and digital meters that are read manually by meter readers who drive or walk from meter to meter, the proposed AMI system

would automatically send encrypted consumption data electronically to FortisBC where the data would be processed for billing. Among other benefits, this would reduce greenhouse gas (GHG) emissions by reducing FortisBC's vehicle mileage.

28. In addition, subject to Commission-approved tariff requirements and FortisBC operational policies, the AMI system would enable functions such as remote connection and disconnection of meters that are currently done manually.

29. By recording and transferring to FortisBC meter-specific energy consumption on an hourly basis, in combination with feeder-specific energy data, the proposed AMI system allows FortisBC to implement electricity theft-detection measures. Theft-detection measures are expected to result in substantial reduction of electricity theft, in part due to cessation of the illegal use of the energy (a reduction in energy loss) and in part due to such load being met with paid-for electricity (a gain in revenue with no change in energy provided).

30. The AMI Project would entail addition customer and system benefits that are discussed below.

(b) Project context and background

31. This is FortisBC's second application to the Commission for a CPCN for an advanced metering infrastructure project. The first application was made in 2007 and was denied by Commission Order G-168-08 dated November 12, 2008. In effect, the Commission found that the 2007 AMI application was premature for several reasons which it encouraged FortisBC to take into account in preparing a revised AMI application.

32. At the time of FortisBC's 2007 AMI application, it was known that BC Hydro and the BC government were considering a BC Hydro smart meter infrastructure (SMI) program. A BC Hydro SMI program would be substantially larger than a FortisBC AMI program due to BC Hydro's much larger customer base. As a result, the Commission wanted FortisBC to explore the possible benefits of economies of scale that might accrue from collaboration with BC Hydro in implementing advanced metering infrastructure in both utilities' service territories. In addition, it was expected that the government would adopt a regulation prescribing certain requirements that

would be applicable to a BC Hydro SMI and might be applicable to, or at least relevant to, a FortisBC AMI.

33. In BCSEA-SCBC's view, another factor in the Commission's 2008 decision was that FortisBC's 2007 AMI application was not based on an identified system provider or a firm contract for sale and deployment of an AMI system. Important technical and financial aspects of the 2007 proposal were based on estimates or ranges. In contrast, as noted above, the 2012 AMI Application is based largely on a contract between FortisBC and Itron for implementation of the AMI system.

34. Following the Commission's 2008 decision, FortisBC continued work on development of an AMI proposal; work that resulted in the present Application.[7] Meanwhile, more or less as anticipated, the government required[8] BC Hydro to implement a smart meter infrastructure project according to a particular timetable and adopted a regulation[9] defining certain SMI requirements.

35. In the current 2012 AMI Application, FortisBC outlines the steps it took in furtherance of the Commission's encouragement to revise and reapply for approval of an AMI system.[10] Key among those, in BCSEA-SCBC's view, was consulting and coordinating with BC Hydro about the technical and procurement aspects of obtaining an advanced metering system, and, as noted above, issuing an RFP for an AMI system.

Part 2. Law and Policy

36. As noted above, this is an application by FortisBC to the Commission for a CPCN for the Project under section 45 and 46 of the *Utilities Commission Act*.

37. The legal test for whether the Commission ought to approve this CPCN application by FortisBC for the Project is a public interest test under the *Act*.

38. The Commission has broad discretion to consider a variety of factors and evidence in determining whether the Project is in the public interest.

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[7] Exhibit B-1, p.10.
[8] *Clean Energy Act*, s.17(2).
[9] Smart Meter and Smart Grid Regulation, B.C. Reg. 368 /2010
[10] Exhibit B-1, pp.10.12.

39. In addition, subsection 46 (3.1) of the *Act* requires the Commission to consider "the applicable of British Columbia's energy objectives" and "the most recent long-term resource plan filed by the public utility under section 44.1."

40. The B.C. energy objectives most relevant to the Commission's consideration of this Application are:

    (a) "to take demand-side measures and to conserve energy,"[11]

    (b) "to use and foster the development in British Columbia of innovative technologies that support energy conservation and efficiency and the use of clean or renewable resources,"[12]

    (c) "to reduce BC greenhouse gas emissions."[13]

41. FortisBC's most recent long-term resource plan filed under section 44.1 of the *Utilities Commission Act* is its 2012 Long Term Resource Plan.

42. If the Commission determines that the Project warrants a CPCN, subsection 45(9) provides that the Commission may impose conditions on the CPCN:

> 45 (9) In giving its approval, the commission
>
> (a) must grant a certificate of public convenience and necessity, and
>
> (b) <u>may impose conditions about</u>
>
> <u>(i) the duration and termination of the privilege, concession or franchise, or</u>
>
> <u>(ii) construction, equipment, maintenance, rates or service,</u>
>
> <u>as the public convenience and interest reasonably require</u>. [underline added]

Part 3. Argument

A. Organization

43. In this part, BCSEA-SCBC address the following topics:

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[11] *Clean Energy Act*, s.2 (b).
[12] *Clean Energy Act*, s.2 (d).
[13] *Clean Energy Act*, s.2 (g).

(a) project need,

(b) financial benefits and costs,

(c) non-financial benefits,

(d) health,

(e) wired alternatives,

(f) home area network,

(g) RF opt-out tariff, and

(h) reporting.

B. Project Need

44. BCSEA-SCBC submit that the need for a FortisBC advanced metering infrastructure project is well established.

45. First, to do nothing is not a viable option. The existing analogue meters will require accelerated replacement due to the future phase-in of increasingly stringent Measurement Canada requirements.[14] Replacement with new analogue meters is not an option, because they are not available.[15] Replacement with simple manually read digital meters would be a costly waste of the unique current opportunity to implement an advanced metering information system in the course of responding to the Measurement Canada requirements.

46. Second, the need for an AMI project with advanced theft reduction functionality in the FortisBC service territory arises at the present time because of BC Hydro's implementation of its SMI program within BC Hydro's service territory. It is important to ensure that the implementation BC Hydro's SMI program does not simply push electricity theft activities out of the BC Hydro territory and into the FortisBC territory.

[14] Exhibit B-1: Application, page 18, lines 7 – 19.
[15] Exhibit B-1: Application, page 17, lines 23-26.

47. Third, an AMI project is required at this time because of the dual imperatives of promoting energy conservation and efficiency and providing downward pressure on rates. These points are discussed in more detail, below.

48. Fourth, provincial energy policy strongly supports implementation of an AMI project in the FortisBC service territory.

C. Financial Benefits and Costs

49. In BCSEA-SCBC's view, consideration of the financial benefits and costs of the AMI Project favours approval of the Application.

50. A project's financial benefits and costs can be summarized by the project's "net present value" (NPV). The NPV represents the stream of financial costs over the life of the project minus the stream of financial benefits of the project over the life of the project, adjusted by a discount rate. If the NPV is negative, the financial costs are outweighed by the financial benefits.

51. In the present case, two methods of estimating the NPV have been used: the FortisBC Model and the BCUC Staff Model. The difference between the two is that the FortisBC Model includes as project benefits the additional revenue[16] from operators of illegal grow-ops induced by implementation of the project to purchase electricity rather than stealing it. The BCUC Staff Model excludes this additional revenue from the NPV calculation.

52. BCSEA-SCBC's view is that the FortisBC Model of calculating the NPV is more realistic than the BCUC Staff Model. 'But for the Project,' the induced additional revenue would not be received; therefore the additional revenue is a project benefit. However, it is submitted that nothing turns on the choice of NPV model. In both methods of calculation, the NPV of the AMI Project indicates that the financial benefits substantially exceed the financial costs, as is discussed in the following paragraphs.

[16] The induced additional revenue is by definition net additional revenue because there is no change in the cost of providing the electricity (that is otherwise stolen).

53. Using the FortisBC Model, FortisBC's estimate of the AMI NPV over 20 years is -$17.6 million[17] -- meaning the financial benefits exceed the financial costs by $17.6 million. Using the BCUC Staff Model, FortisBC's estimate of the AMI NPV is -$10.8 million[18] -- meaning the financial benefits exceed the financial costs by $10.8 million.

54. It should be noted that in both NPV models the estimated net financial benefit of the Project accrues to ratepayers, not to FortisBC.

55. Consideration of the accuracy of an estimate of a project's NPV breaks down into consideration of the accuracy of the estimated financial costs, the accuracy of the estimated financial benefits, and the suitability of the discounting mechanism.

56. Addressing these factors in reverse order, in BCSEA-SCBC's view the discounting mechanism used in the NPV calculation is appropriate and does not affect the results. And, the estimate of the financial costs of the AMI project is subject to relatively little uncertainty. This is primarily because the bulk of the project costs are determined by the contract between FortisBC and Itron.

57. The estimate of the financial benefits is comprised of two main components: theft reduction benefits and meter reading cost reductions. The estimates of meter reading cost reductions are relatively firm.

58. However, the estimates of theft reduction financial benefits are relatively <u>uncertain</u>, as FortisBC acknowledges. There are four main points of uncertainty: uncertainty about the pre-Project quantity of stolen energy; uncertainty about the quantity of energy theft that could be expected to occur going forward in the event the Project is not implemented; and uncertainty about the degree to which the Project can be expected to induce electricity thieves to stop using electricity at all; and uncertainty about the degree to which the Project can be expected to induce existing or would-be electricity thieves to pay for the electricity they use. In addition, the limited amount of research conducted on the topic has focused on the BC Hydro service territory and there is uncertainty about how to extrapolate the results to FortisBC's service territory.

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[17] $23 million with inclusion of City of Kelowna direct customers.
[18] The figure would be higher if City of Kelowna direct customers were included.

59. FortisBC did file as evidence in this proceeding the relatively few B.C. studies that have been produced on the topic. Using these studies, FortisBC articulated various assumptions that it used to estimate the electricity theft related financial benefits of the AMI project.

60. In response to information requests from Commission staff and intervenors, FortisBC provided NPV estimates based on a large number of scenarios involving alternative assumptions about electricity theft and the impact of the proposed AMI project. Naturally, the estimated NPV of the Project varied from FortisBC's NPV estimate depending on the assumptions. In some scenarios, the Project NPV was less than FortisBC's estimate. In other scenarios, the Project NPV was greater than FortisBC's estimate.[19]

61. Notably, however, in all reasonably likely scenarios – in BCSEA-SCBC's view – the estimated AMI Project NPV showed that the financial benefits exceed the financial costs. This applied where both the FortisBC Model or the BCUC Staff Model were used. As a result, while there is uncertainty regarding the size of the theft-related financial benefits of the Project, the Project's financial benefits exceed its financial costs in all reasonably likely scenarios.

62. Consequently, BCSEA-SCBC respectfully submit that the Commission should conclude that consideration of the financial benefits and costs of the AMI Project favours approval of the Application

D. Non-Financial Benefits

63. In addition to the AMI Project's financial benefit to customers, the Project has important immediate (upon Project implementation) and future (beyond Project implementation) non-financial benefits that are discussed here under the following headings:

    (a) conservation and efficiency,

    (b) GHG reductions,

    (c) customer service benefits,

[19] Exhibit B-11, CEC IR 1.61.1.

(d) operational efficiencies.

(a) Conservation and efficiency

64. The AMI Project has several conservation and efficiency benefits. These are described as "non-financial" because FortisBC has chosen not to attempt to quantify[20] the Project's energy and capacity savings.

65. First, as noted in paragraph 18 above, the AMI Project includes development and implementation of a customer information portal on the internet.[21] At this web portal, each customer will be able to receive secure, private, customer-specific information on electricity consumption and costs. It is understood that this information will be available on an hourly, previous-day basis and will include usage data on an hourly, daily, monthly and weather adjusted basis. Information in this detail cannot be provided without an advanced metering system. Approximately 15% of customers are expected to use the web portal[22] in order to make better-informed energy decisions. This will result in energy and capacity savings, to the benefit of all FortisBC ratepayers.

66. Second, as noted in paragraph 19, above, the AMI Project will allow customers, at their discretion, to receive customer-specific real-time electricity consumption information electronically on an in-home display or home-area network. It is reasonable to expect increasing numbers of customers – up to 30%[23] -- to utilize this functionality when it becomes available. This will result in energy and capacity savings, to the benefit of all FortisBC ratepayers.

67. Third, an advanced metering system serves as a platform for possible future conservation-oriented rate structures, such as time-of-use (TOU) rates, critical peak pricing (CPP) rates, and demand response control programs. BCSEA-SCBC consider it valuable to establish the technical prerequisites for such innovative rate

[20] BCSEA-SCBC accept that it is preferable for certain Project benefits and costs to be considered non-quantifiable for CPCN purposes. Attempting to quantify such factors can be misleading, as it implies greater certainty than really exists.
[21] Exhibit B-1, p.51.
[22] Exhibit B-6, BCUC IR 1.8.2; Exhibit B-11, BCSEA IR 1.45 and 1.46.
[23] Exhibit B-6, BCUC IR 1.8.2; Exhibit B-11, BCSEA IR 1.45 and 1.46.

structures and programs. However, any such rates or programs would require Commission consideration and approval before being adopted.

(b) GHG reductions

68. FortisBC estimates the greenhouse gas (GHG) reductions from the Project's reduction of the use of meter-reading vehicles variously as 171,[24] 191[25] and 234[26] tonnes of carbon dioxide (equivalent) per year. This is directionally supportive of B.C.'s GHG emissions reduction goals, although the quantity is minor.

69. It should be noted, however, that in terms of GHG reductions it is crucial that marijuana grow-ops not be allowed to switch to diesel generation as an alternative to using stolen electricity. Due to the energy-intensive operations of grow-ops, the GHG emissions from a single grow-op switching from grid electricity to diesel-fuelled generation could be 300 tonnes CO_2e annually, which would be more than the GHG reduction benefits from the reduced use of meter-reading vehicles.[27]

(c) Customer service benefits

70. Of particular importance to BCSEA-SCBC is the fact that the AMI design requirement[28] includes support for the net metering tariff. BCSEA-SCBC are satisfied that the AMI system causes no technical barrier to net metering.[29]

71. Additional customer service benefits of the AMI Project that BCSEA-SCBC see as valuable include:

    (a) enhanced billing information and improved accuracy,[30]

    (b) flexible billing date,[31]

    (c) reduced need to access customer premises,[32]

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[24] Exhibit B-11, CEC IR 1.25.1, p. 41.
[25] Exhibit B-1, page 1.
[26] Exhibit B-11, BCSEA, *et al* IR 1.48.0, pp. 95-96.
[27] Exhibit B-15, BCSEA, *et al* IR 2.75.2, page 1.
[28] Exhibit B-1, Table 4.2.a – Business Use Cases for Advanced Metering System, p. 52.
[29] Exhibit B-6, BCUC IR 1.18.3, p.34; and Exhibit B-11, BCSEA, et al IR 1.38.1, p. 82.
[30] Exhibit B-1, pp.32-33.
[31] Exhibit B-1, p.34.

(d) possible future Customer Pre-Pay Tariff,[33] and

(e) improved notification of power outage.[34]

72. These non-financial benefits customer service benefits of the AMI Project would significantly improve customer service and satisfaction.

(d) Operational efficiencies

73. BCSEA-SCBC acknowledge that the AMI Project would provide a number of operational benefits that, although not quantified, would likely produce cost savings and system efficiencies. These include:

(a) enhanced system modeling,[35]

(b) improved financial reporting, load forecasting and cost of service analysis,[36]

(c) improved safety,[37]

(d) improved notification of power outage,[38] and

(e) improved power quality monitoring.[39]

74. In addition, the AMI Project would enable possible future system improvements, subject to future capital expenditure approval:

(a) distribution loss reduction,[40]

(b) power grid voltage optimization,[41] and

(c) outage management.[42]

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[32] Exhibit B-1, p.34.
[33] Exhibit B-1, p.102.
[34] Exhibit B-1, p.2, pp.38-39.
[35] Exhibit B-1, pp.35-36; Exhibit B-6, BCUC IR 1.23.1.
[36] Exhibit B-1, p.36.
[37] Exhibit B-6, BCUC IR 1.24.1
[38] Exhibit B-1, pp.38-39; Exhibit B-11, CSTS IR 1.50.2 and 1.50.3.
[39] Exhibit B-1, p.39; Exhibit B-6, BCUC IR 1.2.1.
[40] Exhibit B-1, pp.97-98.
[41] Exhibit B-1, pp.98-99.

75. BCSEA-SCBC agree with FortisBC that the AMI Project is a step in the evolution of what FortisBC describes as its "Smart Grid Vision."[43] In particular, BCSEA-SCBC acknowledge with support that the AMI system would allow FortisBC to support wide-spread deployment of electric vehicles and distributed generation.[44]

E. Health

76. BCSEA-SCBC have thoroughly considered the written and oral evidence regarding health matters and conclude that the evidence supports a conclusion that implementation of the proposed AMI Project would not cause adverse health effects.

77. The focus of this discussion is on the potential adverse human health consequences of exposure to radio frequencies (RF) coming to and from the two radios in an AMI meter (the LAN radio, and the ZigBee radio, if the customer chooses to activate it) and repeater units in the LAN network.

78. Health Canada is the government agency responsible for setting guidelines and standards to protect Canadians from adverse health effects of RF emissions from sources such as the proposed AMI system. Health Canada has issued *Safety Code 6*, which sets limits on acceptable RF exposure levels for sources such as the AMI system. Virtually all of the evidence and arguments made during the proceeding acknowledge that the proposed AMI system would meet the requirements of *Safety Code 6*.[45]

79. However, concern was sincerely and forcefully expressed by various members of the public, FortisBC customers, other intervenors and witnesses called by CSTS that *Safety Code 6* is inadequate and that operation of the AMI system would cause adverse health effects such as cancer and/or electro-hypersensitivity (EHS).

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[42] Exhibit B-1, p.102; Exhibit B-6, BCUC IR 1.102.2 and 1.102.3

[43] Exhibit B-6, BCUC IR 1.12.3 Table BCUC IR1 Q12.3 – Smart Grid Vision. The concept of a "smart grid" is also addressed in the Smart Meters and Smart Grid Regulation, B.C. Reg. 368/2010, with reference to BC Hydro.

[44] Exhibit B-11, Appendix BCSEA IR 1.3.1, "Canadian Smart Grid Standards Roadmap: A Strategic Planning Document," October 2012, p.4 (pdf. p.186), p.19 (pdf p.201), p.28 (pdf p.210), p.30 (pdf p.212), p.31 (pdf p.213), p.37 (pdf p.219); Exhibit B-11, BCPSO IR 1.7.2

[45] Exhibit B-1, Appendix B-6, *Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz: Safety Code 6*, Health Canada, page 5 of 30.

80. BCSEA-SCBC take these concerns seriously and have proposed an 'RF opt-out tariff' in paragraphs 116 to 122, below.

81. However, the Commission must make its determination of whether the AMI Project is in the public interest by considering all of the evidence, including but not limited to individuals' personal opinions. Regarding health, the issue for the Commission is whether the AMI Project would cause adverse health effects.

82. There are three main factors that it is submitted the Commission should consider on this topic.

83. First, the Health Canada authors of *Safety Code 6* did explicitly take into account the up-to-date reports and scientific evidence regarding the possibility of adverse health impacts of RF at sub-thermal levels. They concluded as a matter of professional judgment that the scientific evidence does not establish that RF at sub-thermal levels of exposure causes adverse health effects.

84. The claim by CSTS witnesses Dr. Carpenter, Dr. Blank and Dr. Maisch that the authors of *Safety Code 6* did not <u>consider</u> any scientific evidence regarding sub-thermal exposure levels does not stand up to scrutiny. When pressed, they acknowledged that the authors of *Safety Code 6* did review, or are presumed to have reviewed, the literature in question. However, their real complaint is that the authors of *Safety Code 6* simply did not come to the same conclusion about the health significance of the literature as did the CSTS witnesses. The CSTS witnesses acknowledged that the disagreement is a difference of professional judgment.[46]

85. Second, the actual exposure levels associated with the proposed AMI system are not only miniscule compared to *Safety Code 6* and other national and international standards but are below even the numerical exposure limit proposed by the authors of the *2007 BioInitiative Report* of which some of the CSTS witnesses were co-authors.[47] Dr. Carpenter readily acknowledged that his opinion about the health impacts of the FortisBC AMI system was not based on consideration of smart meter RF emission levels or associated human exposure levels, either generally or

[46] T11:2072, lines 22-26.
[47] T 6: 1027, lines 6-17

concerning the FBC AMI project.[48] Dr. Blank simply took the position that any amount of RF exposure is too much; which is fair enough as his personal opinion but does not help the Commission determine whether the evidence establishes that the RF exposure from the proposed AMI system would cause adverse human health effects.

86. Third, there is no convincing evidence that a decision by the Commission not to allow a wireless AMI system in the FortisBC service territory would provide any significant benefit to public health whatsoever. Yet the proposed AMI Project would provide substantial financial and non-financial benefits to FortisBC ratepayers. If the Project is otherwise in the public interest, it would be senseless, with respect, to squander the Project's benefits for the sake of achieving no significant benefit to public health.

F. Wired Alternatives

87. Some intervenors and members of the public suggested to the Commission that the proposed AMI system should be rejected or deferred in favour of a "wired" advanced metering system of some type. Some, such as Mr. Shadrack, argue that a wired system would be less expensive than the proposed AMI system. The suggested rationale for using a wired system is that it would avoid RF emissions.

88. BCSEA-SCBC's view of the evidence on this topic is that the following two points are key.

89. First, the proposed Itron AMI system selected by FortisBC is the most cost-effective of the proposals that FortisBC received in response to its RFP. The RFP was transparent and competitive. It was open to both wired and wireless systems. Only wireless systems were proposed. Whatever might be the cost of a wired system obtained by some other utility at some other time, the evidence is that the proposed wireless system is the most cost-effective system that is available for purchase by FortisBC at this time. A wired AMI system would be more expensive, not less expensive, than the proposed Itron system.

90. Second, there is no evidentiary basis for the Commission to attempt to compare the health effects of the proposed wireless system with those of a hypothetical wired

[48] Exhibit C-9-12-3, CSTS response to BCSEA IR 8.3; T11:2075, lines 3-13.

metering system. The only evidence regarding health effects concerns the proposed wireless system. Frankly, if the Commission determines, contrary to BCSEA-SCBC's submission above, that the proposed wireless AMI system would cause adverse health effects then clearly such a system would not be in the public interest and that should be the end of the Application.

G. Home Area Network

(a) The AMI HAN interface

91. The following paragraphs address the design of FortisBC's AMI system's interface with customers' home area networks (HAN). For convenience, this will be referred to as the AMI HAN interface. To re-emphasize, the AMI's ability to communicate with a HAN will be turned on only if the customer so chooses.

92. While the design of the AMI HAN interface meets FortisBC's system security needs, BCSEA-SCBC are concerned that:

    (a) the design creates potential security problems for customers who may wish to use the interface, and

    (b) the design would unnecessarily limit the potential for customer choice between different types and brands of in-home devices.

93. In brief, BCSEA-SCBC's view is that these problems on the customer's side of the AMI HAN interface could be prevented by a minor change in the AMI configuration, with no detriment to AMI system functionality. Specifically, it is suggested that the HAN communications system in the AMI meter (i.e., the ZigBee chip) be configured such that the AMI meter would communicate only to an in-home display (IHD) or a "gateway," rather than offering general HAN services to the customer.

94. With the FortisBC's proposed AMI HAN interface design, "the AMI meter would be the network coordinator, controlling the formation and security of the ZigBee HAN

network."[49] With Itron's CENTRON meter, the meter is always both a "coordinator" and a "trust centre."[50]

95. The coordinator establishes a network.[51] The trust centre determines which devices are allowed to join a network.[52] Both have critical security functions, such that FortisBC appropriately requires that its coordinator and trust centre be located on its meter and under FortisBC's control.[53]

96. If a customer were to join his or her own HAN products (beyond the In Home Display) to a HAN established by the coordinator in the AMI meter, the customer's HAN would by default rely on FortisBC's coordinator and trust centre. The problem for the customer is that in the (unlikely) event of a breach of security on FortisBC's side, the customer's HAN could also be breached.

97. In BCSEA-SCBC's view, it is essential that the AMI HAN interface be designed to provide security to FortisBC and – separately – to the customer. FortisBC's witness Mr. Loski acknowledged this concept during the oral hearing:

> MR. ANDREWS: Q: … the customer who is concerned about security of their own information would have that concern even if they were quite satisfied that Fortis as a corporation would not be trying to hack into the customer's home computer system. Is that a fair approach for the customer to take? … the customer will be legitimately concerned that a hacker that got into the Fortis system, … the customer would be at risk, and it wouldn't be as a result of Fortis (that might be a privacy issue) but from a security point of view, that's what the customer would be concerned about.
>
> MR. LOSKI: A: I think I can agree with the concept.[54]

98. From the customer's perspective, the consequences of a security breach in the customer's HAN could be substantial. For example, the customer's HAN could well be operated through the customer's home computer and a breach in HAN security could put all the customer's home computer data at risk.

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[49] Exhibit B-11, BCSEA, *et al* IR 1: 15.6.6, page 50.
[50] Exhibit B-15, BCSEA, *et al* IR 2: 77.1, page 3.
[51] Transcript 2, page 237, l 17-26.
[52] Exhibit B-15, BCSEA, *et al* IR 2: 77.1.7, page 6.
[53] Exhibit B-15, BCSEA, *et al* IR 2: 77.3, page 7.
[54] Transcript 2, page 224, line 25 to page 225, line 13.

99. In BCSEA-SCBC's view it is undesirable for the public utility to have any role or responsibility in maintaining the security of a customer's HAN, even if the public utility's security measures are very reliable. Similarly, it is undesirable for the public utility to use the utility meter to coordinate a HAN (which is thereby the utility's HAN) even if the customer chooses to join it. A customer without computer expertise could easily join the utility's HAN without recognizing the potential security risks involved.

100. BCSEA-SCBC submit that the appropriate solution is for the AMI meters to be required to be configured so that the meter will communicate only with an in-home display (as distinct from other in-home devices) and/or a gateway. This would create what is called 'segmentation' between the FortisBC network and the customer's HAN.

101. Segmentation is a key element of a secure network. FortisBC's witness Mr. Swanson explained network segmentation as follows:

> MR. ANDREWS: Q: Can you describe in general terms what a segmented network infrastructure is and how that would enhance security?
> MR. SWANSON: A: So when you implement any sort of networking infrastructure, you need to isolate yourself from the rest of the communications going on around – through your suppliers, as well as protecting yourself from access into your systems.
>
> So a segmented implemented, basically it's exactly as the word suggests, it's segmented. So we have firewalls and blockers between each of the areas of the network …[55]

102. Requiring a gateway connection would protect the customer's HAN from FortisBC's zone of security,[56] clearly making the customer responsible for his or her own zone of security. This would conform with the recommendation of the Standards Council of Canada CNC/IEC Task Force on Smart Grid Technology and Standards that there be a "clear and unambiguous separation (demarcation) between utility-owned and customer-owned equipment and services."[57]

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[55] Transcript 2, page 228, line 23 to page 229, line 8.
[56] Exhibit B-15, BCSEA, *et al* IR 2: 77.4.1, page 9.
[57] Exhibit B-11, BCSEA, et al IR 1: 3.1 Appendix, *The Canadian Smart Grid Roadmap*, page 29 (.pdf 211).

103. FortisBC confirms that configuring the AMI meter to communicate only with an in-home display and/or gateway is feasible.[58] And, FortisBC agrees that doing so would "reduce the basis for any customer concerns regarding privacy and security associated with having the customer's HAN information flowing through the utility's meter[.]"[59]

104. To explain, allowing the AMI meter to communicate with an in-home display does not create any security issue for the customer because the in-home display is merely an 'end use device' on the FortisBC HAN and does not interact with the customer's HAN.

105. Using a gateway interface between the AMI meter and the customer's HAN – in contrast to having customer products connecting directly to the AMI meter – would add the convenience that a customer would need to contact FortisBC once only to establish the gateway. The customer would not need to contact FortisBC for additional devices that might be installed later.[60]

106. In addition, ensuring that there is a gateway on the customer side allows the customer to use non-ZigBee devices if the customer so chooses. The ability for customers to select protocol-bridging gateway devices promotes customer choice and may therefore promote innovation.[61]

107. Further, configuring the AMI meter to communicate only with an in-home display and/or gateway would be consistent with the approach BC Hydro has taken in its In-Home Feedback Devices Request for Expressions of Interest (RFEI).[62] This would enhance FortisBC's goal of province-wide consistency.[63]

108. During the oral hearing BCSEA-SCBC raised the concept of configuring the AMI meter to communicate only with an in-home display and/or gateway in cross-

[58] Exhibit B-15: BCSEA, *et al* IR 2: 77.4, pp. 8 – 9.
[59] Exhibit B-15: BCSEA, *et al* IR 2: 77.4.2, page 9.
[60] Transcript 3: page 372, lines 9 to 25.
[61] Exhibit B-15: BCSEA, *et al* IR 2: 86.1, 86.1.2, pp. 28-29.
[62] Exhibit B-11, BCSEA, *et al* IR 1: Appendix IR1 9.0, page 5 of 16
[63] Exhibit B-1: Application, section 8.2.3, page 128

examination of FortisBC's Panel 1. The FortisBC witnesses advanced no arguments against it;[64] nor was the idea opposed in FortisBC's argument.

(b) SEP 2.0

109. Smart Energy Profile (SEP) is the name of the software for home area networks (HAN) used in the ZigBee board in the AMI meter and in in-home displays and other HAN devices. What is important for present purposes is that there are two versions of SEP under discussion: SEP 1.x and SEP 2.0. SEP 1.x currently exists and is implemented in many HAN devices, such as BC Hydro's SMI meters. SEP 2.0 is still being revised and has not been finalized.

110. SEP 2.0 is significantly different from SEP 1.x.[65] First, SEP 2.0 is designed for use over a variety of communications media in addition to the physical layer used in ZigBee SEP 1.x.[66] Second, SEP 2.0 is intended to support a wide and expanding range of home automation *and other* services and functions that go beyond the relatively simple services and functions supported by SEP 1.x.

111. FortisBC proposes to implement the AMI meters with either SEP 1.x or SEP 2.0 and to choose which of the two approaches to implement based on its evaluation of the pros and cons when the time comes during the implementation of the AMI Project. It appears that FortisBC does not agree that Commission approval of the choice is warranted.[67] FortisBC acknowledges that SEP 2.0 is not needed for the AMI system to be fully functional as applied for.[68]

112. BCSEA-SCBC's view is that if the Commission issues a CPCN for the AMI Project the Commission should specify that FortisBC can implement SEP 1.x without further approval but that implementation of SEP 2.0 requires Commission approval. They take this position for the following reasons.

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[64] Transcript 2: page 245, line 20 to page 246, line 24.
[65] Transcript 2: page 248, line 23 to page 249, line 4.
[66] FortisBC says "IEEE 802.15.4 is the physical layer for ZigBee SEP 1.x and is an optional physical layer for SEP 2.0..." This was clarified in Exhibit B-11, BCSEA IR1 10.5, page 33. And see: Exhibit B-15, BCSEA, *et al* IR 1: 88.2, page 32.
[67] Transcript 2: page 250, lines 12-20.
[68] Transcript 2: page 249, lines 21-26 to page 250, lines 1-7.

113. First, to be clear, BCSEA-SCBC are not necessarily opposed to implementation of SEP 2.0 in the FortisBC AMI system. On the contrary, SEP 2.0 offers many potential improvements over SEP 1.x regarding energy conservation and efficiency functions and support for plug-in electric vehicles. SEP 2.0 also offers the possibility of providing HAN functionality within apartment buildings that SEP 1.x cannot necessarily support.

114. However, being much more powerful than SEP 1.x, SEP 2.0 raises potential security concerns from the customer's perspective that do not arise with SEP 1.x. For example, SEP 2.0 would apparently provide interconnectivity with a customer's premises alarm system. And, SEP 2.0 allows for use of other media, such as powerline, and for distances well beyond the normal range of ZigBee.[69]

115. Furthermore, because SEP 2.0 is still under development, FortisBC cannot answer questions about SEP 2.0's functions[70] and the Commission cannot be satisfied that implementation of SEP 2.0 is in the public interest.

H. RF Opt-out Tariff

116. Despite the convincing evidence cited above that FortisBC's advanced metering program would not cause adverse health effects, BCSEA-SCBC believe that the Commission should require FortisBC to establish an optional 'RF opt-out' tariff that would allow a customer, at the customer's expense, to have his or her meter specially configured so as not to use any radio frequency (RF) transmission or reception.

117. Key features of the optional RF opt-out tariff that BCSEA-SCBC support include the following:

(a) The default service provided by FortisBC to customers under the existing residential tariff would be defined as service using AMI meters as proposed in the AMI program. As such, the AMI meter's radio for communication with FortisBC would be functional (transmitting and receiving RF), and the ZigBee radio for

[69] Exhibit B-15: BCSEA, *et al* IR 1: 88.2, page 32.
[70] Transcript 2: page 249, lines 9-11.

communication with the customer would be, by default, in a non-transmitting mode unless the customer chooses to have it activated.

(b) The service provided under the optional RF opt-out tariff would use the same type of AMI meter as would normally be used; however, the meter's radio for communication with FortisBC would be turned off[71] for the duration of the time period in which the opt-out service is provided.

(c) The RF opt-out service would include bi-monthly manual meter reading.

(d) The RF opt-out tariff would be the same as the default tariff the customer would otherwise have (such as the standard residential inclining block tariff) except that the opt-out tariff would have an extra charge reflecting the extra cost of providing the manual meter reading and having an employee turn off the meter's radio.

(e) If and when an RF opt-out customer chooses to no longer use the opt-out tariff, the customer would be allowed to switch to the default service and tariff at no charge.

(f) A customer does not need to provide any reason for choosing the opt-out service.

118. It is clear that some FortisBC customers are deeply opposed to having an AMI meter on their premises because of the RF transmissions. It is also clear that, even if the Commission concludes on the evidence in this proceeding that the operation of the proposed AMI system would not cause adverse health effects and decides to issue a CPCN based on all the public interest factors, there may well be some FortisBC customers who remain deeply opposed to having an AMI meter because of the RF transmissions.

119. Moreover, BCSEA-SCBC acknowledge that for some individuals the fact that the meter is attached to *their home* exacerbates their opposition to smart meters, even though legally the meter is the property and responsibility of the utility. People may resent their perceived absence of <u>choice</u> in the matter in addition to opposing the RF transmissions as such.

[71] Presumably, most customers choosing the RF opt-out option would also choose not to activate the ZigBee radio in the meter.

120. The rationale for the proposed RF opt-out tariff is to provide concerned customers with a choice. The content of the proposed RF opt-out tariff embodies a compromise. On the one hand, it would not be free to the customer who opts-out. On the other hand, there would be no requirement to meet any particular criteria.

121. For clarity, BCSEA-SCBC support an RF opt-out tariff along the lines outlined by FortisBC in its response to BCUC IR 2.50.2.[72]

122. If the Commission does issue a CPCN and does favour an RF opt-out tariff then BCSEA-SCBC respectfully suggest that the Commission Panel define the key elements of the opt-out tariff as part of this proceeding, so that only a compliance filing is required.

I. Reporting

123. BCSEA-SCBC recommend that if the Commission approves the CPCN Application it require FortisBC to file semi-annual progress reports.

Part 4. Conclusion

124. In closing, BCSEA-SCBC acknowledge that FortisBC made substantial efforts to communicate with the public and to address concerns about the AMI meters before and during the Commission's proceeding. BCSEA-SCBC encourage FortisBC to continue to consult with ratepayers and stakeholders regarding whatever solutions to the metering system emerge as a result of the Commission's decision in this proceeding.

ALL THE ABOVE IS RESPECTFULLY SUBMITTED

[72] Exhibit B-14, BCUC IR 2.50.2.

April 25, 2013