NEW BRUNSWICK ENERGY AND UTILITIES BOARD

IN THE MATTER OF the New Brunswick Power Corporation and Section 107 of the *Electricity Act,* SNB 2013 c.7 and the Approval of an Advanced Metering Infrastructure Capital Project

EVIDENCE

August 1, 2019

New Brunswick Power Corporation

Advanced Metering Infrastructure Capital Project

Énergie NB Power

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1.0 Introduction

In accordance with section 107 of the *Electricity Act*, NB Power Corporation ("NB Power" or "the Corporation") is required to make an application to the New Brunswick Energy and Utilities Board (the "Board") for approval of a capital project where the total projected capital cost of the project is $50 million or more.

In this matter, NB Power is seeking approval from the Board of a capital project consisting of the procurement and deployment of Advanced Metering Infrastructure ("AMI"). This $92.0 million capital project, including $7.3 million spent to the end of FY 2018/19 and $84.7 million in real dollars[1] over the deployment period, is described in detail in this evidence.

In addition, NB Power is seeking approval of the creation of a deferral account with respect to the write-off and amortization of the remaining book value of NB Power's currently installed electricity meters as they are replaced with smart meters under AMI, outlined in more detail in Section 6.0.

The *Electricity Act* provides guidance to the Board as to the threshold for approval of a capital project application, as well as the factors to be considered in rendering its decision. The investment in AMI is aligned with NB Power's long-term Strategic Plan (2011-2040).

Background

Electric power systems across the globe are experiencing unprecedented change compelled by a number of key driving forces. NB Power believes the case for change is based on three fundamental shifts having particular impacts on the electricity industry.

[1] Real dollars is a value in dollars adjusted for inflation ($2019/20)

The first is the transformational change of advancing technology. In the electricity industry, new technology is simultaneously a threat to, and an opportunity for, the traditional utility. The threat is an ever-widening array of distributed energy resources, the pricing of which continues to fall. The impacts of customer-owned generation (solar, wind or otherwise), together with the potential electrification of transportation and the emerging potential for battery storage, create an uncertain future for both NB Power and its customers. At the same time, advances in electricity system operations enabled by new sensors, control and communication tools create an opportunity for NB Power to integrate these distributed energy resources with its system in a way that optimizes and therefore reduces system costs.

The pace of technological change has been increasing and will continue to increase. NB Power believes that continuing to plan on the basis of making investments in traditional utility assets in the face of such change may not be prudent and reasonable.

The second fundamental shift facing all utilities is evolving customer expectations and demands of their service providers. Increasingly, customers are expecting a more personal experience from service providers. Customers are heavily influenced by advances in digital technology and the availability of information and data. Customers are looking for more engagement and control of their energy needs. Customers expect a service that permits them the opportunity to generate their own electricity from renewable resources, to have improved information on their use of electricity and improved functionality in their ability to control both the level and timing of consumption.

While the evolution of customer expectations is just beginning to build, it is widely recognized that this trend is established. NB Power needs to continue its evolution so that it is prepared for the demands of customers.

The third shift is the introduction of climate change, which represents a fundamental consideration of the supply-side options in meeting customer needs. NB Power is

investing in the tools to address these new requirements as part of the Energy Smart NB Plan.

In Matter 375, NB Power led evidence with respect to the need for AMI, based on the three factors listed above, which remain vital considerations. NB Power believes this need has been generally accepted by the Board and the majority of interveners participating in Matter 375. At paragraph 88 of the Board Decision in Matter 375, the Board stated:

> The preponderance of the evidence and submissions leads the Board to view AMI as an evolutionary step towards grid modernization in Canada and elsewhere. Most interveners expressed qualified support for AMI, but not at this time.

In its analysis of the prudence of the AMI project presented in Matter 375, the Board recognized that a prudent project must be evaluated in the context of the factors set out in subsection 107(11) of the *Act*, and the short and long-term benefits of the project, both quantifiable and unquantifiable [See paragraph 76, Board Decision, Matter 375]. Ultimately, the Board placed significant emphasis on the business case, stating as follows:

> The quantifiable costs and benefits of the project are significant considerations in the Board's analysis. [Paragraph 89].
>
> Given all of these considerations, the Board is not satisfied of the prudence of the AMI capital project. Consequently, it is not in the public interest. The fundamental reason behind this conclusion is the Board's finding that no positive business case was established in the evidence. The demonstrated benefits to ratepayers must outweigh the expected costs that ratepayers will bear. [Paragraph 92].

The business case being presented in this application demonstrates a positive net present value of $31.1 million. The costs and benefits of AMI have been evaluated based on input received from various third parties retained by NB Power (whose reports are attached to this evidence). Further evaluation of the assumptions underlying the costs of

the project, and each of the associated benefit streams, was conducted through a number of internal reviews at operational and management levels. The high level results are presented in the following table:

Table 1.1	
AMI Lifecycle Net Present Value (NPV) 15 Years	
Total Costs	($109.6 million)
Total Benefits	$140.7 million
Total Net Benefit	**$31.1 million***
Discounted Payback Period	11.7 years

**differences due to rounding*

The business case is presented in Section 3.0 of the evidence. A comparison of the costs and benefits in the business case being presented in this Matter compared to the business case presented in Matter 375 is attached as Appendix A.

AMI is an investment in the energy future of NB Power's customers. With increased distributed energy resources putting demands on the grid and changing customer expectations, the grid will need to be more flexible and responsive. With two-way communication provided by AMI, and more frequent access to data, AMI enables many of the requirements needed to support the future grid, making AMI foundational to NB Power's grid modernization efforts. A modern grid will manage electricity in a sustainable, reliable and economic manner. Implementing AMI across the province will increase NB Power's visibility and control of electricity use on the grid, which in turn increases reliability. Without AMI, investments in increased system visibility, monitoring and controls will be required to support grid changes.

Through AMI, customers will be provided with more information about their electricity consumption. This information, delivered more frequently, will enable customers to make informed decisions about how they consume electricity. Consumption reductions will provide fuel and purchased power savings and will ultimately contribute to deferring the requirement to build a new power plant in the future.

AMI helps NB Power operate more efficiently, creating cost savings for customers. NB Power will save money from reduced in-person meter reads, avoided on-site meter testing and replacement, fewer customer service calls and reductions in staff. These savings will be passed on to customers through lower overall revenue requirements once full deployment is completed. This will help NB Power continue to provide competitive rates to customers.

Currently, NB Power does not know when a customer is without power until it is notified by the customer. With AMI, NB Power will know immediately when a customer's power is out, significantly improving outage identification and restoration efforts. During an outage, smart meters issue 'power-off' and 'power-on' messages in real-time. With this information NB Power will be able to quickly assess an outage, precisely and more efficiently dispatching crews, resulting in improved reliability.

As detailed in Section 3.5 of the evidence several of the benefits of AMI are avoided capital costs. NB Power's current meter infrastructure does not support an adequate load research program, a growing net metering program, or conservation voltage reduction. AMI, a single technology and investment, meets the requirements of all three of these programs. With the automated nature of the AMI data, operations, maintenance & administration (OM&A) costs associated with labour and cellular fees for each of these programs is also avoided and NB Power only has one technology as opposed to three that require ongoing operations and maintenance support.

The evidence put forward with this Application demonstrates that the quantified benefits of AMI are greater than the costs. In addition to this positive business case, AMI enables additional non-quantified benefits that NB Power has not included in its financial analysis. Some of these non-quantified benefits are non-quantifiable, while others will derive from new AMI-enabled services that NB Power has not yet submitted for Board approval. More detail on these benefits is provided in section 3.6.

The balance of NB Power's evidence is structured as follows:

Section 2.0 – Description of the Project

Section 3.0 – Net Present Value Business Case

Section 4.0 – Health, Safety and Security Considerations

Section 5.0 – Customer Communication and Engagement

Section 6.0 – Regulatory Deferral Account for Meter Write-off

NB Power retained Navigant Consulting Inc. to perform an independent third-party assessment of the AMI business case, business case model and all supporting evidence. Their report can be found in Appendix B.

2.0 Description of the Project

The AMI project proposes the replacement of approximately 360,000 residential and commercial meters across the province with smart meters and supporting infrastructure. Subject to Board approval, NB Power would begin implementing the network and systems in 2020/21 with the meters being deployed over the following three fiscal years.

AMI is not new to the utility industry. Utilities have been deploying AMI for more than a decade, and the technology continues to evolve to provide benefits that were not possible when utilities first began to replace their legacy metering. Today, AMI provides over 80 per cent of metering in Canada according to a recent Natural Resources Canada report[2], and its usage is growing. AMI has become the standard metering technology. Utilities implementing AMI have seen significant value from AMI data in areas such as improved distribution grid management, lower meter reading costs, the transition to time-differentiated cost-based pricing and reduced theft of service[3].

AMI consists of advanced two-way metering with the following components:

- Smart meters with advanced measurement capabilities and communication modules (to collect and transmit a wide range of meter data with greater granularity)
- Data collectors (to collect data from meters and transmit it to the head-end system)
- Wide-area network ("WAN") (backhaul to deliver data between the meters, collectors and head-end system)
- AMI system software (to receive and store data from the collectors) called a head-end system

[2] Overview of Canada's Clean Energy, Natural Resources Canada presentation to 8th International Conference on Integration of Renewable and Distributed Energy Resources, October 16-19, 2018, Vienna, Austria

[3] Advanced Metering Infrastructure and Customer Systems, Results from the Smart Grid Investment Grant Program, U.U. Department of Energy, Office of Electricity Delivery and Energy Reliability, September 2016

- Meter data management ("MDM") system (to store, analyze, and validate meter data)

The AMI project goes beyond the installation of technology components. The project includes services to modify NB Power business processes to maximize the value of the technology and integration with existing systems. The new technology will be integrated to NB Power's customer information system ("CIS"), geographic information system ("GIS") and outage management system ("OMS"). In addition, customer engagement plans will be implemented to maximize customer acceptance. NB Power's total project costs encompass technology, professional services of a System Integrator, customer engagement and the effort to integrate the solution into NB Power's operations.

The AMI project being proposed by NB Power uses a smart meter that can record consumption every 5 to 15 minutes and provides this information in a daily meter read. The meter also sends system health status information like memory errors, tamper alarms, high voltage alarms and read errors, providing near real-time data to the utility. This information is sent electronically to a data collector located in the customer's neighborhood. The collectors relay the data to an advanced metering control computer, known as the head-end system. The head-end system sends the data to a MDM system to validate the data. The data is sent to a customer information and billing system to prepare bills. Customers can access daily consumption data via the internet. The new meters are equipped with modules that enable communication with the network collection infrastructure and head-end system, so they can be read remotely and at frequent intervals, instead of once a month via a manual (in the case of analog meters) or drive-by (in the case of Automated Meter Reading ("AMR") meters) reading.

2.1 Why AMI is the Right Solution

NB Power's current fleet of meters is comprised of approximately 28 per cent analog meters and 72 per cent AMR meters. The areas with analog meters require a meter reader to walk from home to home, or drive to each individual premise, to read the meters each month while AMR requires driving through the area to collect the data. NB

Power began switching from analog meters to AMR meters over 15 years ago to reduce costs and like any utility that has yet to deploy AMI, NB Power's current business process for meter data collection is to a large extent manual. Even for areas that currently have AMR deployed, the data collection process involves visiting the area to collect information. Nevertheless, the nature of the information remains the same: a point in time reading.

There are limitations on how a single reading or a single consumption value for a billing period can be used. A single reading enables the billing process, but limits how consumption information can be used in other ways, for example in load research. AMR is deployed primarily in residential areas and demand reads are not taken via AMR.

Converting to AMR has allowed NB Power to improve the process of reading meters, billing customers and receiving payment for the energy consumed. By installing AMR meters that are read by drive-by data collectors, NB Power has improved the consistency of the billing period and reduced estimations, thereby improving customer service. However, for NB Power, the impetus for the modernization effort goes beyond what can be achieved by AMR. The manual nature of many current business processes limits the ways in which the utility can improve customer service and introduce new programs.

NB Power plans to deploy AMI province-wide for maximum benefit realization. NB Power analyzed the feasibility of a partial rollout (150,000 meters) which revealed that a full rollout to the entire population captures significantly more benefits in relation to the cost. There are fixed costs for such items as infrastructure, integration, and licenses, regardless of the size of the meter rollout (incremental costs are for meters and installation). A partial rollout would mean that only those customers with a new meter would receive the customer benefits afforded by AMI.

Selective meter replacement based on meter age or functionality is not feasible because AMI radio mesh communication requires a concentration of meters in a geographic area. Since both analog and AMR meters are dispersed across the province, there are no

concentrated geographic areas that make a limited deployment economically viable. Without a functioning mesh network, the AMI meters would have to be read manually until an adequate saturation level is reached. Furthermore, a partial deployment would require all current business processes and systems to remain in place, in addition to new processes, increasing ongoing costs to maintain duplicate systems.

AMI will enable two-way communication between customers' meters and NB Power. This communication network, along with the AMI meters, is essential to building a smarter, cleaner, more reliable and efficient power grid and will lay the foundation for many of the long-term customer benefits that NB Power will deliver through its Energy Smart NB Plan. AMI technology provides a multi-purpose platform for providing customer benefits.

A province-wide deployment will maximize operational and customer benefits as well as ensuring equity across all customer classes to participate in NB Power programs and new product offerings. The value of AMI is in the data it provides to both the utility and the customer. With the availability of more granular data, customers will experience improved reliability, reduced outage response time and ultimately will benefit from reduced operational costs. AMI will also improve the quality of the data available for class cost allocation studies and load forecasting. As a result, with AMI, NB Power will be able to improve its alignment with corporate goals, objectives and strategic initiatives.

As mentioned earlier, there is change in the electricity industry driven by evolving customer expectations. Customers want more information, more control and the ability to manage their energy needs and their bills. Rather than providing one meter reading per month per customer using the current manual and AMR methods, NB Power will collect customer energy usage data at a more granular level and be able to provide customers with visibility to the data. The detailed usage data that will be provided in near real time by AMI will empower customers to understand more clearly how and when they are using electricity, allowing them to make behavioral changes to lower their overall usage.

Customers also want the option to generate their own electricity from renewable energy sources, store excess energy in batteries and still remain connected to the grid. The shift toward electric vehicles ("EV") and the adoption of smart devices will continue to grow. In New Brunswick, there was a 39 per cent increase in EV purchases from December 2017 to December 2018[4]. All of these technologies are distributed energy resources (DERs) that create both an opportunity and a threat to NB Power. In order for NB Power to adapt its distribution system to accommodate increased penetration of DERs, it requires a greater ability to measure and manage the impact they will have on the power grid. AMI will provide the data necessary to understand the impact of dynamic load changes caused by DERs and enable NB Power to sustain energy service levels to all customers.

Affording customers the opportunity to manage their energy and more easily adopt renewable energy resources and electric vehicles also addresses climate change issues, and is all enabled through the data and visibility that AMI provides.

2.2 AMI Roll-out Strategy

NB Power has spent significant time understanding lessons learned from other jurisdictions that have implemented smart metering. Specifically, NB Power has engaged the support of industry peers involved in large smart metering projects in the southeast United States and with Central Maine Power, which deployed more than 600,000 smart meters, and who served as advisors to the U.S. Department of Energy on smart grid and stakeholder engagement. The project team has also spoken with utilities in British Columbia, Quebec and Ontario about their project successes and shortcomings.

The AMI roll-out plan is an extensive effort that will take almost four years to complete. NB Power will be engaging a System Integrator with broad AMI experience and knowledge of NB Power's chosen technologies and will provide oversight over the execution of the AMI project. Once the project is approved, the System Integrator will immediately commence a detailed execution plan. They will develop a master schedule which will

[4] Source: 2017 and 2018 Electric Mobility Canada Annual Reports

include all work to be performed by all AMI vendors including work required by NB Power. The System Integrator will also be responsible for the technical integrations required between NB Power's backend systems and the new AMI software components. They will develop an overall testing strategy and manage test execution to NB Power's satisfaction. By using an experienced System Integrator, NB Power is ensuring that best practices are followed while reducing the risk of cost and schedule overruns.

For the first year of the project, beginning with fiscal year 2020/21, the System Integrator, along with NB Power, will develop the business processes and integration of the software systems in preparation for network and meter installations. In AMI projects, installing the communications network before meters are replaced is preferred; therefore network components will be installed throughout the province to support the automated communication of data to and from meters. Approximately 1,000 meters will then be installed in selected areas of the province to test the system end-to-end. At this point, NB Power will evaluate its processes and the performance of the system before any further work is done or additional meters are installed. Experiences gained in the first year of meter deployment will allow NB Power to adjust and improve its processes, including customer engagement.

After the network components and initial meters are installed and tested, NB Power will begin deploying meters across the province in larger quantities from region to region. This will begin in fiscal year 2021/22, continuing during 2022/23 and end in 2023/24. NB Power has chosen a deployment strategy that balances the risk associated with the timeframe of the fixed price of meters and the achievement of maximum benefits. Meter deployment will be completed by geographic area in accordance with best practices to satisfy the technical requirements of the communications network. The overall deployment plan may be adjusted based on experience gained during initial meter deployment.

NB Power has conducted a risk assessment of the project and has prepared mitigation strategies.

2.3 AMI Project Costs

NB Power defines the AMI project as the timeframe between the issuance of the Request For Proposal ("RFP") for the AMI meters and related infrastructure in fiscal year 2016/17 and the completion of system-wide coverage of AMI in fiscal year 2023/24. The costs incurred during that time constitute the AMI project costs and are presented in actual dollars for the three historical years and real dollars ($2019/20) thereafter in Table 2.3.1. The project costs incurred to date are being tracked against the 10 per cent of projected capital expenditures permitted to be spent prior to Board approval as per Section 107(1) of the *Electricity Act*. They are also part of the capital costs that NB Power is seeking approval of in this application.

Table 2.3.1
AMI Project Costs
(in millions $)

	Fiscal Year	(1) Capital	(2) OM&A	(3) Total
(1)	2016/17A	$2.4	$0.4	$2.8
(2)	2017/18A	2.4	1.2	3.6
(3)	2018/19A	2.5	0.5	2.9
(4)	2019/20	0.7	0.6	1.4
(5)	2020/21	23.2	2.4	25.6
(6)	2021/22	21.8	3.9	25.7
(7)	2022/23	29.1	3.1	32.1
(8)	2023/24	10.0	2.4	12.4
(9)	**Total AMI Project Costs**	**$92.0**	**$14.5**	**$106.6**

Note to reader: Financial tables reflect differences due to rounding

This view of the costs is presented to properly capture the $92.0 million in capital that NB Power is seeking approval of in this application and to also demonstrate that there is an Operations, Maintenance and Administration ("OM&A") budget component required in order to implement AMI.

The project cost figures above are to be distinguished from the net present value analysis being presented in Section 3.0 which looks at the entire lifecycle of AMI. Since the majority of the costs will be incurred during the implementation years of the project (2021 to 2024), and the benefits will accrue each year the new meters are in service, it is necessary to look at the entire life of the meters to ensure the full value of the benefits is being captured.

3.0 Net Present Value Business Case

NB Power has taken a conservative, customer-centric approach to building the AMI business case. The proposed AMI project has been developed with customer expectations in mind, and NB Power intends to complete the required investment while maintaining competitive rates.

NB Power is presenting a business case that has resulted from a comprehensive review of the all of the costs and benefits put forward in Matter 375, taking into consideration the Board's detailed decision regarding specific benefits. NB Power also engaged subject matter experts, both internal and external, to determine if other benefits had been omitted that should be added to the business case and to validate that the costs and benefits being captured were still relevant.

In addition to Navigant Consulting Inc., who reviewed the AMI business case in its entirety, NB Power has retained the following independent experts to review a number of key assumptions underlying the business case:

1. Dunsky Energy Consulting – High bill alert savings; Projected solar adoption in New Brunswick (net metering); and Non-quantified customer and societal benefits
2. DNV GL Energy Insights USA, Inc. – Load research program
3. Kinectrics Inc. – Conservation Voltage Reduction (CVR)

3.1 Financial Analysis

For the AMI business case being put forward in this application NB Power prepared all of the costs and benefits leveraging the methodology used in Matter 375. A similar model and methodology has been used by more than 50 other utilities in North America.[5] In addition to the data provided by NB Power, the methodology inputs costs from the AMI

[5] https://utilassist.com/services/solutionssimplified/#open-overlay; https://utilassist.com/client-list/

vendor and industry standard metrics, along with key assumptions to determine the financial impact of AMI for NB Power. Several assumptions of note are:

- Meter asset life: Historically, utilities have used a 20-year meter asset life. Given the rapid changes in technology over the last 10 years and those expected in the future, the useful life of the meter was reduced to 15 years.
- Investment Analysis Period: The AMI investment analysis period is 17 years. This time frame captures the staggered meter deployment and the cost and benefits over the full 15-year life of the first set of AMI meters deployed. Benefits are calculated proportionately to the number of meters deployed and begin one year after the first meters have been installed.
- Contingency: The fixed capital contingency used in the business case is 2 per cent. This includes meters and hardware that are fixed cost items with a signed contract, representing approximately 50 per cent of the total project. The variable capital contingency on the remaining capital costs is 10 per cent. A contingency of 2 per cent was also included on OM&A costs.
- Consumer Price Index (CPI): The business case also includes an annual 2 per cent CPI added on most costs.
- Discount rate: NB Power used a discount rate of 5.25 per cent[6].
- Net present value: A net present value analysis does not consider sunk costs since it is looking at a series of future cash inflows and outflows in today's dollars. This approach is supported by the recommendations in the report completed by Navigant Consulting Inc, Appendix B.

As shown in Table 3.1.1 below, the present value of the life cycle costs of AMI total $109.6 million with a present value of $140.7 million in expected benefits resulting in a total net benefit of $31.1 million. The costs of AMI will be paid back during the life span of the new technology primarily through operational efficiencies, reduced OM&A, avoided capital costs, energy savings, and reductions in energy losses.

[6] Based on a forecasted cost of borrowing of 4.6 per cent, plus 0.65 per cent Debt Portfolio Management Fee.

Table 3.1.1	
AMI Lifecycle NPV 15 Years	
Total Costs	($109.6 million)
Total Benefits	$140.7 million
Total Net Benefit	**$31.1 million***
Discounted Payback Period	11.7 years

**differences due to rounding*

3.2 Present Value of the 15-Year Lifecycle Costs of AMI

The costs associated with AMI largely fall within three major areas. The largest amount comprises the acquisition and installation of meters and data collectors complete with the head-end system required to establish the network. Integrations with legacy enterprise systems account for the next highest cost allocation, with the cost of the MDM system being the other significant component. Table 3.2 lists the high level costs of AMI.

A summary of each cost and its 15-year present value is presented below.

Table 3.2
Present Value of 15 Year Lifecycle Costs of AMI

	Costs	(1) Total ($M)	(2) % of Total Costs	(3) Capital ($M)	(4) OM&A ($M)
(1)	3.2.1 AMI Capital	$50.1	45.7	$50.1	$0.0
(2)	3.2.2 AMI Operating	11.5	10.5	0.0	11.5
(3)	3.2.3 MDM Operating	10.1	9.2	0.0	10.1
(4)	3.2.4 Meter Installation Capital	9.9	9.1	9.9	0.0
(5)	3.2.5 CIS/WFM/ESB Capital	8.4	7.6	8.4	0.0
(6)	3.2.6 MDM Capital and AMI Project Team	7.3	6.7	7.3	0.0
(7)	3.2.7 CIS/ESB Operating	6.0	5.4	0.0	6.0
(8)	3.2.8 Corp Services & Other Capital	2.8	2.5	2.8	0.0
(9)	3.2.9 Utility Tax	2.6	2.4	0.0	2.6
(10)	3.2.10 Corp Services & Other Ops	0.7	0.6	0.0	0.7
(11)	3.2.11 Pre-Engineering Capital	0.1	0.1	0.1	0.0
(12)	**Total PV Costs**	**$109.6**	**100%**	**$78.6**	**$31.0**

Note to reader: Financial tables reflect differences due to rounding

3.2.1 AMI Capital Costs

AMI capital costs reflect the total cost of the AMI meters and modules based on vendor quotes provided to NB Power. Within the current contract, there is a fixed price on meters

that is valid to June 2023. This cost element includes a two per cent contingency on all meter and module-related costs and assumes a meter failure rate of 0.5 per cent per year[7]. The present value of these costs is $50.1 million.

3.2.2 AMI Operating Costs

AMI operating costs reflect meter base repairs, head-end infrastructure operating costs and network infrastructure operating costs. This category includes labour, server and licensing fees, network carrier costs for collectors, routers, point-to-point meters and other various components. Costs are based on vendor quotes provided to NB Power and include two per cent contingency. The present value of these costs is $11.5 million.

3.2.3 MDM Operating Costs

MDM operating costs reflect the fees associated with the Meter Data Management software, third party licensing and integration to NB Power's operating systems. It also includes an NB Power on-going labour component. The present value of these costs is $10.1 million.

3.2.4 Meter Installation Capital Costs

Meter installation costs include the cost of installing residential and general service meters, along with related costs for warehousing and meter seals. The costs reflect pricing from NB Power's selected vendor and include a 10 per cent contingency since costs have not yet been finalized with a contract (as of time of filing). The present value of these costs is $9.9 million.

3.2.5 CIS/WFM/ESB Capital Costs

Capital costs in this category reflect the costs of system integration for all meter-to-cash systems to AMI, including Customer Information System ("CIS"), Work Force Management ("WFM") and the Enterprise Service Bus ("ESB"). It is derived from vendor quotes provided to NB Power and includes costs for project management, business process

[7] Itron Accelerated Life Test Report, September 2017

redesign, change management and integration through Application Process Interfaces. In addition to the 10 percent contingency applied to all other variable capital costs, this cost includes a 15 per cent contingency on the initial vendor quote since the contract is not yet signed (as of time of filing) for a total of 26.5 per cent contingency on this cost item.

Additionally, this cost element includes a customer portal enabled by AMI to facilitate viewing of daily consumption and the provision of alerts (such as high bill alerts service) to aid in managing consumption. The present value of these costs is $8.4 million.

3.2.6 MDM Capital and AMI Project Team Costs

The MDM capital costs reflect the quote provided by the vendor to implement a MDM system. This also includes the NB Power project team costs. The present value of these costs is $7.3 million.

3.2.7 CIS/ESB Operating Costs

The CIS/ESB operating costs are the annual costs of maintaining the Customer Information System ("CIS") and Enterprise Service Bus ("EBS") interfaces with licensing and/or subscriptions to services for customer information. The present value of these costs is $6.0 million.

3.2.8 Corporate Services & Other Capital Costs

Corporate Services and other capital costs reflects interest during construction ("IDC") and corporate overhead rates applied to all capital projects. Additionally, it includes costs for other support services such for legal, supply chain (procurement) and information technology ("IT") support. The present value of these costs is $2.8 million.

3.2.9 Utility Tax

Utility tax per Section 1, paragraph b.1 of the New Brunswick *Assessment Act* is applied to the assets in this project at a rate of $2.186 per $100 of incremental net book value

of the current in-service meters and the net book value of the AMI meters replacing existing meters. The present value of these costs is $2.6 million.

3.2.10 Corporate Services & Other Operating Costs

Corporate services and other operating costs captures the expenses for NB Power's internal system security audits, contract management and other corporate support. The present value of these costs is $0.7 million.

3.2.11 Pre-Engineering Capital Costs

Pre-engineering capital costs are third party consulting costs incurred related to the project design. The present value of these costs is $0.1 million.

3.3 Procurement

NB Power started the AMI procurement process with the issuance of a request for proposals in fiscal year 2016/17 as part of a utility consortium with Emera affiliates Nova Scotia Power Incorporated, Emera Maine, and Tampa Electric Company. The consortium members recognized that collaboratively creating the RFP and working together to manage the procurement and evaluation process provided clear benefits and costs savings. By working with the consortium, over $10 million (more than 20 per cent) in AMI vendor costs savings have been realized. Additional benefits include reduced legal costs and more favourable contract terms through greater negotiating power.

NB Power, through this process, has selected a technology that meets or exceeds all mandatory functional requirements. It incorporates the total cost of ownership over the life of the asset and provides the best future capabilities for NB Power.

The major components in the procurement plan include:

<u>AMI Meter Equipment and Related Infrastructure</u>

The AMI vendor will provide the core network and solution for the AMI project including the meters, communications modules, communications network and the head-end

system responsible for coordination of the communication to all the devices. The AMI vendor contract has been executed, and is contingent on Board approval of this AMI application.

Meter Data Management

The MDM system is the central repository of meter data and is responsible for providing data to the other systems as required. The MDM system is also the integration hub for AMI meter data where multiple systems can access validated data. The RFP was issued, responses evaluated and a vendor selected. Contract negotiations have not yet concluded as of the time of filing and will be contingent on Board approval of this AMI application.

Meter Installation Services

With approximately 360,000 meters to install, NB Power has selected a vendor to perform installation services. The vendor will be responsible for the inventory, storage, staging and labour required to perform the installation effort. The RFP was issued, responses evaluated and a vendor selected. Contract negotiations have not yet concluded as of the time of filing and will be contingent on Board approval of this AMI application.

System Integrator

AMI requires multiple integrations to NB Power legacy systems. The Project team requires professional services with the requisite technical expertise to lead and support these efforts. The RFP for these services was issued, responses evaluated and a vendor selected. Contract negotiations have not yet concluded as of the time of filing and will be contingent on Board approval of this AMI application.

3.4 NB Power Costs Compared to Other AMI Deployments

In order to provide a comparison of the cost of NB Power's AMI project to other AMI projects, NB Power reviewed Canadian publications regarding AMI installations. Not all jurisdictions clearly stated in their reports if the calculations included lifecycle cost

analysis shown in present value terms or if it was simply the costs to the end of deployment.

- Ontario's (includes Hydro One)[8] cost per meter across 73 distribution companies was $293. The cost for Hydro One only was $550
- BC Hydro's[9] cost per meter ranged from a present value of $404 to $482 in nominal dollars
- Hydro Quebec's[10] all-in cost was $266 per meter
- Nova Scotia Power's[11]all-in cost is estimated to be $269 per meter

NB Power's all-in lifecycle cost per meter ranges from a present value of $304 ($109.6 million/360,000) to $375 ($135 million/360,000) in real dollars. Looking strictly at the cost to the end of deployment NB Power's cost per meter is $296 ($106.6 million/360,000),

3.5 Present Value of the 15 Year Lifecycle Benefits of AMI

The AMI project will provide broad benefits across the utility and extend to NB Power's customers. Table 3.3 lists the identified benefits that have been quantified as part of the financial analysis of the AMI investment. With the exception of Conservation Voltage Reduction and Avoided Cost of Meter Services Manager Salary all benefits are prorated based on the AMI meter penetration on an annual basis and are recognized one year after the installation. A summary of each benefit and its 15 year present value is presented below. In general these benefits are escalated over the period of the business case and discounted to 2019/20 dollars at a rate of 5.25 per cent. Detailed information

[8] 2014 Annual Report of the Office of the Auditor General of Ontario. Ministry of Energy – Smart Metering Initiative. Chapter 3, Section 3.11. December 9, 2014. http://www.auditor.on.ca/en/content/annualreports/arreports/en14/311en14.pdf ($1.4B/4.8M meters)($660M/1.2M)

[9] BC Hydro. Smart Metering & Infrastructure Program – Program Completion and Evaluation Report. December 21, 2016 ($779.2M/1.93M meters)

[10] http://www.regie-energie.qc.ca/documents/rapports_annuels/rapp_ann_2013-2014_ang.pdf ($997.4M/3.75M meters)

[11] https://uarb.novascotia.ca/fmi/webd/UARB15 NS Power Application for Advanced Metering Infrastructure ($133.2M/495K meters)

and calculations for each of the benefits can be found in Attachment 1, AMI Benefits Sheets, and in Attachment 2, AMI Business Case Model.

Table 3.5
Present Value of 15 Year Lifecycle Benefits of AMI

	Benefits	(1) Total ($M)	(2) % of Total Benefits	(3) Reference
(1)	3.5.1 Reduced Manual Meter Reading and Meter Service Orders	$39.9	28.4	Attachment 1, Page 1
(2)	3.5.2 Avoided Meter Replacement Costs	22.0	15.6	Attachment 1, Page 2
(3)	3.5.3 Conservation Voltage Reduction	16.2	11.6	Attachment 1, Page 3
(4)	3.5.4 High Bill Alert Service	15.4	10.9	Attachment 1, Page 4
(5)	3.5.5 Distribution Network Losses	15.0	10.7	Attachment 1, Page 5
(6)	3.5.6 Meter Accuracy Losses	11.5	8.2	Attachment 1, Page 6
(7)	3.5.7 Avoided Cost of Load Research Program	5.2	3.7	Attachment 1, Page 7
(8)	3.5.8 Avoided Cost of Net Metering Program	4.8	3.4	Attachment 1, Page 8
(9)	3.5.9 Avoided Cost of Meter Services Manager Salary	1.8	1.3	Attachment 1, Page 10
(10)	3.5.10 Avoided Cost of Meter Reading Vehicles	1.8	1.3	Attachment 1, Page 11
(11)	3.5.11 Outage Restoration (Crew Management)	1.6	1.1	Attachment 1, Page 12
(12)	3.5.12 Reduced Customer Inquiries	1.4	1.0	Attachment 1, Page 13
(13)	3.5.13 Avoided Cost of Handheld System	1.4	1.0	Attachment 1, Page 14
(14)	3.5.14 Unbilled / Uncollectable Accounts	1.2	0.8	Attachment 1, Page 15
(15)	3.5.15 Avoided Cost of Meter Reading Supervisor	1.0	0.7	Attachment 1, Page 16
(16)	3.5.16 Reduced Overtime for Meter Service Orders	0.6	0.4	Attachment 1, Page 17
(17)	**Total PV Benefits**	**$140.7**	**100%**	

Note to reader: Financial tables reflect differences due to rounding

3.5.1 Reduced Manual Meter Reading and Meter Service Orders

AMI will deliver measurable customer benefits by automating many meter reading functions. The reduced manual meter reading and meter service benefit is based on the reduced need for manual meter reading and support staff functions. The field work reduction is attributable to the ability to remotely read the meters on demand as well as to utilize the remote connect/disconnect switch, reducing costs associated with the manual read including salaries, benefits, vehicle operating costs and miscellaneous expenses. It is estimated that of the 55 staff required in meter services today (36 full-time NB Power employees ("FTEs") and 19 contractors) only 10 FTEs will be required after AMI is implemented. There are seven FTEs in meter services support that will no longer be required as a result of AMI. The present value of this benefit is $39.9 million.

3.5.2 Avoided Meter Replacement Costs

The budget for maintenance, repair and replacement of the meters NB Power currently has in the field can be saved and captured as an AMI benefit since the installation of new meters will allow NB Power to avoid these costs. The business case assumes a weighted average based on quantity of residential and demand meters lifecycle resulting in 4.41 per cent of the meter population assumed to be replaced on an annual basis. This takes into account the new meters required plus the labour to perform the field meter change work. This approach also captures required Measurement Canada meter replacements as scheduled each year. The present value of this benefit is $22.0 million.

3.5.3 Conservation Voltage Reduction

Conservation Voltage Reduction (CVR) uses smart grid technology to reduce energy consumption by dynamically optimizing voltage levels. Based on a report from Kinectrics (found in Appendix D) CVR can reduce energy use by 48 GWh annually without AMI by using an end-of-line sensor, such as a pole top transformer connected device, which provides the feedback loop to the CVR head end. Alternatively, AMI acts as that end-of-line sensor, thereby avoiding the cost of purchasing the additional end-of-line sensors as well as the ongoing maintenance and communication costs associated with the sensors. The AMI based CVR system also allows NB Power to reduce energy use by an additional 12 GWh as opposed to the non-AMI based CVR system due to improved information upon which to operate substation feeder voltage regulators. The avoided capital, operating and maintenance costs of the end-of-line-sensors coupled with the additional energy savings have a present value of $16.2 million.

3.5.4 High Bill Alert Service

Offering customers multi-channel access to monitor their electricity consumption can lead to increased awareness of usage and increased conservation behaviour. NB Power will offer its customers a high bill alert service that will provide more frequent information to customers when their bill is trending to be higher than their usual energy consumption compared to the same month of the previous year or based on forecasted weather trends. Many utilities in North America have implemented bill alert programs with a

resulting reduction in energy usage. Although NB Power will be using multi-channels such as telephony, text and email to alert customers, the benefit is calculated based on alerts provided by email. It is estimated that over 50 per cent of NB Power customers will participate by 2024 after AMI is fully deployed. High bill alerts will be offered as an opt-out service with the assumption of a 10 per cent opt-out rate. Customers are projected to reduce 0.7 per cent of annual consumption on average as referenced in Appendix C. The present value of this benefit is $15.4 million.

3.5.5 Distribution Network Losses

The data provided by AMI allows an opportunity for NB Power to create programs that can be used to reduce overall distribution system losses. Programs that contribute to this include:

- Improved asset management (e.g., transformer monitoring to identify over and under sized assets)
- Theft detected from meters (removal and reverse energy flow) and voltage data and alarms combined with connectivity information identifying potential taps or using transformer metering programs to identify high losses

Other AMI projects have reduced distribution losses (outside of improved meter accuracy) by 0.25 per cent to 0.5 per cent. NB Power estimates that a 0.25 per cent reduction can be achieved resulting in a present value of $15.0 million for this benefit.

3.5.6 Meter Accuracy Losses

Analog (electromechanical) meters slow down over time. This causes NB Power to under-measure consumption on older assets. Utilities that upgrade their metering infrastructure can see a 0.5 per cent to 1.0 per cent increase in their kWh reads resulting from improved meter accuracy.[12] NB Power has been updating its metering assets to AMR meters; however, approximately 28 per cent of the fleet are still analog meters. This

[12] EPRI Accuracy of Digital Electricity Meters, May 2010

benefit assumes a 0.5 per cent increase in kWh reads on the remaining analog meters in the field. The present value of this benefit is $11.5 million.

3.5.7 Avoided Cost of Load Research Program

NB Power lacks current load research data suitable for class cost allocations and dynamic rate design. A modern load research program would allow NB Power to: estimate load factors and coincidence factors; assess and design rates to address cross-subsidization; and provide appropriate economic signals in consideration of disruptive technologies and increased customer expectations. It would also enhance DSM program planning and customer service. In its decision in Matter 430, the Board recognized this fact and directed NB Power to submit a proposal for an enhanced load research program.

Prior to receiving this directive, NB Power engaged DNV GL Energy Insights USA, Inc. to determine the size of a load research program that would be required to meet all of these needs (see Appendix E). The recommendation stated that initially 1,061 load research meters would be required as well as staff to manage and validate the data. In addition, there will be cellular communication fees to transmit the data to head office. The report also recommends a 20 per cent annual growth (220 meter per year) in the load research meter population in order to expand and improve the statistical performance and overall coverage of the sample. Beginning in 2024 after AMI is fully deployed, the interval data from the AMI system provides the level of detail and granularity required for adequate load research data without adding additional infrastructure. The avoided cost of the annual growth in the load research population associated staffing costs and cellular fees can be attributed as a benefit of AMI. The present value of this benefit is $5.2 million.

3.5.8 Avoided Cost of Net Metering Program

NB Power currently offers a net metering program to customers with the option to connect their own environmentally sustainable generation unit to NB Power's distribution system. When customers enroll in NB Power’s net metering program, NB Power replaces the existing meter with a bi-directional meter to allow for the measurement of both delivered and received energy. Since AMI meters provide the two-way communication

capability required to support net metering, NB Power can avoid the cost of purchasing and installing bi-directional meters in the future. The forecasted uptake of solar generation is based on a 2017study conducted by Dunsky Energy Consulting (see Appendix F - Projected Solar Adoption in New Brunswick). In addition to the avoided meter costs, there will be avoided costs of up to 2.75 FTEs required to perform back office work for net metering in light of the anticipated growth. The present value of this benefit is $4.8 million.

3.5.9 Avoided Cost of Meter Services Manager Salary

With the reduction of work load in the meter services group as a result of AMI, the Meter Services Manager position will be eliminated and remaining work will be redistributed to other managers. This benefit is being realized in FY 2019/20 because the individual who held this role has joined the AMI project team and this position has not been backfilled. If the AMI project does not proceed, this position will need to be filled. The present value of the benefit is $1.8 million.

3.5.10 Avoided Cost of Meter Reading Vehicles

Currently, NB Power purchases and maintains 27 vehicles for meter readers and meter changers. The vehicles are replaced every five years due to the amount of mileage and the constant wear and tear on them. Once AMI is in place the need to purchase all but one of these replacement vehicles will be eliminated. The present value of this benefit is $1.8 million.

3.5.11 Outage Restoration (Crew Management)

An AMI enabled distribution network provides visibility to the grid and the meters provide a message when power is out and/or restored to a customer. The meter also supports two-way communication that provides control room operators and the outage management system (“OMS”) with visibility on the power status of customers in a geographic area. With this visibility, a number of false positive service requests from customers who believe they are experiencing a power outage caused by the grid can be reduced. This benefit captures the value of having fewer work orders and therefore

avoiding the costs associated by sending field crews unnecessarily. The present value of this benefit is $1.6 million.

3.5.12 Reduced Customer Inquiries

Customer Care advisors, who have limited access to data, handle calls from customers who have concerns regarding estimated bills and high bills. With the deployment of AMI, estimated readings and perceived incorrect billing will be reduced. Using channels such as web, email and telephony, customers can be notified of potential high bills and provided with more granular data to help them better understand their consumption. Ultimately, the goal is to help customers trust their bill and reduce these specific call types. It is estimated that the reduction in calls will result in the elimination of two FTEs within Customer Care, resulting in a present value of $1.4 million in savings.

3.5.13 Avoided Cost of Handheld System

Approximately 72 per cent of NB Power's fleet of meters is currently made up AMR meters that are read using handheld reading equipment. Once AMI is in place, the annual software costs of the equipment as well as its replacement costs every five years will be reduced. Some equipment will be retained to accommodate customers who choose to opt out of having an AMI meter. The present value of the reduction in costs is $1.4 million.

3.5.14 Unbilled/Uncollectable Accounts

AMI enables functionality such as remote disconnect/reconnect, prepayment and load limiting that will enable customers to manage their energy usage. These tools, coupled with the ability to see more detailed information on their usage, will help some customers avoid disconnection. Currently, accounts that result in disconnection often have corresponding write-offs for unpaid balances. Helping customers manage the amount of energy they consume will reduce the amount of write-offs. The present value of this benefit is $1.2 million.

3.5.15 Avoided Cost of Meter Reading Supervisor

NB Power currently employs two meter reading supervisors. Once AMI is fully deployed there will be significantly fewer meter readers, eliminating the need for one meter reading supervisor. This benefit cannot be realized until AMI has been fully deployed. The present value of this benefit is $1.0 million.

3.5.16 Reduced Overtime for Meter Service Orders

Some reconnects of customer power are conducted after normal business hours, resulting in overtime being paid to the technicians who perform the work. With AMI, disconnects and reconnects can be done remotely, eliminating the need for an estimated 95 per cent of the overtime work related to reconnects. The present value of this benefit is $0.6 million.

3.6 Non-quantified Customer and Societal Benefits of AMI

In addition to clear, near-term, quantifiable savings opportunities, the investment in AMI infrastructure is designed to enable new services and additional value throughout the meters' lifetime. NB Power asked Dunsky Energy Consulting ("Dunsky") to review the list of quantified benefits and identify non-quantified benefits complementary to the AMI business case.

Dunsky identified twelve additional benefits that NB Power had not quantified, but that would likely provide real benefits to NB Power, its customers and/or society. These include time-varying rates, which can provide significant benefits to customers and NB Power by providing more efficient price signals, and geographically-targeted demand-side management (DSM) programs, which can avoid or defer costly transmission & distribution ("T&D") investments based on AMI-derived visibility into grid needs and patterns.

Other non-quantified benefits do not depend on new services: AMI is expected to enable improved DSM programs for all New Brunswickers; reduce the duration of outages and associated costs to people and businesses across the province; and reduce greenhouse

gas emissions, thereby potentially reducing costs associated with carbon levies or compliance rules. Dunsky assigned a rating of 1-3 to each additional benefit, as an indication of its scale. The additional non-quantified benefits are detailed in Appendix G – AMI – Non-Quantified Benefits.

4.0 Health, Safety and Security Considerations

The safety of employees and all members of the public is NB Power's top priority. NB Power ensures that safety is the top priority in every job and is paramount in this project. NB Power follows best practices for safety, including ensuring the smart meters meet current safety standards, and will follow safe installation procedures to prevent incidents from occurring.

4.1 Radiofrequency Emissions

The Board considered issues regarding the health effects of human exposure to radiofrequency (RF) emissions in Matter 375, concluding as follows at paragraph 70:

> The Board accepts that Safety Code 6 is the applicable industry safety standard in relation to RF emissions with respect to the smart meters proposed by NB Power. Further, the Board accepts the evidence that the smart meters proposed by NB Power fall well within federal government standards, as set out in Safety Code 6.

Health Canada Safety Code 6 (attached as Appendix H) remains as part of an exhaustive federal regulatory framework regarding radio communications, which covers both the technical requirements of radio apparatus, as well as health and safety requirements associated with RF exposure limits.

In addition, NB Power has retained Dr. Michel Plante to review the compliance of these meters with the requirements of Safety Code 6. This evidence, which appears at Appendix I, again confirms that the meters proposed for deployment fall within the standards established in Safety Code 6.

4.2 Safety

All of NB Power's meters meet industry standards and are subject to rigorous testing, and these requirements apply to the new smart meters as well. The Underwriters Laboratories (UL) certifies the meters. UL is an independent safety science company that

offers smart meter testing and certification. In response to the absence of safety standards, UL published the UL 2735, Standard for Safety for Electric Utility Meters in May 2013. This standard covers the construction and performance requirements of meters. The smart meters that NB Power has selected meet the new UL2735 safety standard. The UL2735 tests cover a full range of conditions, such as temperature, dust, mold, rain and mechanical. Please see Appendix J for the UL certificates issued for the smart meters that NB Power has selected.

With AMI, NB Power will have the ability to detect high temperature and high voltage events that occur at the meter and take appropriate action. As part of the meter deployment process each meter socket will be inspected before and after the old meter is removed to identify and address any potential safety concerns.

4.3 Privacy and Security

Protecting customer data is a top priority for NB Power, and as such the utility adheres to strong privacy protection practices. Information is encrypted (coded), and sent over a secure network which incorporates multiple layers of security. As a result, no private, customer-identifying information is collected or transmitted across the network.

Cyber security is a mandatory requirement of the AMI system, from end-to-end. Security safeguards will be built into the design and implementation of the smart grid and smart meter system. A comprehensive, defense-in-depth approach will ensure that we have top security measures at every level.

North American Electric Reliability Corporation ("NERC") cyber security standards have been incorporated in New Brunswick under the Compliance and Enforcement monitoring program established under Part VII of the *Electricity Act*. In addition, NB Power is contractually obligated to ensure secure network infrastructure is established at the time of ordering the meters. Before the implementation of the system, all components will be reviewed following strict cyber security criteria and will be continuously monitored for any potential issues by NB Power's IT Security Team.

5.0 Customer Communication and Engagement

Based on Board feedback in Matter 375, NB Power committed to building awareness and understanding of its grid modernization efforts, including a proposal to install smart meters, and ensuring customers understand how a smarter, more efficient power grid will benefit them. NB Power expects that a small percentage of customers may not want a smart meter and have prepared an approach to be able to respond to these requests.

5.1 Public Outreach

As part of the strategic communication and engagement plan, NB Power began outreach to customers and other key stakeholders in 2018. The goal of the early communication and outreach efforts included listening closely to customers to gain insight into their knowledge and opinions of smart grid and smart meters in order to ensure information being provided would be meeting their needs.

NB Power developed a four-phase communications and engagement plan to support the proposed meter deployment. The report labeled "What Was Said" found in Appendix K was prepared by NATIONAL Public Relations and focuses on the engagement efforts of Phase One.

The following is the **Key Findings** section from the report:

> *More than two thirds, or 67%, of engagement survey participants confirmed they had heard the term "smart meter" recently, suggesting there is a relatively high level of smart meter awareness among New Brunswickers. Respondents who identified as Seniors were the most aware (74%) while those who identified as Low Income were the least aware (61%).*
>
> *Participants were asked about the importance of six smart meter benefits. Having power restoration efforts begin quicker was cited as the most important benefit, followed closely by receiving alerts when your energy use goes up. The third most important benefit was access to detailed energy information. Senior and Low Income participants' responses followed the same ranking.*

A number of key themes emerged when New Brunswickers were asked to share any concerns they might have about smart meters. More than 60% of survey participants did not comment. Of the 40% who answered the question, 19% wanted more information on smart meters and 6% expressed support for the smart meter deployment. The concerns expressed related to:

- *Cost and financial considerations*
- *Cyber security*
- *Reliability of the smart meters (including accuracy of reporting, data sharing, and service)*
- *Glitches with the new technology (interruptions in service, malfunctions, technical difficulties)*

Other comments included health concerns related to radio frequency, environmental considerations (i.e. wanting solar power instead of smart meters), as well as comments focused on safety, customer service, and potential impacts on jobs. A small number felt smart meters weren't really needed and said they did not want a smart meter, nor would they plan to use a smart meter.

These themes are consistent with the conversations that NB Power employees had with thousands of New Brunswickers at home shows and events throughout the province. Some New Brunswickers were looking for more information about smart meters (i.e., What are they? How much do they cost? Do I already have a smart meter?), some were questioning potential rate impacts, and a couple of home show visitors inquired about potential health impacts.

In summary, learnings from the Phase 1 public engagement process will help NB Power continue to build awareness of the benefits of smart meters and the need to modernize the grid. This information will inform the next phases of planned public and stakeholder engagement to build further understanding and awareness on the benefits of smart meters.

Outreach efforts were focused on these activities:

<u>Events</u>

Since early 2019, NB Power participated in home shows and events across the province. This provided the opportunity to present information on smart grid, smart meters and engage with the diverse New Brunswick customer base and the general public at large.

At many of these events there were interactions with hundreds of people, sharing information and answering questions about smart meters.

NB Power's presence at these events included an information booth hosted by knowledgeable employees who communicated directly with New Brunswickers and answered their questions. Important public feedback at these events has allowed for direct contact and a deeper understanding of what the public interests are when it comes to smart grid and smart meters.

Stakeholder Meetings

Smart meters and smart grid touch on issues of vital importance to the province and have important implications for stakeholders interested in economic development, innovation, clean energy, smart communities, and consumer empowerment. NB Power initiated outreach to stakeholders across the province through one-on-one meetings, NB Power community liaison committee meetings and various conferences to share information and gather input on the smart grid and smart meter proposal.

Online Survey

NB Power launched an online survey in June 2019 through nbpower.com to find out how familiar New Brunswickers are with smart meters, which smart meter benefits are most appealing to them, and whether they have questions or concerns about the meters.

5.1.1 Impact and Demographics

Overall, New Brunswickers expressed interest, engaged, or provided feedback to NB Power over 158,000 times through both on-line and in-person touchpoints, ranging from surveys to bill inserts to home show and trade show participation. This includes New Brunswickers from all communities and regions of the province, as well as diverse populations, with focused efforts to ensure the inclusion of low-income households, senior citizen groups, and First Nations communities.

5.1.2 Public Information Resources

NB Power strives to make it easy for customers to have access to credible, accurate information about smart grid and smart meters. As such, extensive information resources are provided on NB Power's website which can also be accessed via mobile phones. The materials include fact sheets, video, frequently asked questions, and infographics created by NB Power, as well as links to information developed by relevant agencies and independent experts. Much of this material is made available in printed form at home shows and other events.

5.1.3 Internal Communication

Employees can be influential in helping to inform their families, friends, and neighbours. An internal employee education program began more than two years ago, starting with employees who would be affected by the proposed AMI deployment. In the intervening period, this has broadened to encompass all employees, providing employee briefings, addressing common questions and providing fact sheets on the key benefits of AMI.

5.2 Opt-out Policy

Upon approval of the AMI project by the Board, NB Power will offer customers the option to opt-out from receiving a smart meter. The smart meter will be the standard meter going forward and customers choosing a non-standard meter will be advised of a fee to be applied monthly to recover the operational costs of reading their meter.

NB Power has reviewed the experiences in other North American jurisdictions as well as regulatory decisions, and is recommending that the opt-out rate be calculated and approved after full deployment of the smart meters so that final costs will be known. The evaluation conducted to date assumes approximately two per cent of customers may opt-out, and in order to minimize the cost to opt-out customers NB Power recommends a bi-annual meter read, rather than monthly, with the expectation that these customers will enroll in the Equalized Payment Program. Using these criteria, the estimated cost would be approximately $4 per month.

NB Power is proposing a methodology and a monthly rate based on a cost-recovery model. The costs considered for customers opting out of the standard smart meter are those directly associated with manual meter readings and any incremental support requirements. The fee is intended to cover operational costs only.

After deployment is complete, a phased multi-media customer engagement strategy will be rolled out to all customers who continue to have a non-standard meter. NB Power will ensure customers understand the costs and terms of keeping their existing meter, and provide two months to confirm their choice.

NB Power is also proposing that the following eligibility criteria be met in order for a customer to opt out of a smart meter:

- the customer account must be either residential or seasonal
- the customer must be the owner of the premise
- the account must be on Equalized Payment Plan

Based on experience in neighbouring jurisdictions, a further analysis of cost and recovery requirements will be completed at the end of the project, and a final fee identified and requested. No fee will be charged until approval has been received by the Board.

6.0 Regulatory Deferral Account for Meter Write-off

NB Power expects to begin the installation of smart meters in October 2021 subject to Board approval. NB Power expects to install approximately 118,000 meters in FY 2021/22, 179,000 meters in FY 2022/23 and the final 61,000 meters in FY 2023/24. In total, it is expected that $15.6 million in remaining net book value will be written off. Without an approved regulatory deferral account, the net book value of the meters removed would be written off to net earnings under the NB Power property, plant and equipment accounting policy in the year that they are removed.

NB Power is proposing that a deferral account be established in order to levelize the recognition of the expense over a longer period of time. The capital project is expected to be completed over a three-year period. NB Power is requesting to allocate the write-off over five years starting in FY 2021/22. The proposed deferral will be included as part of NB Power's 2021-2031 10-Year Plan which will consider the impact on rates, impact on earnings and the impact on the debt/equity ratio. NB Power believes the five year amortization period provides a reasonable balance between these three considerations.