

NOVA SCOTIA UTILITY AND REVIEW BOARD

IN THE MATTER OF THE PUBLIC UTILITIES ACT

- and -

IN THE MATTER OF AN APPLICATION by NOVA SCOTIA POWER INCORPORATED
for approval of its **Annual Capital Expenditure Plan for 2022**

BEFORE: Roberta J. Clarke, Q.C., Panel Chair
Steven M. Murphy, MBA, P.Eng., Member
Richard J. Melanson, LL.B., Member

APPLICANT: **NOVA SCOTIA POWER INCORPORATED**
Blake Williams, Senior Regulatory Counsel
Matthew Gorman, Regulatory Counsel

INTERVENORS: **CONSUMER ADVOCATE**
William L. Mahody, Q.C.
Emily Mason, Counsel

SMALL BUSINESS ADVOCATE
E.A. Nelson Blackburn, Q.C.
Melissa P. MacAdam, Counsel

INDUSTRIAL GROUP
Nancy G. Rubin, Q.C.

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EFFICIENCYONE
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PROVINCE OF NOVA SCOTIA

Nova Scotia Department of Natural Resources
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Peter Craig

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BOARD COUNSEL: S. Bruce Outhouse, Q.C.

FINAL SUBMISSIONS: April 27, 2022

DECISION DATE: June 9, 2022

DECISION: The Board approves the 2022 ACE Plan and provides directions to Nova Scotia Power in Paragraph 213 of this decision.

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APPENDIX

Schedule “A” - 2022 ACE Plan Projects Approved by Board

1.0 INTRODUCTION

[1] Each year Nova Scotia Power Inc. files an Annual Capital Expenditure (ACE) Plan outlining its proposed capital expenditures for the upcoming year. As a result of an amendment to the *Public Utilities Act*, R.S.N.S.1989, c. 380, for a large-scale public utility, such as NS Power, capital projects exceeding \$1,000,000 must generally be approved by the Board. Prior to the amendment, the threshold was \$250,000.

[2] NS Power's 2022 ACE Plan sought approval for capital projects totalling \$181.1 million. This decision is about whether the Board should approve this proposed capital spending.

[3] Based on the evidence presented, and after considering the submissions made by the parties participating in this proceeding, the Board has determined there is sufficient justification for the need, and the corresponding cost estimates, for the proposed projects. Therefore, the Board approves the 2022 ACE Plan.

[4] In addition to considering the specific projects submitted for approval in the ACE Plan, the Board has taken the opportunity presented by the annual filing to address more general issues relating to capital spending and the approval process.

[5] In this decision, the Board has commented on the following:

- Project scoping and management;
- Cost minimization;
- Reliability investments;
- The Economic Analysis Model (EAM);
- Revenue Requirement;
- Contingency and contingency guidelines;
- Eastern Clean Energy Initiative (ECEI) and Impact of Recent Provincial and Federal Legislation;
- Alignment with the 2020 Integrated Resource Plan (IRP);
- Total cost of ownership for IT projects and electric vehicles; and
- Impact of COVID-19 on capital spending and lessons learned.

[6] In addition, the Board directs NS Power to take certain actions as outlined in Paragraph 213 of this decision.

2.0 ISSUE

[7] The Board must decide whether the ACE Plan program and spending that NS Power asked to have approved are prudent, necessary, and justified.

3.0 ANALYSIS AND FINDINGS

[8] Each year when NS Power files its ACE Plan application, the Board takes the opportunity to explore issues related to the activities the utility proposes and the way spending is budgeted and justified. The Board identifies these issues early in the proceeding and seeks comments from the parties on the issues list before it is finalized.

[9] The Board considers these issues important, as there have been limited opportunities to publicly consider them. This is because there has been no general rate application (GRA) by NS Power since 2013, partly due to Rate Stabilization Periods. The Board observes, however, that NS Power has filed a GRA, to be heard in September, 2022. Some of the issues canvassed in this decision may be explored further in that GRA hearing.

[10] In this decision, the Board will first consider the 2022 ACE Plan application, and then address the issues which emerged as important through the process.

3.1 Content of the 2022 ACE Plan

[11] NS Power's 2022 ACE Plan application provides a comprehensive overview of its capital expenditure program. It includes the following:

- A description of capital projects for which NS Power is seeking approval;

- Details regarding routine capital expenditures requiring Board approval;
- A list of capital projects to be submitted for subsequent approval;
- Lists of capital items not requiring Board approval;
- Responses to Board directives from prior ACE Plan proceedings; and
- Responses to stakeholder engagement commitments.

[12] NS Power forecasts total capital spending of \$531.6 million during 2022. This amount is for individual capital items, including capital items under \$1 million and Point Aconi items which do not require Board approval; routine capital expenditures; carryover spending from previous years; and items for subsequent submittal. NS Power stated that these expenditures are “focused on customers and providing safe, reliable, environmentally compliant, affordable and innovative electrical service.”

[13] NS Power requested approval for spending of \$181.1 million. The requested amount includes 24 individual capital projects totalling \$70.6 million. NS Power plans to spend \$33.3 million on these projects in 2022, and an additional \$37.3 million in 2023, and beyond. NS Power also requested Board approval for \$110.5 million for routine capital expenditures in 2022.

[14] The 24 individual projects NS Power asked the Board to approve include 20 projects, each with a total estimated cost between \$1 million and \$5 million, and four projects with cost estimates, each exceeding \$5 million. The number of individual projects is greater than in the 2021 ACE Plan application.

[15] NS Power provided a detailed description, justification, and cost support for each of these capital work order applications. NS Power also provided substantial additional information in its responses to Information Requests (IRs) submitted by intervenors and the Board.

[16] The Board notes that during the proceeding, other than the Consumer Advocate (CA), no intervenor objected to any of the capital projects submitted for Board

approval in NS Power's 2022 ACE Plan. The CA's consultant objected to approval of two projects related to Victoria Junction Unit 1(VJ1), which are discussed later in this decision. However, the Small Business Advocate (SBA) and CA submissions examined several issues in their submissions related to NS Power's capital spending that are also discussed in this decision.

[17] The Board finds that the capital projects listed in Schedule "A" are necessary. Further, the Board is satisfied that the plan is prudent and that the spending has been justified in accordance with the Board-approved Capital Expenditure Justification Criteria (CEJC).

[18] The Board approves the projects and capital expenditures set out in Schedule "A". Should any of them be cancelled, or deferred beyond 2022, NS Power must resubmit them for Board approval.

3.1.1 Spare Autotransformer

[19] In the 2021 ACE Plan application, NS Power sought approval of the purchase of a spare autotransformer to respond to an unplanned failure. John Wilson, of Resource Insight, the CA's consultant, said that NS Power had done an insufficient analysis of the alternatives. Lia MacDonald, NS Power's Vice-President, Transmission, Distribution and Delivery, testified at the 2021 hearing that NS Power was developing an overall plan for the autotransformers in its system. The Board approved the purchase but directed NS Power to report in the 2022 ACE Plan on the status of the management plan for the autotransformer fleet.

[20] In this application, NS Power filed Appendix G in response to the Board's 2021 directive. The report provides a risk profile of the ten 138kV substation autotransformers currently in service. The units vary in age, criticality, condition, and

overall risk. NS Power indicated the year for tentative replacement of each unit, and in several cases, noted interim mitigation strategies for identified problems.

[21] In response to CA IR-13, NS Power stated that the earliest planned replacement of a substation autotransformer would be in 2023. Like any other replacement, the request for approval must be justified at the time. NS Power said that it does not intend to run these autotransformers to failure. The company said replacement decisions will be based on criticality and condition, rather than service life or the probability of failure.

[22] Mr. Wilson says that the plan filed as Appendix G provides insufficient analysis. In his opinion, the probability of failures should be considered under the CEJC scoring. He expected the plan to explain how future replacement decisions would be made. Mr. Wilson thinks that NS Power should have a more aggressive plan instead of relying on a spare autotransformer for an indefinite period. He concluded that NS Power “seems unwilling” to plan more strategically and recommended that the Board select an independent consultant to investigate autotransformer replacement strategies in coordination with NS Power’s subject matter experts.

[23] Both Mr. Wilson’s opening statement and the CA’s closing submissions suggest that there is nothing newly developed as a plan for management of the autotransformer fleet.

[24] NS Power disagreed with Mr. Wilson’s recommendation, noting that the Board had approved the 2021 spare autotransformer project. NS Power said that the information in Appendix G shows the company is prudent in its asset management of these units. Directing an independent consultant to investigate is both unnecessary and would provide no value to ratepayers, according to NS Power. The company said the

details are a “snapshot” of its autotransformer management plan. NS Power submitted that it is constantly assessing and updating the plan and is not currently requesting approval of any replacement project from the Board. Each project will be justified when approval is sought. The company urged the Board not to accept Mr. Wilson’s recommendation.

3.1.1.1 Findings

[25] The Board need not, and will not, revisit its decision about the spare autotransformer from the 2021 ACE Plan. While the Board considers that Appendix G does not set out an explicit plan for the autotransformer fleet, the Board is satisfied that NS Power is aware of the risk level of each unit now. The company has mitigation strategies in place. The Board expects NS Power to continually monitor and assess the status of the transformers. When NS Power determines there is need for a replacement, the Board expects a fully justified application will be filed. Such applications will receive the same rigour the Board brings to all capital expenditure requests by the company. The Board does not consider it necessary to engage an independent consultant as suggested by the CA.

3.1.2 VJ1 Generator Replacement Project and Control System Upgrade Project

[26] Only two projects in the 2022 ACE Plan were singled out by an Intervenor: C0029693 and C0029691, a generator replacement and control system upgrade, respectively, for the combustion turbine (CT) at VJ1. In the application, NS Power said that the generator assembly currently at VJ1 was commissioned in 1976; the replacement will extend the life of the unit and the equipment will be consistent with what has been installed at other CT units. The company said the replacement is the “only technical

feasible alternative.” NS Power claims that refurbishment will not mitigate the risk of a forced outage or collateral damage to the rest of the unit. The company described CT units as critical to meet firm capacity requirements. NS Power said the investment in this unit is consistent with the 2020 Integrated Resource Plan (IRP).

[27] As for the control system upgrade, NS Power said that portions of the existing control system are now obsolete. Finding replacement parts, troubleshooting, and diagnosing problems has become difficult. Without replacement of the system, this will only continue. The company plans to replace the system during the regularly scheduled outage. The replacement will improve service life and reduce future costs due to the modular design.

[28] Mr. Wilson questioned the estimated costs, including the contingency amounts for both projects. The cost estimate classifications are Class 3, and the contingency range is +10% to +30% for both projects according to the response to SBA IR-26.

[29] Mr. Wilson expressed concern about what he considered an excessive contingency for the projects. He also considered the procurement process had not resulted in cost minimization. Mr. Wilson’s concerns were:

- A lack of evidence of competitive bidding for both projects;
- Higher budgets than two other generator replacement projects; and
- An unreasonable 20% contingency for both projects.

[30] NS Power confirmed in response to NSUARB IR-63 that the generator replacement is needed to continue safe reliable operation of the unit until 2045. The company expects continued operation of the CT fleet until at least that time for the required fast acting generation due to intermittent renewable generation. NS Power estimated the sustaining capital investments for the entire VJ1 unit from 2023 -2045

exceed \$7 million in 2022 dollars. In response to SBA IR-6, NS Power said that sustaining the existing diesel CTs “is the lowest cost option to meet system capacity requirements when evaluated against alternative resource options.”

[31] Mr. Wilson recommended that the Board withhold approval for both projects and, instead, require NS Power to resubmit the applications after addressing his concerns and seeking to further minimize costs.

[32] In its rebuttal evidence, NS Power explained that the generator project was sole-sourced from the original equipment manufacturer (OEM) to eliminate the need for significant modifications and retrofitting. The company said that the increased budget is due to additional scoping learned from the other two projects, site preparation, travel, and cost escalation since 2017 when those projects were undertaken. Part of the reason for the contingency related to restrictions resulting from the COVID-19 pandemic. In addition, the two units Mr. Wilson referred to were steam generators, not CT generators; NS Power refurbishes steam generators more often and therefore, its experience suggests a lower contingency amount for those projects.

[33] Mr. Wilson remained concerned and questioned whether NS Power favours OEMs in its procurements, and whether the company can provide clear justification for its contingency amounts. As a result, the CA submitted that the Board should accept Mr. Wilson’s recommendation on the two VJ1 projects.

[34] NS Power maintained that it does not favour, nor always commits to, OEMs but determines what is the best value for its customers, considering “the future life-cycle costs” of the asset. As for the 20% contingency, NS Power said it had fully justified the level, in accordance with its Non-Binding Contingency Guidelines, based on the COVID-19 protocols (which had not been in effect for the two earlier generator replacements),

potential “unknowns” when old systems are removed, the difference between steam generator refurbishments and CTs, and its internal expert judgement. The company urged the Board to reject Mr. Wilson’s recommendation.

3.1.2.1 Findings

[35] The Board is satisfied that NS Power has justified both VJ1 projects in question. The Board accepts the reasons for the 20% contingency. Further, the Board considers the explanation for the selection of the OEM for the replacement generator to be reasonable. As a result, the Board considers the projects prudent, and approves them, along with the other projects listed in Schedule “A.”

3.1.3 Letters of Comment

[36] The Board received two letters of comment from Kevin Mullen who, the Board understands, is the CEO of a company involved in renewable energy development. Mr. Mullen offered comments on several topics referred to in NS Power’s application, including:

- Wind projects and the role of NS Power compared to independent power producers;
- Conversion of coal plants to natural gas;
- Investment in New Brunswick transmission;
- Overspending on Tuskett Falls and other small hydro dams;
- Project costs for the Mersey River system; and
- Use of grid scale battery storage.

[37] The CA questioned NS Power about the indication in Mr. Mullen’s first letter that there are 17 small hydro dams which NS Power had identified, as of 2018, being in need of refurbishment or decommissioning. Mr. Mullen’s letter stated his company had contacted NS Power and offered to take ownership of some of these dams, including Tuskett Falls. In an exchange with Jamie MacDonald, Vice President, Power Production, Mr. Mahody suggested that, given the extent of potential hydro investment, such offers

should be considered. While Mr. MacDonald said the company is always interested in looking at offers, NS Power must comply with its continuing regulatory requirements and guidelines. Mr. MacDonald acknowledged that these requirements and guidelines would apply to any owner of these dams.

[38] In response to questions from Nancy Rubin, Counsel for the Industrial Group, NS Power filed Undertaking U-6. Ms. MacDonald confirmed that NS Power had a discussion with Mr. Mullen's company in 2020 and had determined that its proposal was not viable. The Board notes that, should NS Power contemplate the sale or transfer of its undertaking, s. 62 of the *Public Utilities Act* requires approval before any sale or transfer can occur.

[39] The Board briefly explored the other topics in Mr. Mullen's letters with the panel. Ms. MacDonald said she had read the letters and looked at some of the reports cited. In her view, many of his comments relate to ECEI matters, and identify "...the very type of questions that'll be answered with the submissions." While Ms. MacDonald said there was nothing in his comments that is new to the company, she hoped that Mr. Mullen would engage in the process when the ECEI applications are submitted.

[40] The Board appreciates that Mr. Mullen took the time to provide comments and information to the Board, and encourages him to engage further with NS Power, and participate, should he wish, when the ECEI applications come before the Board.

3.2 Routine Capital Expenditures

[41] Routine capital expenditures are recurring annual expenses incurred to sustain NS Power's equipment, and to allow for both system growth and addition of customers to the system. NS Power requested approval for its Routine capital program

in the amount of \$110,533,578, exclusive of Point Aconi Routine spending of \$764,158, which does not require Board approval.

[42] The proposed Routines budget in 2022 is approximately 17% higher than the 2021 ACE Plan budget; however, the Board notes that it is lower than actual spending in 2021. The increased spending in 2021 was primarily due to above-average distribution-related work.

3.2.1.1 Findings

[43] The Board approves NS Power's 2022 Routine capital expenditures in the amount of \$110,533,578. The Board notes that Distribution Routine D007, in the amount of \$4,387,955, is approved at that figure on the understanding that where poles being replaced are less than 30 years old, Bell Aliant is responsible to cover the Sacrificial Life of the poles, as that term is defined in a joint use agreement between the parties. Any such amount paid by, or recovered from, Bell Aliant should not be included in NS Power's rate base.

3.3 Cost Minimization

[44] The issue of NS Power's capital cost minimization efforts became an area of focus for the Board and stakeholders during the 2019 ACE Plan proceeding. As noted in the Board's 2021 ACE Plan decision, the Board now considers it useful to address cost minimization through two separate themes. These include the effectiveness of NS Power's cost minimization practices, including capital cost budgeting and project scoping; and NS Power's capital project cost minimization and related project management practices themselves.

3.3.1 NS Power's Capital Project Cost Minimization Effectiveness, including Capital Cost Budgeting and Project Scoping

[45] The Board's 2021 ACE Plan Order directed NS Power as follows:

3. Continue to track the information noted in Paragraph 92 of the Board's 2020 ACE Plan decision for each completed capital project that was submitted for Board approval in 2017, 2018, 2019, 2020 and 2021 (either through or outside of the ACE Plan proceedings, including projects submitted for subsequent approval, but excluding U&U projects). Further the Board directs that the following additional information be included in the related 2022 ACE Plan reporting:
 - NS Power is to identify all new projects that have been added to the report; and
 - For any capital projects that have a negative variance greater than or equal to 25% of the Board approved capital cost estimate, NS Power shall provide an explanation detailing the reasons for the variance.

The Board directs NS Power to continue to track this information, including information related to projects approved by the Board after 2021, and report it in subsequent ACE Plan applications. The Board finds the format of Appendix E of the 2021 ACE Plan application a useful means of presenting this data. The Board, therefore, directs that the data continue to be presented in this format in subsequent ACE Plan applications (subject to the modifications noted in the preceding paragraph). This reporting shall also categorize projects by function (i.e., generation, transmission, distribution, and general plant), with "generation" projects further categorized by type of project (i.e., hydro, steam, gas, other renewables).

[46] NS Power provided this information in Appendix E. Appendix E presents an analysis comparing Board approved project budget amounts to final spending on the completed projects. In particular, Appendix E provides the Board with information to better assess NS Power's capital cost minimization and capital cost budgeting effectiveness, as well as its use of contingencies.

[47] The Board has summarized the information in response to NSUARB IR-76, and included, where relevant, comparative figures from the 2021 and 2020 ACE Plan proceedings in brackets:

- There are 211 projects included in Appendix E (154 projects were included in Appendix E of the 2021 ACE Plan Application).
- The average variance for the listed projects amounts to approximately +9.5% (2021: +10.8%; 2020: +10.47%) of the original submission approved project cost estimate.

- The total variance of \$20,137,705 for the listed projects is over and above the total contingency amount of \$11,791,484 included in the total of the original submission approved cost estimates.
- The average contingency amount for the listed projects amounts to approximately 5.9% (2021: 5.6%; 2020: 5.03%) of the original submission approved cost estimate less the contingency amount.
- For projects approved by the Board prior to November 8, 2019 that have an original submission approved cost estimate greater than \$250,000 but less than \$5,000,000, amounting to 190 projects in total:
 - a. 31% (2021: 28%; 2020: 31%) had a negative variance;
 - b. 69% (2021: 72%; 2020: 69%) had a positive variance; and
 - c. Of the projects that had a positive variance, 92% (2021: 92%; 2020: 91%), or 121 projects, did not require an ATO submission to the Board.
- There was one project approved by the Board after November 8, 2019 that had an original submission approved cost estimate greater than \$1,000,000 but less than \$5,000,000. This project had a positive variance but did not require an ATO submission to the Board.
- For projects that have an original submission approved cost estimate greater than \$5,000,000, amounting to 5 projects in total:
 - a. 0% (2021: 0%; 2020: 33%) had a negative variance;
 - b. 100% (2021: 100%; 2020: 67%) had a positive variance; and
 - c. Of the projects that had a positive variance, none required an ATO submission to the Board.
- For all projects that have an original submission approved cost estimate less than \$250,000, amounting to 15 projects in total, the total sum of the individual project variances as a percentage of the total sum of the individual project original submission approved cost estimates is 206% (2021: 206%; 2020: 210%). Updated for their subsequently approved greater than \$250,000 submissions, the total sum of the individual project variances as a percentage of the total sum of the individual project original submission approved cost estimates is 10% (2021: 10%; 2020: 9%).
- 72% of the projects listed in Appendix E have a variance to the original approved estimate that falls within the expected accuracy

range of -20% to +30% for an AACE (Association for Advancement of Cost Engineering) Class 3 cost estimate.

- 18% of the projects listed in Appendix E have a variance to the original approved estimate greater than +30%.

[48] A further review by the Board of the data in Appendix E reveals the following (the Board has provided the comparative percentages from the 2021 and 2020 ACE Plan proceedings in brackets):

- For projects that have a negative variance, the total variance amount is approximately \$6.78 million or 3.2% (2021: 2.7%; 2020: 3.1%) of the total of the original approved cost estimates.
- For projects that have a positive variance, the total variance amount is approximately \$26.92 million or 12.7% (2021: 13.5%; 2020: 13.6%) of the total of the original approved cost estimates.

[49] In the 2021 ACE Plan Order, NS Power was directed to provide detailed reasons for any negative project spending variances greater than or equal to 25% of the Board approved capital cost estimate. NS Power neglected to include this information in its 2022 ACE Plan Application. However, the company did provide the requested information in response to NSUARB IR-76(I). Sixteen of the projects in Appendix E have negative variances greater than 25%.

[50] Mr. Wilson completed his own analysis of the data contained in Appendix E. His analysis produced similar results to those listed above, and he stated the following in his evidence:

In comparison to my review of the contingency data provided by NS Power in the 2021 ACE Plan Proceeding, the new data continue to show that NS Power appears, on average, to underestimate project costs, inclusive of estimated contingency amounts. While the 2021 data showed a slight increase in this tendency, the 2022 data show a slight decrease in this tendency. It appears that for projects placed in service through late 2019, there has been no material improvement in the accuracy of project cost estimates.

[Exhibit N-10, p. 13]

[51] Mr. Wilson's analysis of Appendix E also led him to conclude that most of NS Power's high overspend costs occur on steam generation plant projects. Based on his analysis of evidence submitted in Board Matter M10197 (Tusket Main Dam Refurbishment ATO), he also asserted that for most hydro capital projects, NS Power's project cost estimates are reasonably reflective of actual spending. However, he noted that a group of high-overspend hydro capital projects indicates a significant cost estimation problem. With regards to transmission and distribution (T&D) capital projects, Mr. Wilson stated:

In comparison with the pattern I note above with respect to steam generation projects and below with respect to civil hydroelectric projects, it appears that NS Power has a good track record with cost estimates in the renewable, transmission and distribution project areas, with high-overspend projects occurring at a lower frequency than steam generation projects and with less dramatic financial consequences than the high-overspend civil hydroelectric projects.

[Exhibit N-10, p. 14]

[52] Mr. Wilson's opinion regarding NS Power's track record on T&D capital project cost estimating was probed further during the hearing. The Board questioned NS Power on the data the company provided in response to CA IR-17 and IR-18. That is the data upon which Mr. Wilson based his T&D analysis. In response to Board questioning, NS Power clarified some of the data provided in response to CA IR-17 and IR-18 and provided Undertakings U-22 and U-23 to provide further clarification post-hearing. The Board asked Mr. Wilson if the clarifications provided by NS Power would change his conclusion. Through Undertaking U-25, Mr. Wilson re-performed his analysis based on the clarifications provided by NS Power, and stated:

Based on this clarified analysis, I continue to conclude that NS Power has a good track record of cost estimates for new transmission facilities or investment in the replacement of existing transmission facilities at a substantially upgraded level of service.

...

Based on this clarified analysis, I continue to conclude that NS Power has a good track record of cost estimates for new distribution facilities or investment in the replacement of existing distribution facilities at a substantially upgraded level of service.

[Exhibit N-18, p. 5, and p. 8]

[53] As noted in response to NSUARB IR-76(k), 72% of the capital projects in Appendix E have final spending amounts that are within the AACE Class 3 capital cost estimate expected range of accuracy of -20% to +30% of their respective original approved estimates (inclusive of contingency allowances). Further, 18% of the Appendix E projects have final spending that exceeds +30% of their respective original approved capital cost estimates. As noted during the 2021 ACE Plan proceeding, AACE Class 3 capital cost estimating expectations generally suggest that no more than 10% of capital projects should have final spending exceeding the +30% upper accuracy limit; no more than 10% of capital projects should have final spending less than the -20% lower accuracy limit; and at least 80% of capital projects should incur final spending falling within these accuracy limits. In response to CA IR-10(e), NS Power noted that while 18% of Appendix E projects exceed the AACE upper accuracy expectation, the company has experienced a declining trend between 2016 and 2020 in projects that are over-spent by more than 30%. NS Power also suggested a positive trend in the percentage of projects falling within the -20% to +30% range expected for projects with Class 3 estimates. These perceived trends were presented in the following table:

Year	Total # of projects placed in service	Percentage of projects under-spent by greater than 20%	Percentage of projects with total spending between -20% and +30% of budget	Percentage of Projects over-spent by greater than 30%
2016	4	0.0%	25.0%	75.0%
2017	59	11.9%	59.3%	28.8%
2018	82	9.8%	72.0%	18.3%
2019	56	7.1%	87.5%	5.4%
2020	10	20.0%	80.0%	0.0%
All years	211	10.0%	72.0%	18.0%

[Exhibit N-4, IR-10(e)]

[54] In its rebuttal evidence, NS Power stated that the information provided in the 2022 ACE Plan Application and in response to IRs indicates that NS Power's capital project spending variances generally are within AACE guidelines. This claim was explored further during the hearing:

Q. (Murphy) ... On page 22 of your reply evidence -- it states, "Generally with respect to Nova Scotia Power spending" I'm sorry.

Generally, with respect to Nova Scotia Power's project spending, the data produced by Nova Scotia Power, either in the 2022 ACE Plan or in responses to its IRs, indicates that Nova Scotia Power project variances are within AACE (sic) Guidelines as described in the above: (i) the project data within Appendix "E" shows that NS Power is executing projects within AACE guidelines;...

However, in response to CA's IR-10(e), Nova Scotia Power stated that 18 percent of the projects listed in Appendix E of the ACE Plan Application have overspent their budgets by more than 30 percent. So I guess my question is, really, can you reconcile those two statements, the one from the reply evidence and the one from the response to the CA's IR?

A. (Dandurand) Yes, I believe that I can, Mr. Murphy, and I think the starting point for that would be the data that's included within Appendix E. And so when looking at that data within the appendix, looking at the total cost for all of the 211 projects listed within the appendix, relative to their approved budget amounts, the ratio of those projects that are overspent more than 30 percent, which falls in line with the expectation for a Class 3 estimate, will be somewhere closer to about 12 percent.

...

Q. I'm not sure I follow. Did you say that based on the Appendix E data 12 percent of the projects fall above that 30 percent threshold? But how does that reconcile -- I'm not

sure how that reconciles with the response to the CA's IR where it says 18 percent of the projects were above that threshold.

A. (Dandurand) I think the reason for that difference, Mr. Murphy, is that the comparison between the final cost or, you know, the total cost for a project relative to what it was in the ACE Plan for will differ from the final cost of the project compared to its approved budget amount.

So I think that that's why those two numbers don't reconcile, is that one is comparing to what the project was approved for versus what the project was entered into the ACE Plan for.

And the reason why that is important, in terms of that distinction, is that there may be a project that is in the ACE Plan for a particular amount but was later submitted to the Board for the Board's approval and then the measuring -- or the baseline for measuring, rather, then becomes what the project was approved for, not what the project was in the ACE Plan for.

...

A. (Dandurand) Yeah. So I'm speaking to all -- all of our projects within Appendix E, Mr. Murphy, and so there are notes within Appendix E specific to projects that may have been in the ACE Plan for a specific amount, was then advanced for approval, for the Board's approval, and approved at a specific amount that may differ from what it was in the ACE Plan for, and then that's the comparison that I was making when I was speaking to the alignment to AECE [sic] Guidelines, and that explains the difference between the two figures that you mentioned earlier.

Q. So you're talking about projects, perhaps, that were in the ACE Plan below 250 or below a million and then ultimately crossed those thresholds and needed -- you know, at one point, below 250 you didn't need approval and below a million you don't need approval, but at some point perhaps those projects progressed beyond a million, beyond 250, and ultimately needed Board approval, so when you're talking about the 12 percent number, you're talking about the -- it's called the latest approved budget number.

A. (Dandurand) We're talking about the first approved budget number in those cases ---

...

A. (Dandurand) --- for a project that was advanced for the Board's approval.

[Transcript, pp. 317-322]

[55] In effect, this exchange confirmed that the 18% of Appendix E projects exceeding the AACE +30% upper accuracy limit, as referenced in response to CA IR-10(e) and NSUARB IR-76, is based on a comparison of final project spending to original budgets as presented in prior ACE Plans. However, when final project spending is

compared to the original Board approved project budgets, 12% of Appendix E projects exceed the AACE upper accuracy limit.

3.3.1.1 Findings

[56] In its reply to closing submissions, NS Power stated that none of its evidence pertaining to project budgeting and spending, as outlined in Section 4 of its rebuttal evidence, was refuted in either the Wilson opening statement, nor the CA or SBA closing submissions. In addition, the company asserted the evidence shows that its project variances are within AACE guidelines. The CA, on the other hand, argued that NS Power has a long history of project cost control issues.

[57] While the Board does not fully agree with the position put forward by the CA, the Board believes that the effectiveness of NS Power's capital project cost minimization practices, including capital cost budgeting and project scoping, remains in question. This is the same view that the Board expressed in its 2021 ACE Plan decision.

[58] As NS Power noted during the 2021 ACE Plan proceeding, the bulk of its capital project cost estimates in its ACE Plans are at a Class 3 level, in accordance with AACE International Recommended Practice. NS Power noted that AACE states that typical accuracy ranges for Class 3 estimates are -20% to +30%, inclusive of contingency allowances. Further, AACE cost estimating methodology implies that 80% the projects listed in Appendix E should typically have a final cost that falls within this expected accuracy range. AACE also suggests that generally 10% of the projects should have final costs that fall below the -20% accuracy limits, and 10% should fall above the +30% limit.

[59] Referring to the project data contained in Appendix E of the application, the Board reviewed the data to compare original Board approved project budget amounts to final spending on the related projects. The review took into account the "subsequently

approved” budgets for those projects listed in Appendix E that were originally estimated by NS Power to be below the Board capital approval threshold of \$250,000 pre-November 8, 2019 and \$1 million post-November 8, 2019. Based on this review, it appears that NS Power’s total spend on the projects listed in Appendix E is, on average, 6.8% greater than the Board approved budget amounts. This is a nominal improvement over the 7% figure presented by NS Power during the 2021 ACE Plan proceeding. Further, while NS Power’s average capital overspend of 6.8% on the Appendix E projects is within AACE accuracy expectations, it still remains above the midpoint of the -20% to +30% range.

[60] In addition, during the hearing, NS Power confirmed that approximately 12% of the Appendix E projects incurred final spending that exceeded the Board’s original approved budget by more than the maximum expected AACE accuracy limit of +30%. The Board notes that this represents an improvement over the 14% figure presented by NS Power during the 2021 ACE Plan proceeding. However, 12% of Appendix E projects incurring overspending beyond the AACE +30% upper accuracy limit for Class 3 estimates still exceeds the 10% expectation prescribed by AACE.

[61] In Undertaking U-25, Mr. Wilson re-performed his analysis of NS Power’s capital cost performance on T&D projects. Based on the revised T&D project cost data in Undertaking U-22 and U-23, Mr. Wilson again concluded that NS Power has a good track record of completing accurate capital cost estimates for T&D capital projects. However, the Board has reviewed Undertaking U-25 in more detail and has found apparent discrepancies in the underlying data. In particular, the Board notes the following:

- In Table 1, the variances for the GRA transmission projects appear to be calculated by subtracting the “actual spend” from the “approved budget” rather than vice versa. As a result of what appears to be a summation error,

the total variance of \$4,215,692 for the transmission projects appears to be correct in Table 1.

- In Table 1, the average cost variance for the listed transmission projects as a percent of the total approved budget for the projects should be +2.4% (i.e., \$4,215,690 divided by \$173,730,611) rather than +2.0% noted in Table 1.
- Table 1 has not adjusted the “actual spend” value for “CI C0031089 – 2021/2022 Trans ROW Widening” to reflect the fact that NS Power has projected additional spending on this project. Based on data provided in the 2022 ACE Plan proceeding, final spending on this project is expected to be \$5,284,787, resulting in a project variance of -\$3,733 rather than -\$2,803,258 noted in Table 1. With this adjustment, the total cost variance for the listed transmission projects is \$7,015,215. This represents an average variance of +4.0% of the total approved budget for the transmission projects.
- In Table 2, the average cost variance for the listed distributions projects as a percent of the total approved budget for the projects should be +2.7% (i.e., \$5,217,864 divided by \$191,032,031) rather than 0% noted in Table 2.
- Table 2 has not adjusted the “actual spend” value for “CI C0031083 – New Distribution ROW Phase 6” to reflect the fact that NS Power has projected additional spending on this project. Based on data provided in the 2022 ACE Plan proceeding, final spending on this project is expected to be \$11,533,408, resulting in a project variance of +\$1,770,673 rather than -\$3,880,343 noted in Table 2. With this adjustment, the total cost variance for the listed distribution projects is \$10,868,880. This represents an average variance of +5.7% of the total approved budget for the distribution projects.
- Further, Table 2 has not adjusted the “actual spend” value for “CI 47124 – Advanced Meter Infrastructure” to reflect the fact that NS Power has projected additional spending on this project. Based on data provided in the 2022 ACE Plan proceeding, final spending on this project is expected to be \$143,414,479, resulting in a project variance of +\$10,185,527 rather than +\$7,104,567 noted in Table 2. With this adjustment, coupled with the adjustment noted in the previous bullet, the total cost variance for the listed distribution projects is \$13,949,840. This represents an average variance of +7.3% of the total approved budget for the distribution projects.

[62] With these adjustments, the average cost variances for transmission and distribution projects in Undertaking U-25 remain within AACE accuracy expectations for Class 3 capital cost estimates. However, NS Power’s capital cost performance on T&D

projects is not as good as Mr. Wilson suggested. In fact, the Board finds that the average T&D cost variances are more aligned with NS Power's overall capital project average overspend of 6.8%. Distribution capital cost performance is perhaps more concerning, with average overspending above the midpoint of the -20% to +30% AACE expected accuracy range.

[63] Based on the above, and considering the responses to NSUARB IR-76, the Board finds that NS Power has marginally improved its capital cost overspending performance compared to its performance noted in the 2021 ACE Plan proceeding. The Board notes NS Power's improvement. However, it is clear to the Board that, on average, NS Power continues to overspend on capital projects. As such, the Board finds, as it did in its 2021 ACE Plan decision, that NS Power's capital cost minimization and/or budgeting/scoping performance as it relates to AACE expectations remains less than ideal. It also remains unclear to the Board whether this issue is related to inadequate NS Power capital cost estimating/budgeting practices, inadequate costs minimization efforts by NS Power, or a combination of both.

[64] In the 2021 ACE Plan Order, NS Power was directed to include explanations within Appendix E detailing the reasons for any negative project spending variances greater than or equal to 25% of the Board approved capital cost estimate. In its 2021 ACE Plan decision, the Board expressed concern that underspending of this magnitude could suggest project over-scoping at the original cost estimate stage, or a significant reduction or cancellation of the originally planned work scope. Just as large positive variances can skew overall capital project spending results upward, the Board is concerned that large negative variances can skew overall spending results downward.

[65] NS Power provided the requested large negative variance information in response to NSUARB IR-76(l). Sixteen of the projects in Appendix E have negative variances greater than 25%. The total of the variances for these projects is -\$3,082,511. For the most part, the variances are a result of costs being lower than estimated, reductions in the originally estimated work scope, and not requiring the use of contingency funds. The total dollar amount of these variances only represents approximately 1.4% of the total of the original Board approved budgets for the Appendix E projects. However, these variances represent roughly 21% of the total variance from the original Board approved budgets for all the Appendix E projects. If these variances and related approved budgets are removed from the overall variance calculations, NS Power's total spend on the remaining projects listed in Appendix E would be, on average, 8.6% greater than the approved Board budget amounts (compared to 6.8% when the large negative variances are included). The Board does not consider this difference significant at this point. However, the Board will continue to monitor large negative project variances in future ACE plan proceedings to ensure that variances related to significant project scope reduction do not skew NS Power's capital cost performance reporting.

[66] In response to CA IR-10(e), NS Power provided a table (at Paragraph 53 above) that the company claims shows a declining trend between 2016 and 2020 in Appendix E projects that are over-spent by more than 30%. NS Power also suggested that the table shows a positive trend in the percentage of projects falling within the -20% to +30% range expected for projects with Class 3 estimates. The Board finds the table useful. However, as presented, the table is organized by the year the Appendix E projects were placed into service. The Board notes that the year a project is placed in service may be long after the original project's cost estimate is submitted for Board approval.

Therefore, to better discern trends over time in NS Power's capital cost estimating and spending performance, the Board finds it would be more informative if the table were organized by the year projects were put forward for original Board approval (as the second column in the table). As such, the Board directs NS Power to incorporate the table accordingly in future ACE Plan applications.

[67] The Board directs NS Power to continue to track the information noted in Paragraph 92 of the Board's 2020 ACE Plan decision for each completed capital project that was submitted for Board approval in 2017, 2018, 2019, 2020, 2021 and 2022 (either through or outside of the ACE Plan proceedings, including projects submitted for subsequent approval, but excluding U&U projects). Further the Board directs that the following additional information be included in the related 2023 ACE Plan reporting:

- NS Power is to identify all new projects that have been added to the report; and
- For any capital projects that have a negative variance greater than or equal to 25% of the Board approved capital cost estimate, NS Power is to provide an explanation detailing the reasons for the variance.

[68] The Board directs NS Power to continue to track this information, including information related to projects approved by the Board after 2022, and report it in future ACE Plan applications. The Board directs that the data continue to be presented in the 2022 ACE Plan application Appendix E format in future ACE Plan applications (subject to the modifications noted in the preceding paragraph). This reporting is to also categorize projects by function (i.e., generation, transmission, distribution, and general plant), with "generation" projects further categorized by type of project (i.e., hydro, steam, gas, other renewables).

3.3.2 NS Power's Capital Project Cost Minimization and Related Project Management Practices

[69] In its 2019 ACE Plan Order, the Board directed NS Power to provide, in future ACE Plan applications, "specific examples of project execution cost minimization efforts for the prior year, complete with a description of the cost savings accrued by these efforts." In its 2020 ACE Plan decision, the Board found that the cost minimization examples provided by NS Power in its 2020 ACE Plan application were not responsive to this direction. As a result, the Board's 2020 ACE Plan Order extended its 2019 direction to provide, in future ACE Plan applications, "examples of cost minimization during execution and construction from the prior year's projects, with specific cost minimization being fully described."

[70] In its 2021 ACE Plan Order, the Board directed NS Power to continue providing, in future ACE Plan applications, specific examples of cost minimization practices used during execution and construction of the prior year's projects, with specific cost minimization efforts being fully described. In particular, the Board directed NS Power to present this information in the format used in Section 11.1.5 of the 2021 ACE Plan application. This material was to be supplemented with additional specific project details in the format used in Attachment 1 of NS Power's response to CA IR-1 in the 2021 ACE Plan proceeding. NS Power complied with this directive in its 2022 ACE Plan application by providing Appendix F in its application.

[71] The Board's 2021 ACE Plan Order further directed NS Power to undertake stakeholder engagement to address the following issues as they relate to the company's cost minimization efforts:

- A better understanding of NS Power's cost minimization and project management practices;

- Development of criteria for the selection of projects to be included as specific examples of NS Power's cost minimization efforts;
- The capital cost threshold for which NS Power will conduct internal post project reviews;
- A framework and reporting protocols for a capital cost "lessons learned" business practice; and
- Whether the Board's Contingency Directive should be expanded to require data on all projects with budgets or spending over \$250,000, and whether the scope of the data request should be wider.

[72] NS Power submitted its 2021 ACE Plan Stakeholder Engagement Report to the Board on October 1, 2021.

[73] In response to these directives, and as it did in its 2020 and 2021 ACE Plan applications, NS Power stated in its application that "Cost minimization is at the forefront of all stages of capital project development and execution." The company went on to reiterate that it follows cost minimization processes intended to "obtain best value for customers at the lowest cost." NS Power then described some of the general cost minimization processes that it typically employs throughout the course of capital project execution. These processes are essentially the same as those outlined by the company in the 2019, 2020 and 2021 ACE Plan proceedings.

[74] Section 11.1.5 of NS Power's 2022 ACE Plan application then described several capital cost minimization efforts undertaken by the company over the past year. As in the 2021 ACE Plan application, these efforts were categorized as follows: design and detailed engineering; project execution efficiencies; and procurement process/negotiated savings. The total project cost savings NS Power assigned to these efforts was \$13.4 million, as presented in Figure 71 of the application. For each of these categories, Appendix F of NS Power's application described specific project cost

minimization examples (49 in total) that were completed to help achieve these project cost savings.

[75] In response to NSUARB IR-77(e), NS Power stated that the \$13.4 million in cost savings noted in Appendix F represent approximately 11% of the approved costs of the related projects. During the hearing, Paul Dandurand, Senior Manager of Asset Management Operations and Capital Planning, confirmed that the noted savings of \$13.4 million relate only to the examples in Appendix F. He further stated that the examples of cost minimization and related savings in Appendix F are not inclusive of all the cost minimization efforts by NS Power over the course of 2021.

[76] The Appendix F cost minimization efforts were assessed further in Mr. Wilson's evidence. Mr. Wilson noted that the reported cost savings of \$13.4 million in Appendix F primarily results from NS Power's procurement process and negotiated savings. He further stated that while NS Power views its procurement process as the main opportunity to achieve cost minimization, Appendix F does not provide much further explanation. Specifically, he identified that most of the Appendix F procurement process savings are explained as "Procurement process resulted in lower pricing," or words to that effect. In most of these cases, Mr. Wilson noted that the cost savings appear to simply be the difference between the winning bid and another bid or the original budget. He therefore recommended that NS Power:

Provide cost minimization information that is more useful for identifying lessons learned in the 2023 ACE Plan. The Board should then identify as an issue in the 2023 ACE Plan proceeding the determination of what cost minimization information would be useful (and worth the effort) to compile and file, or whether it may be more efficient to consolidate the cost minimization report with information summarized from the post-project reviews into a single requirement.

[Exhibit N-10, p. 6]

[77] The Appendix F examples of capital cost minimization submitted by NS

Power were explored further during the hearing:

MEMBER MURPHY: Jeff, can you call up response to Board IR-77(b), please? That's good. Thanks, Jeff. In that IR, Nova Scotia Power is asked to explain specifically how the company's procurement process resulted in cost savings for the eight projects that were listed.

...

Q. So Nova Scotia Power was asked to explain how the procurement process resulted in cost savings for eight of those projects that -- those eight projects that are noted. For five of the projects, number (i), (ii), (iv), (vii) and (viii), Nova Scotia Power explained that the cost savings was a result of using the company's RFP process where the selected lowest cost vendor's cost was less than the original budget amount. Can you confirm to me that the cost savings for those projects that were noted in Appendix F based on that response are simply the difference between Nova Scotia Power's estimate and the price provided by the low-cost vendor?

...

Q. So I'm looking for confirmation -- for those five projects, can you confirm to me that the savings is the difference between what was budgeted by Nova Scotia Power for the project and the price that was provided by the lowest cost vendor?

A. (Dandurand) That I would need for each of these individually to undertake to confirm that for you, Mr. Murphy. I believe that to be the case, but I'm not 100 percent certain that that's the case in all of these five examples.

Q. Okay. I don't think I'll ask for an undertaking for this, but that's the way I interpret the response. So my question, really, was if I'm interpreting it correctly, wouldn't those savings actually be more related to perhaps an overestimate on Nova Scotia Power's part or perhaps the low bidder being a little more aggressive than perhaps Nova Scotia Power thought, rather than a proactive example of cost minimization on behalf of Nova Scotia Power?

A. (Dandurand) So I think the intention of these examples, Mr. Murphy, to demonstrate cost minimization is the RFP process itself, and so utilizing the RFP process to competitively source either materials, services, et cetera, resulting in cost savings for customers through that process and then making the comparison between what the successful bidder's cost was relative to others that were competing through that RFP process. And the reason that we highlight that, of course, is that our procurement resources, you know, work to negotiate the best possible price for our customers, and so the savings then are captured as a result of that work that's done by those involved in negotiating the best price for customers.

Q. Do you know what percentage of procured projects are procured using a tender process or an RFP process rather than a sole source process?

...

Q. Or rather than percentage, would it be fair to say that the good majority of projects are procured using a tender process or an RFP process?

A. (Dandurand) I think subject to check, Mr. Murphy, I would say that I would expect the majority of, you know, projects are competitively sourced and then in some cases, yes, there's a requirement to sole source, but I would need to confirm that for you in terms of a specific percentage as to what percentage of our procurements are competitively sources versus sole sourced.

Q. Okay. And I understand what you're saying about the -- about the procurement -- the RFP procurement process and whatnot, but it almost sounds like it's fair to say that that process is a standard process rather than a project-specific process. And I guess in terms of cost minimization, the examples that the Board is looking for is project-specific examples rather than general -- general examples that could be applied to the bulk of Nova Scotia Power's projects.

A. (Dandurand) So I think -- I think, Mr. Murphy, that, you know, those examples related to our procurement process can certainly apply to our capital, you know, projects and procedures, so that's the reason why we've captured them as such. Specific examples outside of the procurement process or, you know, processes that are on the front end of a project, for example, we have captured some of those in Appendix F of the ACE Plan that are related more to the execution phase of our capital projects. But just to not -- not include these, you know, cost savings initiatives from a procurement, I'll say, perspective is something that we did not want to do. We just wanted to ensure that they were included in there as they are part of the execution of our -- of our capital projects.

[Transcript, pp. 289-295]

[78] As it relates to the provision of cost minimization examples in future ACE Plan applications, NS Power proposed criteria describing how such examples will be selected. These criteria, identified in the 2021 Stakeholder Engagement Report, would be implemented for the 2023 and subsequent ACE Plans and include:

- projects over \$5 million; and
- projects between \$1 million and \$5 million identified as part of the post project review selection criteria (ATO, a unique or first-time undertaking (new technology), significant schedule under or over performance, and/or project manager initiated for sharing or recognition).

[79] In addition, NS Power stated in its 2021 Stakeholder Engagement Report with respect to the selection criteria of cost minimization projects within ACE Plans: "NS Power will monitor the process for effectiveness and solicit feedback internally and through stakeholder engagement through the 2022 ACE Plan process and consider updates as a continuing improvement activity." The CA supports this proposal but believes that a random sampling of 15% of projects under \$1 million should also be

included as examples. NS Power does not agree with the CA on this point. Instead, the company agreed to also include specific examples of its cost minimization efforts from projects under \$1 million that meet the criteria identified in the second bullet above, excluding the ATO criterion.

[80] During the hearing, the CA asked NS Power to identify any “new initiatives” the company undertook in 2021 to ensure projects costs were minimized and executed on a least cost basis. NS Power responded that it has developed a number of continuous improvement initiatives, but that there has not been a lot of specific new initiatives implemented. In his closing submission, the CA stated:

Recognizing the level of attention that the Board and stakeholders have placed on cost minimization in recent years, it is concerning that NS Power is unable to identify new initiatives that ensure projects are executed on a least cost basis. For a company that takes all opportunities to highlight that cost minimization is integral to how it executes its projects, NS Power comes up remarkably emptyhanded when asked to provide the concrete examples of how this is achieved.

[Exhibit N-21, p. 17]

[81] For the 2023 ACE Plan, NS Power has agreed to report on any new cost minimization techniques that it adopts.

[82] With respect to NS Power’s cost minimization practices, the issue of capital project management and delivery was raised during this proceeding. This was aimed at addressing the Board’s 2021 ACE Plan directive for the company to work with stakeholders to develop a better understanding of NS Power’s cost minimization and project management practices. In response to CA IR-9, NS Power reiterated its commitment from the 2021 ACE Plan stakeholder engagement process to review and update its project management guidance documentation and practices, which includes cost minimization elements. Updates to this documentation will be incorporated into a new NS Power Project Delivery Model (PDM), which is currently being developed by in-

house subject matter experts. The PDM will include guidance and recommended practice for risk management, value engineering and benchmarking, to ensure these tools are identified and applied appropriately. The PDM will be provided as the project management standard guidance for capital projects at NS Power. NS Power confirmed during hearing testimony that it expects the PDM will help the company improve its capital cost performance so that it better meets AACE accuracy expectations. NS Power also stated that it expects the new PDM to be implemented in the second quarter of 2022.

[83] As part of the PDM implementation, NS Power noted that training on the use of new practices and reporting tools to capture information related to cost minimization is planned to be completed in the first half of 2022. Cost minimization reporting will also be a standing agenda item for regular meetings with employees leading capital projects. Capital and project management workshops are also planned for 2022 to discuss elements of NS Power's capital planning and execution and project management practices. In addition to providing employees with information related to NS Power's processes, these workshops will also provide training on new or updated elements. This will include topics that have been the subject of ongoing consultation with stakeholders, including cost minimization, post-project reviews and NS Power's contingency guidelines.

[84] To address the Board's 2021 ACE Plan directive related to work with stakeholders to develop a framework and reporting protocols for a capital cost "lessons learned" business practice, NS Power described its proposal in its 2021 Stakeholder Engagement Report. The company stated that it will implement changes to formalize its capital project planning process to ensure learnings are institutionalized. NS Power

claimed that this will result in the lessons learned business practice forming part of the post-project reviews. Elements of the company's proposal include:

- The post-project review will assess the project against a template of key project elements and expected outcomes. The product of the review will be a summary report with any recommendations for correction, improvement, standardization or training as applicable.
- A post-project review template will be utilized to guide and record the review. The template will identify key project elements for post-process consideration. A copy of the proposed template was included as Appendix D in the 2021 Stakeholder Engagement Report.
- Guidance and education on the post project review process will be documented internally and included in the annual NS Power capital program workshops for education and best practice awareness.

[85] The CA contends that NS Power's proposed post-project review template is deficient and presented recommendations for improvement.

[86] Other issues raised during the hearing concerning NS Power's costs minimization practices included:

- Sole-sourcing of capital projects; and
- NS Power's post-project review process.

[87] Mr. Wilson expressed concern related to NS Power's sole-sourcing procurement practices. In particular, he noted that cost minimization is more difficult in sole-source procurement due to a lack of competition and because it is more difficult to form an independent estimate of cost. As such, he recommended that NS Power include projects procured through a sole-sourcing process with budgets or costs over \$1 million and a sample of projects with costs below \$1 million in the post-project review process. Although NS Power questioned the value of such reviews, it agreed to add these items to the post-project review criteria.

[88] With regards to post-project reviews, in the 2021 ACE Plan proceeding, NS Power agreed to complete internal post-project reviews for capital projects over \$5 million in cost. The Board, however, found that a capital cost threshold of \$5 million for NS Power to conduct internal post-project reviews was too high, but needed to be countered by concerns about regulatory efficiency and associated costs to complete more post-project reviews at a lower threshold. Consequently, the Board directed NS Power to engage with stakeholders to develop an appropriate threshold.

[89] In its 2021 Stakeholder Engagement Report, NS Power outlined proposed criteria and project capital cost thresholds which would trigger when post-project reviews are to be completed. Through the 2022 ACE Plan proceeding, the company proposed an additional trigger to address concerns of Mr. Wilson related to sole-sourced projects. NS Power described these criteria and thresholds in its rebuttal evidence:

...NS Power will commit to conducting post project reviews as follows, which shall be available upon the NSUARB's request:

- Post project reviews for all projects submitted for approval that are greater than \$5 million (including actual spend greater than \$5 million);
- Post project reviews for all projects between \$1 million - \$5 million that meet the following criteria (beyond already established ATO and FIN thresholds): (i) unique or first-time undertaking (e.g. new technology), (ii) significant safety or environmental event or risk management deployed, (iii) significant schedule/budget under or over performance, (iv) project manager initiated for sharing or recognition; and (v) projects that include sole sourcing of equipment, materials or services of material monetary value within the context of the capital project; and
- 5 post project reviews each year for projects less than \$1 million, with a focus on steam projects for the first year.

[Exhibit N-12, p. 26]

[90] Mr. Wilson recommended that NS Power should make all, or a reasonably sized sample, of its post-project reviews available as part of the 2023 ACE Plan filing. He further recommended that the Board should then identify as issues in the 2023 ACE Plan

proceeding (a) whether the post-project reviews are useful and effective and (b) what information from those reviews (such as a summary) NS Power should submit on an annual basis. NS Power objected to this recommendation, noting that post-project reviews will be available at the Board's request, and, as such, do not need to be filed with future ACE Plans.

[91] Finally, the 2021 Stakeholder Engagement Report addressed the Board's 2021 ACE Plan directive to assess whether the Board's contingency directive should be expanded to require data on all projects with budgets or spending over \$250,000, and whether the scope of the data request should be wider. The CA has recommended that the contingency directive (Appendix E of the ACE Plan) be expanded to include the scope of the contingency (e.g., Class 3) for each project, a breakout of the different levels of contingency if a project has multiple contingency levels, data on all projects with budgets or spending over \$250,000, and relevant data (e.g., excluding "actual spend") for in-progress and proposed projects. In addition, Mr. Athas stated:

This filing raises the questions of whether NSPI's cost estimation process merits further review and lacks sufficient transparency to determine if the value ascribed to the project has or will materialize for Nova Scotians. The cost estimation process is still creating more examples where cost overruns extend well beyond the contingency set by NSPI in their application.

[Exhibit N-9, p. 8]

[92] Based on this assertion, Mr. Athas recommended expanding the annual ACE filing to include a greater emphasis on cost minimization, with each specific project submitted for approval including a detailed discussion of how various approaches to reducing cost were evaluated and applied in an effort to better understand where there is significant project scope risk.

[93] NS Power does not agree with the CA's recommendation. The company believes that its current reporting effectively addresses ACE Plan reporting requirements

ordered previously by the Board. NS Power also does not believe that Mr. Athas' recommendation is either necessary or appropriate. The company noted that the extent of such a discussion within the "why do the project this way" section of a capital application description page will depend on the current stage of the project at filing. Further, NS Power currently adds a technical justification explanation separate from the EAM to identify alternatives to capital investments. Separate and apart from the EAM, the company provides information within the Capital Description Page, which identifies alternatives explored. In addition, when there is only one technically feasible project alternative, NS Power provides information as to why other project alternatives were discounted.

3.3.2.1 Findings

[94] In Section 11.1.5 and Appendix F of its 2022 ACE Plan application, NS Power provided examples of cost minimization efforts over the past year. The Board finds these examples and related supporting information to be useful and informative. The Board directs NS Power to continue to provide such information in subsequent ACE Plan applications. This is to include specific examples of cost minimization practices used during execution and construction of the prior year's projects, fully describing specific cost minimization efforts, complete with a description of the cost savings accrued by these efforts. In particular, the Board directs that this information continue to be presented in the format used in Section 11.1.5 and Appendix F of the 2022 ACE Plan application. Further, as agreed by NS Power, the Board directs the company to report on any new cost minimization techniques that it adopts.

[95] During the 2021 ACE Plan hearing, NS Power revealed that it selected at random the 35 projects used to produce the cost minimization data in Figure 69 of the

2021 ACE Plan application. As such, the Board directed NS Power to engage with stakeholders to develop criteria for the selection of projects to be included as specific examples of NS Power's cost minimization efforts in future ACE Plan applications. NS Power presented these proposed criteria in its 2021 Stakeholder Engagement Report. The Board finds them to be reasonable and effectively balancing satisfactory reporting that provides the Board and stakeholders with a sample size of cost minimization achievements while not adding to regulatory inefficiencies or costly reporting. The Board, therefore, directs NS Power to use these criteria (including those for projects less than \$1 million) in future ACE Plan applications to select projects to be included as specific examples of the company's cost minimization efforts. The Board also directs NS Power to monitor the process for effectiveness and solicit feedback internally and through stakeholder engagement through future ACE Plan processes and consider updates as a continuing improvement activity.

[96] As noted above, the Board questioned NS Power during the hearing about its claimed cost savings related to "procurement negotiations" for five projects in Appendix F. Specifically, these questions dealt with the issue of claimed project cost savings associated with using the company's RFP process where the selected lowest cost vendor's cost was less than the original budget amount. The Board understands and agrees with NS Power's response that seeking competitive bids is a means of obtaining value and minimizing costs for customers. However, as noted in its 2021 ACE Plan decision, the Board considers this a general example of obtaining best value, and one that the Board would expect NS Power to use for the bulk of its capital projects. As such, the Board does not consider the noted costs savings on these projects to be specific examples of a proactive cost minimization practice by the company. Instead, the Board

considers these cost savings may primarily result from astute or aggressive bidding practices on the part of the low bidder and/or NS Power over-estimating the project cost.

[97] Similarly, there are three projects in Appendix F (HYD - WRC LEM Balance of Plant, HYD - Weymouth Falls Unit 1 Generator Refurbishment, and TRE Heavy Fuel Oil Tank Refurbishment) where NS Power explained, in response to NSUARB IR-77(b), that the claimed cost savings are a result of NS Power selecting the lowest bidder for the project. The claimed savings are the difference in price between the lowest bidder and the next lowest bidder. Again, the Board does not consider the noted costs savings on these projects to be specific examples of a proactive cost minimization practice by the company. Instead, the Board considers these cost savings may primarily relate to individual bidder's approaches to pricing projects and/or astute or aggressive bidding practices on the part of the low bidder.

[98] NS Power's noted cost savings in Appendix F for the eight capital projects referenced in the preceding two paragraphs amounts to a total of approximately \$8.2 million. If these savings are deducted from the total Appendix F project cost savings of \$13.4 million, the Appendix F savings would be \$5.2 million. This would represent only 4% of the approved project costs in Appendix F. The Board trusts that in future ACE Plan applications NS Power will not weight its Appendix F reporting so heavily to these types of minimization and savings examples. As such, the Board partially supports Mr. Wilson's recommendation, and encourages NS Power to provide cost minimization information in future ACE Plan applications that is more useful for identifying lessons learned. Ideally, NS Power's new criteria to include projects as specific examples of the company's cost minimization efforts will help to address this issue.

[99] The Board looks forward to implementation of the company's new PDM in the second quarter of 2022. As per the documentation included in the 2021 Stakeholder Engagement Report, the Board expects the PDM will include development and execution of a planned and documented forward-looking cost minimization review process to be applied to projects indicated for cost minimization review. The Board also expects that the process will utilize a simple running cost minimization tracker of key project elements with status for cost avoidance and cost reduction opportunities.

[100] Moving forward, the Board would like to see a capital project cost estimating process incorporated into the PDM. The intent of this process would be to help NS Power improve its capital cost estimating/budgeting practices, with the goal of reducing the company's overall spending variance. If this process has not yet been incorporated into the PDM, the Board directs NS Power to engage with stakeholders to solicit input.

[101] In its rebuttal evidence, NS Power proposed criteria and project capital cost thresholds (including those for sole-sourced projects) which would trigger when post-project reviews are to be completed. The Board finds these to be reasonable and directs that they be adopted by NS Power in advance of submission of the 2023 ACE Plan application. Mr. Wilson recommended that NS Power should make all, or a reasonably sized sample, of its post-project reviews available as part of the 2023 ACE Plan filing. NS Power does not agree that, as a matter of practice, internal post-project reviews should be filed with future ACE Plans. The Board agrees with NS Power, particularly given that the company must continue to file both ATOs and FINs with the Board in accordance with the CEJC, fully justifying either under- or overspending beyond CEJC thresholds. In addition, the company has stated that post-project reviews will be available at the Board's request. As such, if the Board requires a sample of post-project reviews for future ACE

Plan applications, it can simply request, and would expect, to be provided with the information. Through future ACE Plan proceedings, the Board and stakeholders will have the option to review the triggers for post-project reviews.

[102] The Board finds NS Power's proposal for a framework and reporting protocols for a capital cost "lessons learned" business practice to be appropriate. The Board, therefore, directs the company to implement that practice in advance of submission of the 2023 ACE Plan application. The CA expressed concerns related to NS Power's proposed post-project review template in the "lessons learned" business practice. However, the Board has reviewed the template and finds it reasonable, as well as addressing most of the CA's concerns. Nonetheless, as the "lessons learned" business practice evolves, there may be opportunities and reasons for the template to be updated. The Board, therefore, encourages NS Power to review the template regularly to determine whether it can be improved. The Board and stakeholders will also have the option to review usefulness and effectiveness of the "lessons learned" business practice in future ACE Plan proceedings.

[103] The Board has reviewed the evidence related to the Board's 2021 ACE Plan directive to assess whether the Board's contingency directive should be expanded to require data on all projects with budgets or spending over \$250,000, and whether the scope of the data request should be wider. Both the CA and the SBA (through Mr. Athas) have argued that ACE Plan cost minimization reporting should be expanded. NS Power believes that its current approach to cost minimization reporting strikes a proper balance of providing the Board and stakeholders with helpful information to assess contingency and capital budgeting/spending, while not being overly burdensome. The company thus submitted that no further Board direction is required with respect to cost minimization

reporting, whether within future ACE Plans or otherwise, beyond what NS Power has already committed to in the current ACE Plan proceeding. NS Power argued that the contingency directive should remain as directed by the Board.

[104] The Board agrees with NS Power. At this point, the Board believes it has the required cost minimization reporting, both currently and as directed in this decision, that it needs to effectively evaluate the company's capital cost performance and cost minimization efforts and practices. Nevertheless, the Board still has concerns associated with the effectiveness of NS Power's capital cost minimization and budgeting practices. The Board expects to see improvement in these areas, and these issues will continue to be monitored in future ACE Plan proceedings. Should these concerns continue, the Board may, at some point, direct NS Power to engage a third-party expert to review cost minimization and capital cost budgeting practices.

3.4 Reliability Investments

[105] In past ACE Plan applications, NS Power has stated that reliability is a primary focus of its investments. The 2022 application is no different. NS Power also emphasizes the need to balance affordability for customers with improvement in system reliability.

[106] In this application, the reliability focus is on T&D projects and a response to weather events, which are becoming increasingly more severe. The transmission capital investment is focused on sustaining system reliability. Customer reliability is the focus of distribution capital investment. The 2022 ACE Plan is targeting investments for T&D vegetation management and defective, deteriorated, or failed distribution equipment.

[107] NS Power said it employs a Customer Reliability Strategy (CRS) to identify and implement improvements in system reliability to benefit its customers. The

company's goal is to prioritize reliability investments to "mitigate the highest risks on the system for the greatest number of customers." The company said it uses lessons learned from problem feeder investments to improve CRS projects.

[108] In response to NSUARB IR-48, NS Power discussed its CRS, describing the strategy as "the collection of asset strategies, processes and investment recommendations...for T&D assets." However, there is no separate documented program for the elements of the CRS. The CA further explored this:

Q. ...Ms. MacDonald, as I reviewed the various IR responses, I understand that Nova Scotia Power's Customer Reliability Strategy is not documented. Is that correct?

A. (L. MacDonald) So what I would say on that is that it -- insofar as it is the collection of programmes, it's the collection of how we're organized in terms of our asset management approach, and then the various projects or collections of projects that you see, those things working together is the Customer Reliability Strategy.

Q. Okay. And so if one were looking to see Nova Scotia Power's strategy for customer reliability that has been committed to writing, what would we look at?

A. (L. MacDonald) We would look across recent ACE Plans, performance standards, the problem circuit reporting as well as the various storm templates, so there's really a collection of reliability driven reporting and programming that we think is very comprehensive and transparent and has absolutely developed and evolved over the last number of years.

Q. And at other major electrical utilities, Ms. MacDonald, that have a Customer Reliability Strategy, are you familiar with whether or not at those utilities it's common to have a documented reliability strategy?

A. (L. MacDonald) Yes, I think different utilities do this in different ways. In some ways, you could -- you could think of it in terms of presentations, of PowerPoint presentations or Word documents which summarize the collection of activities that I'm talking about here.

When we say that it's not documented as its own standalone, it's because we have these other parallel collection of approaches working together, and that's the approach we've taken. But I am familiar with how other utilities can certainly put together one document or one presentation to summarize these types of efforts.

Q. And is the company giving consideration to centralizing this and having a documented reliability strategy?

A. (L. MacDonald) In terms of centralizing, in fact, what we've done over the last few years is reorganized to an enterprise asset management function, which is where we've integrated the generation as well as transmission and distribution grid reliability approach into an overall function and department of engineers and analysts and others working together constantly to make sure that we are coordinated and are seeing those cross-functional learnings that apply to various reliability strategies all in one function. And

in that way, perhaps you could think of it as the reliability strategy is embodied in how that is organized and some of the -- we've alluded to reliability teams in many of our IR responses in this ACE proceeding, and that is how we do the work. It's constant and it's every day as opposed to a document or a presentation.

Q. And I don't mean to sound as though I'm challenging about the work getting done, and we'll come to some of the reliability results in a moment, but just from an idea of having a centralized, documented strategy that then can be looked at in order to understand, okay, certain capital projects being justified on this basis, here's the strategy under which that particular capital project fits, is the company giving some thought to getting a documented reliability strategy put in place?

A. (L. MacDonald) As -- as I'm explaining, Mr. Mahody, I think we are, or we have. How that results in one document, I think remains to be determined whether that is a valuable exercise in and of itself, but the criteria, the asset management mechanisms, the various reports and metrics against which we report on all of this, those are absolutely documented and provided and then elaborated on as needed through the various processes that we're part of.

Q. Ms. MacDonald, perhaps by way of an undertaking, would you be willing to list the various documents that do make up the overall reliability strategies so we have in one place where this list of documentation would be?

A. (L. MacDonald) Yes, we can undertake to do that.

[Transcript, pp. 49-54]

[109] Undertaking U-1 lists the documents NS Power considers support the CRS:

A listing of documents and data that support this strategy are outlined below and are organized in the three main components of the Asset Management Mechanism. Risk Profiles, Mitigating Measures and Maintenance Strategies.

Risk Profiles:

- Feeder Risk Profiles
- Transmission Line Risk Profiles
- Major Substation Asset Risk Profiles

Mitigating Measures:

- Annual Capital Expenditure Plans
- Performance Standards Annual Report
- Performance Standards Summary and Revision Reports
- Storm Reports
- NS Power Problem Circuit Study
- Climate Adaptation Planning Documents
- Third Party Risk Reviews from Insurers
- Reliability Team Working Documents

Maintenance Strategies:

- Feeder Inspection Data
- Transmission Inspection Data
- Preventative Maintenance Programs
- Real Time Monitoring Data
- Feeder Load Monitoring Data
- Feeder Protection Coordination Studies

- Third Party Engineering Assessments
- Substation Field Inspection Data
- Root Cause Analysis Reports
- Distribution Planning Studies

[Exhibit N-19, U-1, pp. 4-5]

[110] NS Power's application included reliability statistics for its own operations, as well as those for Atlantic Canada utilities. The company stated that, generally, its annual outage frequency and duration is below the other Atlantic utilities, and where it is higher, it is due to a substantial number of storms.

[111] In its 2020 Performance Standards decision (M10055), the Board identified the worst 5% problem circuits and set out its expectations of NS Power regarding the circuits:

A comprehensive and effective approach to align the reliability performance of those circuits with the service level provided to customers in other regions of the province needs to be developed. It is unclear whether NS Power has undertaken any reliability analysis to determine if performance would be improved with additional or reconfigured infrastructure (circuits or substation) that could minimize circuit exposure. It is also unclear whether integrating innovative technological advances associated with microgrids, battery storage, or other distributed energy resources was studied to determine the effectiveness of such measures in improving service restoration or minimizing outage durations. The Board directs NS Power to undertake a comprehensive analysis which results in clearly identified measures, as well as the associated timing and costs, to bring these problem and chronic circuits into alignment with the reliability performance in the rest of the province. This study and the action plan are to be reviewed during an upcoming ACE Plan proceeding. [Emphasis added]

[Decision letter, June 23, 2021, p.13]

[112] The NS Power Problem Circuit Reliability Study was filed with the Board on December 10, 2021 in response to the Board's directive. The Board made the Study an exhibit in this proceeding. The Study described four problem circuits in Cape Breton. The four circuits "have been and continue to be, targets of reliability investments to improve performance." NS Power considered other options for improving the performance of each circuit, and developing some specific projects, taking into account reliability gains, costs,

feasibility, and the time required to implement the work. The proposed investment for 26 projects totals \$10.8 million. The Study noted four key areas as investment targets:

- Targeted priority device replacement;
- Storm hardening and reliability upgrades of devices;
- Enhanced vegetation management; and
- Smart Grid and Intelligent Devices deployment.

[113] Mr. Athas expressed concern about the overall level of funding stemming from the plan for the four problem circuits and what he considers to be disproportionate spending on outage causes as well as a general lack of specifics. He noted that most of the spending is on vegetation management and bringing lines to roadside, leaving little for the issues noted in the Study. Mr. Athas also expressed his concerns, generally, about a lack of specifics in the justification of T&D projects based on the impact on reliability:

Reliability impact is frequently used as justification for T&D capital projects and at times excessively so. Absent a specific numerical impact upon which to evaluate the cost-benefit of what is being proposed the term becomes little more than a buzz word.

[Exhibit N-9, p. 33]

[114] NS Power stated in its rebuttal evidence that the investment in the four problem circuits on vegetation management and outage causes is warranted due to the geographic conditions as well as the meteorological systems in the areas. The company considers its approach to mitigating the issues with the circuits in the circumstances is balanced.

[115] Mr. Athas set out several questions about vegetation management spending, suggesting that the circuits in question had fallen behind, and remedial attention was long overdue. NS Power rejected Mr. Athas' position, saying that there was no evidence that NS Power had fallen behind in its vegetation management. The company said it regularly reviews indicators to take the best steps to undertake the

necessary activities. NS Power did not accept Mr. Athas' suggestion that there is a need for an investigation. Further the company disputed the accuracy of the suggestion that it waits for a feeder to be in the "bottom 5%" before investing in it, noting that there are other feeders on which it is making investments in addition to the problem circuits.

[116] A further concern of Mr. Athas is the impact of underspending on several projects which he claims could negatively impact reliability. In its rebuttal evidence, NS Power responded to these concerns, noting that the projects identified by Mr. Athas have progressed. Further, with one exception, the projects all had variances of less than 10% from their approved budgets. NS Power noted that, in its quarterly reports filed with the Board, variance explanations are available to address Mr. Athas' concerns.

[117] In its application, NS Power discussed its Reliability Investment Strategy for aging T&D assets. The company stated that aging infrastructure is not replaced solely based on age, but other factors may impact its useful life: condition; risk; reliability impact, and others. In response to NSUARB IR-8, NS Power said its proposed capital investments for these assets will address current challenges as well as help to avoid future outages. In the longer term, the investments will support reliability "by both correcting existing/emerging reliability issues and avoiding issues that have not caused reliability impacts yet."

[118] The CA also explored the amount of spending on vegetation management with the NS Power panel during the hearing:

Q. (Mahody) Still on the topic of reliability, I would like to talk about trees. And if we could turn up page 168 of the Exhibit N-1, Mr. Goodine?

Q. And down as the very bottom, line of that portion of the evidence, it indicates that 27 percent of all identified event-day outage hours year to date in 2021 have been caused by trees.

So is that fair to say that somewhere between 25 to 30 percent of customer-experienced outages, the company in 2021 said that those were caused by trees?

A. (L. MacDonald) Yes, in addition to what I think we explain as well in the ACE Plan and elsewhere in respect to how weather-coded outages are often also tree caused, but coded to the weather event in question, so it's at least that, and likely more, depending on how the weather codes fall into trees.

Q. And that range of tree-caused outages, Ms. MacDonald, has been a relatively consistent level over the last 10 or more years?

A. (L. MacDonald) Subject to check, I think so, and again, depending on how the weather relates to it. And if you want to point me to something, we can, ---

Q. Sure.

A. --- myself and my colleagues, talk more about that.

Q. Certainly.

Mr. Goodine, Exhibit N-5, Responses to Board IRs, could we turn up Response to Board IR-50(b), and just down at the bottom of that page, if we could see that graph? Okay.

Q. So Ms. MacDonald, I was understanding that this graph, if you take out the 2010 and 2014, or if you normalize those as significant events that occurred that's referenced in your evidence, that line, at approximately 25 percent is what I understood to be a relatively consistent impact of trees on the system.

A. (L. MacDonald) Yes. Looking at it that way, you can definitely say that.

Q. Okay. As you know, Ms. MacDonald, a significant amount of investment has been made in vegetation management, in tree trimming, over at least the last 10 or 15 years, to the tune of millions and millions of dollars annually. Why is it that the impact that we see of trees causing outages doesn't seem to have changed, even though we've invested the tens of millions of dollars that we have in that initiative?

A. (L. MacDonald) So broadly speaking, I would say that maintaining the level -- perhaps it's a downward trend as well, if we look at it -- but is working in the context of increasing occurrences and severity of those weather days that I spoke about in terms of both the day itself that weather could be affecting the system as well as the stress in the days after.

And so all of that taken together, we know that the frequency and the severity of those events, the wind, for example, that causes -- typically causes the tree issues, have been increasing, so in some ways, to be holding or slightly decreasing in terms of the effects of that, as part of what we call maintaining and improving system performance in the context of the increasing severity and frequency of the weather.

Q. And going forward, Ms. MacDonald, I understand the company plans to spend approximately \$8 million in vegetation management tree trimming in the coming years. Is that a sufficient amount, in the company's view, given the impact the trees are having on our reliability?

A. (L. MacDonald) Well, we're constantly reviewing that, and if it becomes apparent that we need to increase in a material way the size of one of those programmes, we would bring that forward. But that is exactly the work that we're reviewing constantly, in terms of the balance of our programme among vegetation management investment as well as the other equipment related system-wide transmission distribution and feeder level improvement.

So it's all part of that balancing act based on what we see in the trends.

[Transcript, pp. 55-59]

[119] In her opening statement and closing submission, the SBA said that significant questions remained about what is targeted to address reliability and how success is assessed. The SBA emphasized the need for clarity, saying it is necessary to be able to determine what has been achieved by the investment.

[120] During the hearing, Ms. MacAdam asked the NS Power panel how the company will know if it has addressed the problem and achieved reliability. Matthew Drover, Senior Director of T&D and Delivery Operations, said that NS Power tracks the performance of all its feeders regularly, and if they are improving, the company knows it has made a difference.

[121] The Board also explored performance measures with the NS Power panel:

Q. (Murphy) So these two tables, my understanding is they present expected reductions in CKAIID and CKAIIF performance measures as a result of completing proposed projects in the Feeder Action Plan that was submitted -- I think it was Exhibit N-2, as part of this proceeding.

And I think these may be questions for Mr. Drover, but I'm wondering if you could explain how the targets for the estimated reduction in CKAIID and CKAIIF were determined?

A. (Dandurand) Mr. Murphy, maybe I'll start ---

Q. Sure.

A. (Dandurand) --- with -- in response to your question, and then Mr. Drover and I can respond accordingly.

Q. Maybe I'll -- before you start, my next question was going to also be how were those estimated range reductions estimated as well, so let's combine in the one question.

A. (Dandurand) Okay. For sure.

Yeah. So the estimated reduction in CKAIID and CKAIIF, as you've noted in the table, are what the company would expect as a reduction in those two metrics as a result of the investments that are included in the plan.

I guess the caveat to that, though, would be listed at the bottom of the table as well, just an important note that that anticipated avoided CKAIID, CKAIIF from a particular

project within the plan would vary, depending on the unique conditions that the feeder is exposed to in any given year.

So they are a range of, I'll say, possible outcomes, as the sub-note suggests to the table, with respect to reduction in those reliability metrics; again, based on the investments within the study.

Q. But is that specifically based on, I guess, Nova Scotia Power experience in doing previous type of work and what you saw in terms of reductions in those measures?

A. (Dandurand) So I guess partly.

My understanding would be that certainly, with the elements that feed into what the causes of outages are and having a firm understanding as to what the causes of outages are or impacts to reliability, and again, I'll say, coupled with the company's experience using that information to provide an expected range in reduction to CKAIID and CKAIIF.

Q. Thank you. In that same IR Response to the -- it was IR Response 81(b) ---

Q. --- there's reference there, it says:

Loss of supply related outages on feeder 53 [or sorry] 58C-403 contributed approximately 15 percent of customer hours of interruption and approximately 22 percent of the number of customer interruptions on average from 2018 to 2021.

Those numbers, I guess, to me, anyway, appear rather significant and I'm wondering what steps Nova Scotia Power's undertaking to reduce those particular transmission interruptions.

A. (Drover) I can speak to that one, Mr. Murphy.

So when it comes to loss of supply, those are typically either transmission or substation interruptions to a poll substation, and they can have the same causes as the other types of feeder outages we have, whether it's vegetation that falls on the transmission line or a type of asset that has weakened for whatever reason.

So it's part of our asset management programme, same that we do with our feeder inspections, we do the same thing with transmission inspections, and the projects that we put forth within the ACE Plan would reflect those -- those programmes.

[Transcript, pp. 285-289]

[122] While the SBA sought some means of quantifying the success of reliability investments, the Board observes that there was no suggestion about how this might be achieved. The Board notes NS Power's statements in its rebuttal evidence about the use of predictive analysis to inform its spending priorities, targeting improvements in CKAIID and CKAIIF in the study. The company said improvements in feeders are hard to predict exactly, due in large part to external factors like storms. NS Power went on to say that

its success can also be reviewed in the annual Performance Standards Review by the Board.

3.4.1.1 Findings

[123] The Board finds that presently there is no need to direct an investigation into reliability investments made by NS Power as part of this proceeding. No party objected to the approval of any of the projects identified to improve reliability in the 2022 ACE Plan application. The Board considers that the appropriate venue in which to explore whether improved performance has been achieved is in its annual Performance Standards Review. The Board understands that the results of T&D capital spending will not necessarily be seen immediately, however, and expects NS Power to be diligent in continuing regular monitoring of the circuits/feeders in the interim.

3.5 Economic Analysis Model

[124] The Board identified the EAM in the Final Issues List developed for this proceeding, with three areas for examination: Replacement Energy Cost (REC); Accounting Treatment of Decommissioning Costs; and Monte Carlo/Decision Analysis. The Board discusses these areas below, recognizing that they are all elements for consideration in the EAM.

[125] The SBA suggested that NS Power could expand the use of the EAM to scrutinize projects where the company has identified only one option as technically feasible. Mr. Athas said NS Power should expand on this conclusion as well as clarifying its review of alternatives. NS Power's response was that the company already does this and will continue to do so. The Board does not consider further direction is required.

[126] In its 2021 ACE Plan decision, the Board referred several questions to the stakeholder engagement process, including:

- Whether the Board should direct NS Power to update the EAM to align with new practices and more recent data that affect the replacement cost of energy and the design of sensitivities;
- Whether NS Power should be directed to provide a full explanation of the current accounting treatment for all decommissioning-related costs.

[127] In its 2021 Stakeholder Engagement Report, NS Power indicated that complete agreement with stakeholders was not reached on these two issues. The Board accepted the report in a letter dated November 2, 2021, and said it expected the unresolved issues would be addressed in either the next ACE Plan proceeding or other applications before the Board.

3.5.1 Replacement Energy Cost

[128] NS Power reported agreement to update the REC calculations in the EAM to align with the IRP Reference Plan 2.0C. The sensitivity for the REC would remain at 10%; however, NS Power noted that this would be updated to show it represents a P67/P33 range in alignment with IRP fuel sensitivities. In its closing submissions, NS Power said it would update the 10% sensitivity once it has completed its IRP evergreen work, suggesting it makes no sense to update it on a frequent or annual basis.

[129] Sensitivities for capital investment were updated to 30%, although the CA considered that rather than apply a Class 3 sensitivity of 30% to all projects, the sensitivity should be aligned with the class of each project. NS Power's position is that most projects submitted for Board approval are based on Class 3 estimates and therefore the 30% sensitivity is most appropriate. The company claimed that making changes to the EAM to accommodate the CA's position would be administratively burdensome. Finally, NS Power said it would continue to show the economic impact on a project of a one-, two-

and three-year delay in its EAM, with analysis of longer periods for projects where there is uncertainty around timelines.

[130] In his evidence, Mr. Wilson said that the changes made from the stakeholder engagement regarding REC are appropriate but suggested that the energy cost sensitivity should reflect the same range as the sensitivity for capital investment. He also suggested that, due to recent legislative changes, there should be a change to a different IRP scenario.

3.5.1.1 Findings

[131] The Board is satisfied that NS Power has appropriately updated its EAM regarding REC for current use and expects that there will be a further update once the evergreen process of the IRP is complete.

3.5.2 Accounting Treatment of Decommissioning Costs

[132] In its October 1, 2021 Stakeholder Engagement Report, NS Power said it had provided stakeholders with a complete explanation of its current accounting treatment for decommissioning-related costs and considered the Board's directive to have been properly addressed. However, the company noted concerns of the CA about how decommissioning liabilities are treated in the EAM. NS Power's position is that the decommissioning liability is the same in reinvestment and decommissioning options in the EAM at the beginning of the analysis, and the future revenue requirement only changes if the future cash flows between the options are different. The company said the changes are captured in the EAM through the changes in depreciation expense, financing costs and tax impacts.

[133] The CA pursued the issue of decommissioning costs in the context of the Tusket Main Dam Refurbishment ATO proceeding (M10197) currently before the Board.

In response to CA IR-19, NS Power said it does not have formal policies and practices about the comprehensiveness and accuracy of decommissioning costs developed for use in the EAM. The company said it typically evaluates the projects at a Class 5 level, and then further refines its analysis. The company went on to say that hydro projects can be deferred indefinitely if there is sustaining capital to ensure it reaches the next refurbishment or life extension modernization investment. While such a deferral may not be the most economic alternative, NS Power said it looks at what is the best value for its customers.

[134] Mr. Wilson suggested that the Board should direct NS Power to provide a sensitivity analysis including the cost of decommissioning in the economic analysis of the Mersey redevelopment project, which is not yet before the Board. During the hearing, this issue was explored by the CA with the NS Power panel:

Q. ... In his eighth recommendation, Mr. Wilson indicates that Nova Scotia Power should include a sensitivity analysis in the Mersey EAM that, at a minimum, includes the full cost of decommissioning the facility at the end of the analysis period. It is Nova Scotia Power's intent to supply that type of information as part of the Mersey filing?

A. (Dandurand) Yes, Mr. Mahody, to the extent it's appropriate, a decommissioning scenario would be included as part of the filing.

[Transcript, p. 83]

[135] Justin Heisler, Controller, also confirmed this in response to Board questions, with additional comment from Mr. MacDonald:

Q. (Murphy) Again aligned with Mersey, I wanted to follow up on a question that Mr. Mahody asked earlier today. ...

But Mr. Mahody referenced a recommendation from Mr. Wilson that Nova Scotia Power include a sensitivity analysis in the Mersey EAM, which includes the full costs of decommissioning the facility at the end of the analysis period.

And I think Mr. Mahody asked the panel to confirm that that would be done, but maybe I misheard, but the answer I heard was that Nova Scotia Power agreed to consider decommissioning as an alternative to Mersey Project. Is that what I heard?

A. (Heisler) Mr. Murphy, that was me, Justin Heisler. So we will look at a decommissioning.

Q. As an alternative. But the question was per Mr. Wilson's recommendations, when you look at the Mersey Redevelopment option, will you include decommissioning in that particular option at the end?

It's along the lines of the questions that Mr. Melanson was asking earlier. Will you look at decommissioning at the end of the project and include that in the costs for the refurbishment project or the redevelopment project?

A. (Heisler) Yes, we will.

Q. And you'll conduct the sensitivity analysis that Mr. Wilson had recommended?

A. (Heisler) Correct.

Q. Okay, thank you.

A. (J. MacDonald) Mr. Murphy, just to add to that. So certainly when you look at the price tag that's on Mersey, we're all, you know, like, a bit taken aback by sticker shock. But we're endeavouring to look at the lowest cost option for customers whether, you know, it's replacing the assets and sustaining the energy, whether it's de-energizing, which would include keeping the dams in place; and then the third option is to take the dams out which is kind of the decommissioning option for Phase 1.

So those are the considerations. And also part of those considerations are part of the consultation process that we have currently. And then certainly different views on all three of those, but certainly that would be part of the filing of the latter part of this year. But those are kind of the three options that we're looking at.

[Transcript, pp. 267-270]

[136] The question of whether NS Power's approach described in response to CA IR-19 of using a 40-year model in the EAM when looking at refurbishment or decommissioning introduces a bias in favour of refurbishment was pursued with Mr. Heisler:

Q. (Melanson) And my experience with decommissioning versus refurbishment is primarily in the area of hydro, and most of the hydro assets, the useful life has been considerably longer than 40 years and could go on to perpetuity depending on how often you refurbish it. Doesn't that introduce a bias in favour of refurbishment in every application?

A. (Heisler) Mr. Melanson, I mean, I think as we would have noted in our response to you; I believe it was CA IR-19. We do generally take the view that based on there' sufficient sustaining capital, we can extend the life of specifically hydro facilities in perpetuity. But to your point, that isn't always necessarily the most economic option. And so our approach would be to -- would be to look at all options, including decommissioning. And then we do expect that in certain cases at a certain point continuing to refurbish or extend the life of those assets may not be the most economic. So we would look at all appropriate options to ensure that the conclusion we're drawing is in the best interests of customers.

Q. My question was not so much whether you're going to be looking at the two options or not. My question is not -- is there not a problem, is there not an internal problem with the mechanism of the economic analysis model so that every time you do it separately over the course of time, the outcome is never going to be in favour of decommissioning.

A. (Heisler) I mean, certainly given the time value (indiscernible) on the basis of the -- comparing options on a net present value revenue requirement basis, there is -- there is a benefit in deferring the decommissioning costs, but at the same time, there are sustaining capital requirements throughout the course of the -- throughout the course -- through the life of the asset to extend that life, so I don't know what the -- certainly the time value of money isn't a factor, but I think our general view would be that the approach we're taking is appropriate from a net present value revenue requirement.

[Transcript pp. 211-213]

3.5.2.1 Findings

[137] NS Power confirmed, in its reply submission, its commitment to provide the sensitivity analysis around decommissioning in its Mersey application as suggested by Mr. Wilson. The Board agrees that doing so will provide a more appropriate EAM, but considering the potential inherent bias, expects that application to be closely scrutinized by stakeholders as well as the Board.

3.5.3 Monte Carlo/Decision Analysis

[138] In its decision in M10013 regarding the Annapolis Tidal Generator Retirement, the Board discussed NS Power's Decision Analysis model and the Monte Carlo Economic Analysis model as discussed in the evidence of Matthew Schoenhardt of MS Consulting, a consultant to the Board's consultant, Grant Thornton. The Board quoted a description of the Monte Carlo analysis from his report:

[67] MS Consulting stated that the primary purpose of Monte Carlo Economic Analysis (MCEA) is:

... The primary purpose of using MCEA is to compare project alternatives and understand under which scenarios does the ordinal ranking of each alternative change. Once the variables are identified that change the ordinal ranking, investigation of the most significant variables should have priority funding in the next stage so that their ranges can be further refined and/or reduced (i.e., de-risked by progressive project development). Investigating these key variables allows for reduced project development costs.

One method of understanding critical conditions are "tornado diagrams". A tornado diagram runs the economic analysis moving each variable through its maximum and minimum

range to determine the impact value on the outcome. This allows a user to see which variables are the most important to the desired outcome.

[M10013, Exhibit N-9, Appendix A, p. 6]

[139] In the Annapolis matter, Mr. Schoenhardt considered the NS Power Decision Analysis to be lacking. In this matter, there was little discussion of the issue. The Board notes that the Non-Binding Contingency Guidelines of NS Power, as filed in response to CA IR-15, refer to when a Monte Carlo analysis or similar simulation is used for range estimation. In response to NSUARB IR-21, NS Power explained that the company does not use such simulations as a standard for risk-rating and optimization; rather, NS Power uses the simulations for the evaluation of specific complex capital projects to compare alternatives.

[140] Mr. Wilson did not suggest the Board should favour the use or the non-use of a Monte Carlo decision analysis in his evidence. In his opinion, the EAM is suitable, but the Monte Carlo analysis could be useful as an “intermediate level of sophistication and complexity that is particularly useful for complex hydro projects or new technologies.”

3.5.3.1 Findings

[141] The Board considers Mr. Wilson’s view to be aligned with that of NS Power regarding the use of a Monte Carlo analysis. This appears reasonable to the Board; however, the Board will expect NS Power to be diligent in determining when such an analytical approach is called for, and to undertake a rigorous analysis in those instances.

3.6 Revenue Requirement

[142] In the Board’s 2011 and 2012 ACE Plan decisions, the Board directed NS Power to provide an estimate of the effect which the ACE Plan spending might have on the revenue requirement over the next five years. NS Power included this information in its application, as it has done since those directives were issued. The Board’s purpose

for the directives was to gain insight into the affordability of proposed ACE Plan spending. The Board subsequently directed NS Power in the 2017 ACE Plan decision to provide the same information based on assumptions from stakeholders.

[143] NS Power provided the calculations for revenue requirement based on its own, and on stakeholder, assumptions. In the application, NS Power claimed that the table based on its assumptions (Figure 59) “shows that NS Power’s capital expenditures have a cumulative decreasing effect on NS Power’s revenue requirement for customers over the next five years, taking into account the contribution to fixed costs provided by new customer additions.” After explaining the method of its calculation, NS Power stated:

This method does not address the revenue requirement effect should capital projects not be completed. Costs resulting from not completing certain projects include items such as increased operating costs, increased fuel costs, increased repair costs, and other risks or implications. Avoided cost benefits are not included in this revenue requirement calculation.

[Exhibit N-1, p. 119]

[144] In addition to cost recovery from customer growth, NS Power went on to explain that Administrative Overhead (AO) and AFUDC credits and income tax impact contributed to the cumulative decrease in revenue requirement.

[145] The Board notes that NS Power does not believe that the stakeholder assumptions accurately impact its capital program because the impact of fixed cost recovery and AO and AFUDC credits are removed. In response to NSUARB IR-44, NS Power acknowledged that AO is a main driver of the decrease.

[146] NS Power also acknowledged in response to SBA IR-28 that the customer growth used in determining the revenue requirement includes projected growth, and if that growth is lower than projected, the revenue requirement increases. This led Mr. Athas to conclude that, without support for the projected customer growth, that growth should not be included to justify minimizing the revenue requirement. He described it as

“misleading” and suggested the use of AO, most of which is in the early years, is not appropriate. He said that NS Power should use a low case customer growth projection. Mr. Athas concluded that the Board should make approval of the 2022 ACE Plan spending “contingent upon its projected customer growth metric for each year being achieved.”

[147] NS Power rejected the SBA’s suggestion for using a low case customer growth scenario and said that the company had already provided such a scenario in response to SBA IR-28 which resulted in no change, and had also demonstrated this in Figure 59 by excluding all customer growth in the section entitled ‘Excluding Fixed Cost Recovery.’ In its closing submission, NS Power confirmed that the revenue requirement is merely an estimate, and said it was neither necessary nor appropriate to adopt Mr. Athas’ suggestion to make the 2022 ACE Plan spending contingent on the growth being achieved.

3.6.1.1 Findings

[148] While several years ago the Board directed the impact of proposed capital spending on revenue requirement be included in the ACE Plan applications, the Board now questions whether the information proves useful. As NS Power has acknowledged, it is an estimate only. In the Board’s view, given the uncertainties surrounding estimates in the calculation, and the lack of consensus on the inputs, the information does not appear to be useful. The Board will not require this information to be included in the 2023 ACE Plan but reserves the right to seek information on the revenue requirement in a future proceeding. The Board observes that the GRA proceeding later this year may shed more light on this subject. Further, the Board agrees with NS Power that it should not accept Mr. Athas’ suggestion to make approval of the 2022 ACE Plan contingent on the achievement of projected customer growth.

3.7 Contingency and Contingency Guidelines

[149] Directive 7 of the Board's 2020 ACE Plan Order directed NS Power to develop non-binding contingency guidelines "...describing how it determines when a capital cost estimate contingency amount is merited and at what level... ." The company issued the Non-Binding Contingency Guidelines (Contingency Guidelines) on November 20, 2020 and revised them on August 31, 2021.

[150] In this proceeding, Mr. Wilson made the following recommendation in his report:

Include the following documents with every capital work order and application.

- Project maturity classification checklist
- Statement of the basis for the contingency guidelines including, as applicable:
 - a. Predetermined guidelines – reference to or statement of documented basis for use of a standard "single contingency" or other referenced practice;
 - b. Subject matter expert judgement – documented reasons for the determination, including a supporting risk register; and
 - c. Other, more technical methods - Supporting analysis as described in the Contingency Guidelines. (Page 29)

[Exhibit N-10, p.5]

[151] Mr. Dandurand confirmed during the hearing that NS Power would provide the requested information for all projects with a capital cost over \$1 million requiring Board approval as part of the 2023 ACE Plan filing. This was further confirmed by the company at pages 15-16 of its closing submission. The Board, therefore, directs NS Power to follow through on its commitment and provide the information set out in Mr. Wilson's recommendation.

[152] Mr. Wilson's report also raised an issue with the use of expected accuracy ranges in establishing a contingency amount. His concern was that the Contingency Guidelines "...conflate the expected accuracy range of the budget estimate with the contingency determination."

[153] The portion of the Contingency Guidelines quoted by Mr. Wilson which gave rise to his concern is reproduced for ease of reference:

NS Power recognizes that AACE makes no correlation between the contingency and the upper limits of the estimate accuracy, however, the level of a project maturity and hence the estimate class is directly related to the level of Uncertainty inherent in the project budget estimate; as a result, there are varying levels of contingency that can be applied and although NS Power starts with using the AACE recommended upper limits of the estimate accuracy range to establish the range for the probable contingency, as project progression develops, NS Power will take into account evidence such as budgetary quotes, RFP responses, further detailed design, construction assessments and other insight as necessary to narrow the proposed AACE accuracy where possible for a given class of estimate.

[Exhibit N-4, RIR-15, Attachment 1, p.10]

[154] In Mr. Wilson's opinion there is an internal contradiction in the referenced passage, where the AACE makes no correlation between the contingency and the upper limits of the estimate accuracy, while NS Power uses the AACE "upper limits of the estimate accuracy range to establish the range of the probable contingency... ." Mr. Wilson provided the Nictaux Canal Crest Rebuild project as an example where the AACE Class 3 estimate was apparently used to justify a 15% contingency, described as "...the lower end of the 10-30 percent range of this estimate class..."

[155] This analysis led Mr. Wilson to make the following recommendation:

Further clarify the Contingency Guidelines to avoid relying on the expected accuracy range to set a contingency, considering an approach I suggest for application of the predetermined guidelines method when used to determine a contingency.

[Exhibit N-10, p.5]

[156] The predetermined guidelines method envisaged by Mr. Wilson would be based on past performance modified up or down with the use of expert judgment. While Mr. Wilson discussed, by way of example, aligning the expert judgment with a project's risk register, during questioning at the hearing he indicated a risk register would not necessarily be required for every project. For example, standard projects which are done over and over again might not require this type of assessment. Mr. Wilson did not want

to become involved in micro-management but suggested a risk register would be useful for civil hydro-electric projects.

[157] NS Power was less receptive to this recommendation. The company confirmed the predetermined guidelines method is one already found in the Contingency Guidelines. NS Power agreed with Mr. Wilson that predetermined guidelines used with expert judgment is an appropriate approach. That said, the company maintained that a contingency range adds useful information in addition to methods such as predetermined guidelines. NS Power suggested that if the contingency amounts for projects were estimated at greater than 30%, they might not be ready for submittal. The company further submitted “a contingency range also provides clear direction and bounds to project managers.” Furthermore, the company said that because of the varying nature of projects within an asset class, the predetermined guideline plus expert judgment approach may not always be the preferred one.

[158] The Board begins its analysis by noting that the issues being addressed relate to non-binding contingency guidelines. These were developed in response to concerns from stakeholders and the Board that, in numerous instances, it was difficult to determine, and therefore assess, what specific factors went into the contingency figure found in a capital work order. That said, as the guidelines are non-binding, the Board must be careful not to make them too prescriptive or, as discussed by Mr. Wilson, become involved in micro-management.

[159] In every case, NS Power has the burden of showing that the chosen contingency amount is reasonable. If the Contingency Guidelines are helpful in focusing project managers on the need to have reasonable contingency figures reflected in the

preparation and execution of capital work orders, and showing the reasonableness of these figures to the Board, they are useful to both the company and the Board.

[160] In this context, the Board has some difficulty in following how the range of the expected accuracy of, for example, a Class 3 estimate under the AACE guidelines informs the chosen contingency amount. NS Power and Mr. Wilson appear to agree that the AACE guidelines related to the accuracy of estimates make no direct correlation between this and the determination of contingency amounts.

[161] The purpose of the AACE guidelines related to class estimates is to establish a range of accuracy based on the amount of work that has been done to arrive at these estimates. The purpose of these AACE guidelines is not to establish the potential bounds of any contingency related to each known risk, sometimes referenced as “known, unknowns.” Mr. Wilson said potentially unknown project risks, sometimes described as “unknown, unknowns,” would be best addressed in a project management reserve type of account.

[162] The use of the expected AACE class estimate accuracy range to support a contingency figure, such as appears to have been done in the Nictaux Falls Crest Rebuild, does not appear to the Board to add much to the exercise. Using the AACE class estimates to set upper bounds also potentially increases the project contingency to unreasonable levels, as explained by Mr. Wilson in his testimony when discussing Figure 2 in his report, which is taken directly from the Contingency Guidelines.

3.7.1.1 Findings

[163] The Board will not order the Contingency Guidelines to be altered at this stage, given their non-binding nature. Mr. Wilson’s recommended approach appears to have merit as it relates to transparency and simplicity. That said, the Contingency

Guidelines have just been adopted by the company. The Board will, therefore, not, at this stage, direct NS Power to limit its approach to the one suggested by Mr. Wilson.

[164] Despite the foregoing, the Board is not satisfied NS Power's evidence and submissions on this point sufficiently address the possibility of conflating accuracy ranges for estimates with the determination of a contingency amount. The Board would benefit from a better understanding of how NS Power can address the concerns about transparency, simplicity and potential inflation of contingency amounts when using the estimated accuracy ranges arising from the AACE guidelines as a form of guidance in arriving at a contingency amount. The Board directs NS Power to provide greater clarity in this regard in the 2023 ACE Plan.

3.8 Eastern Clean Energy Initiative and Impact of Recent Provincial and Federal legislation on Proposed Spending

[165] The ECEI projects consist of C0044392 (Coal Conversion), C0044771 (Wind), C0044391 (Transmission) and C0045132 (Energy Storage). The goal of the ECEI is to assist NS Power in the transition to 80% renewable electricity by 2030. These projects are listed as items for subsequent submittal in the 2022 ACE Plan. They are, therefore, not currently before the Board for approval.

[166] The Coal Conversion project is for the conversion of up to two coal generating units (Point Tupper and Trenton 6) to gas-fired units. Understanding that scoping and project refinement have not reached a level required for submittal, the current total capital cost estimate for this project is \$32,341,325, with \$9,390,264 forecast to be spent in 2022.

[167] The Wind project consists of 350 MW of wind energy from a provincial RFP, along with new generation facilities for onshore wind of up to 160 MW in partnership with

one or more Mi'Kmaq communities. The current total capital cost estimate for this project is \$83,280,972, with a budgeted forecast spend of \$29,563,744 in 2022.

[168] The Transmission project involves a portion of the proposed Atlantic Loop, the purpose of which is to provide a transmission loop for accessing hydro-electric power from Quebec and Newfoundland and Labrador. This portion of the project would expand and upgrade the New Brunswick intertie and transmission capacity from that province. The current capital cost estimate for this project is \$351,898,909, with a budgeted forecast spend of \$20,378,370 in 2022.

[169] The Energy Storage project envisages the purchase of four 50 MW 4-hour grid scale batteries for installation on the transmission system, to assist in integrating new renewable energy, provide energy arbitrage and resiliency services, along with firm capacity and fuel savings. The current capital cost estimate for this project is \$171,207,920, with a budgeted forecast spend of \$60,413,412 in 2022.

[170] The total current capital cost estimate for the four ECEI projects is, therefore, approximately \$638,729,126, of which approximately \$119,745,790 is scheduled to be spent in 2022. The Board further understands that there are sensitive ongoing negotiations with respect to potential government funding for portions of these capital costs. Notwithstanding this, and the fact the company is not seeking approval of the ECEI projects as part of this application, the level of spending attracted considerable interest from the parties and the Board.

[171] NS Power currently intends to file each capital work order for approval as a separate project. The company says the four ECEI projects are consistent with the scenarios developed in the recent 2020 IRP Action Plan. NS Power also says each

project can stand on its own merits, separate and apart from the others, as part of an overall approach designed to meet legislated climate change mitigation objectives.

[172] The relationship between the ECEI projects and the 2020 IRP Action Plan will be discussed in more detail below. Aside from issues related to consistency with the 2020 IRP, and any request by the parties to update the 2020 IRP, another issue raised as part of the ACE Plan proceeding was whether the projects should be considered separately by the Board. The Board further raised the issue of whether the ECEI could proceed without government funding assistance. As well, the Board raised the risk associated with natural gas conversions as a transitional energy source in the event natural gas falls out of favour when total methane emissions from source to burning are considered.

3.8.1.1 Findings

[173] At this stage it is premature to provide any specific directions on many of the issues canvassed during the hearing, as the ECEI projects are not before the Board. Each project is tied to the goal of ending coal-fired generation in the province, significantly reducing reliance on carbon-based energy, and substantially increasing renewable energy production. NS Power has determined that each project can be justified on its own. The Board should not pre-judge this assertion at this stage.

[174] In the past, the Board has commented on the conceptual and analytical difficulties which can arise, especially in the context of individual EAMs, when reviewing large projects involving a single generating system, which are presented in phases. The Board will simply comment that reviewing large projects with a common goal in isolation has similar potential pitfalls if information gaps arise. This is particularly the case in the context of the level of investment contemplated by the ECEI and its long-term systems

and planning impacts. To avoid delays, with the knowledge of stakeholder concerns expressed in this proceeding, engagement takes on added importance.

[175] The Board is mindful that there are clear distinctions, for example, between the transmission upgrades with New Brunswick, and eventually Quebec, and converting coal plants to gas-fired ones. There would appear to potentially be direct links between substantial increases in intermittent wind generation and grid scale battery storage. In any event, all the projects relate to the decarbonization and renewable energy goal. The need for certain attributes in notionally separate projects, such as, for example, firm capacity attained through hydroelectric purchases or gasification of coal plants, could theoretically be dependent on what firm capacity is achieved by each project. The onus will be on NS Power to justify its approach and the Board expects a rigorous analysis.

[176] NS Power has committed to providing project alternatives for each of the four ECEI submittals. The number of viable alternatives will depend on the scope and project refinements leading to the ultimate applications. This is the methodology envisaged by the CEJC and the Board expects all reasonable and viable alternatives to be included. Depending on how these alternatives are presented, it may or may not alleviate Mr. Wilson's concern about EAMs for ECEI projects that are considered in isolation from the other ECEI projects. That is for another day.

3.9 Alignment with the 2020 IRP

[177] The 2020 IRP proceeding involved a comprehensive exercise with significant stakeholder input. The goal was to develop a robust and risk-weighted long-term strategy to guide NS Power in meeting government decarbonization goals in a safe and reliable manner at the least cost to its customers. Through the engagement process, the company produced a number of scenarios in order to explore future policy options

and resource strategies, which were tested against various potential future conditions and circumstances.

[178] In its rebuttal evidence, NS Power described one of the outputs of the 2020 IRP process as follows:

Another key objective of NS Power's 2020 IRP was to construct an Action Plan and Roadmap outlining the key tasks to be undertaken in the next five years to implement the strategy, and to identify signposts to monitor and decision gates to be addressed in order to enable carefully considered changes in strategy as the external policy, technology, and market landscape evolves. This Action Plan and Roadmap are directly informed by the modeling performed by NS Power as part of the 2020 IRP analysis, which reflected a range of potential external influences, as well as by other known potential future uncertainties.

[Exhibit N-12, p. 13]

[179] Both Mr. Wilson and Mr. Athas were concerned about the alignment of the four proposed ECEI projects for subsequent submittal with the 2020 IRP. Both made recommendations on how NS Power should present the four capital work orders to the Board for approval.

[180] Mr. Wilson made the following recommendation:

Demonstrate that the levels of investment in proposed Eastern Clean Energy Initiative projects are supported by an optimal resource plan based on a scenario similar to 2020 IRP Scenario 3.1C, and that NS Power has engaged directly with stakeholders in developing this demonstration prior to filing its subsequent submittals.

[Exhibit N-10, p. 5]

[181] Mr. Athas said that a full perspective on an update to the 2020 IRP should be provided before approval of the four ECEI projects is considered by the Board. He stated:

It will be crucial to conduct a thorough evaluation of the ECEI CIs once NSPI submits them for approval. The Board should be careful in its review and delay any approval of these matters until the updated IRP modeling is complete and NSPI has more certainty regarding its long-term resource strategy.

NSPI has stated that each ECEI investment stands on its own and intends to submit for approval as separate capital filings. However, due to the integrated nature of the investments, it is important that the Board have an updated, complete picture of NSPI's long-term planning strategy prior to considering any of these large investment decisions.

[Exhibit N-9, pp. 19-20]

[182] In its rebuttal evidence and submissions, NS Power says the purpose of an IRP is not to prescribe specific investments. The company, therefore, disagrees with any suggestion that the four projects either displace components of the 2020 IRP or are investments which formed part of the IRP. That said, NS Power views the four ECEI projects as aligned with the 2020 IRP strategy. It provided a detailed description of its position on this alignment in its rebuttal evidence.

[183] The company further points out that it filed its first annual 2020 IRP Action Plan update on January 21, 2022. It says stakeholder engagement will take place with respect to this report and other evergreen related aspects of the IRP. NS Power does not agree that the submittal of the ECEI projects should await a complete update of the 2020 IRP. The company says no specific direction should be provided at this time. It argues the Board's process when the capital work orders are submitted is the proper venue to address issues related to alignment with the 2020 IRP.

[184] NS Power goes on to say how it sees the Board approval process will address IRP alignment concerns and burden of proof the company expects it will have to meet:

Having said that, the Company reiterates that it is committed to continuing to engage interested parties around the process to keep its IRP strategy evergreen. As of the filing of this Closing Submission, NS Power and stakeholders have begun to engage with respect to updated scenarios that reflect recent decarbonization policies.

NS Power further notes that the IRP is not intended as the venue to test specific projects for approval. Upon submission to the Board, the ECEI projects will (i) be thoroughly vetted and fully justified; (ii) will confirm consistency with IRP Findings, IRP Roadmap Items, and IRP Action Plan Items; and (iii) be supported by the appropriate analysis.

[Exhibit N-22, p. 11]

[185] NS Power is concerned about the relatively short time the company has to meet the 2030 targets related to coal generation and renewables. It is one of the reasons why it opposes delaying project submittals pending updated 2020 IRP modeling. In

response to a Board question about potential delay if an updated IRP modelling exercise is not done in advance of the submittals, Ms. MacDonald provided the following view:

The way that the model will be updated to consider the projects is the same type of work that would happen to update the relevant generic plan. And we are at the stage where we've spent a couple of years with the directional plans and have paths that look, if not exactly like ECEI, similar.

And the next step is the project definition to then evaluate using both the starting point of the IRP and the updated analysis that goes with the project, but in the IRP Evergreen, so to speak, set of inputs and modelling runs.

So in that way, I think we're talking about the same thing, but to pause for X-months to have one happen before the other, we don't think it's necessary.

[Transcript, pp. 242-243]

[186] Mr. Athas appeared to be relatively satisfied, at least in principle, with the evidence NS Power provided about his concerns in its rebuttal evidence and in responses to questioning during the hearing. In his opening remarks, Mr. Wilson indicated the type of updated modeling he was recommending, while involving a significant amount of work, was not equivalent to the extensive 18-month 2020 IRP process, as NS Power had suggested in its rebuttal evidence. He is still of the opinion this updated modeling should occur before the four ECEI projects are submitted for approval.

3.9.1.1 Findings

[187] The Board agrees with the general proposition that the purpose of an IRP is not to prescribe specific investments. When, however, there are short time horizons for completing a massive change in the way the electricity system will produce and deliver energy, it is clear the 2020 IRP forms an integral part of any capital works planning. An Action Plan Update and Roadmap were developed from the exercise with a relatively short initial five-year horizon.

[188] The Board would, therefore, expect there would be alignment between the scenarios reviewed in the 2020 IRP, or any updated modeling related thereto, and the

2020 IRP Action Plan Update and Roadmap, and any related updating. NS Power acknowledges this in its rebuttal evidence and submissions. The issue is how and when this updated modelling should occur. Because of the scope of the projects, and the urgency of addressing the fast-approaching 2030 deadlines, NS Power says this can be done in parallel with the preparation and submittal of the four ECEI projects.

[189] The Board agrees in principle that a parallel approach could achieve the desired result. It will, therefore, not direct an alternative approach. That said, the devil is in the details. The Board has cautioned NS Power about its concerns that time could potentially be wasted if all the modelling is not done before submitting the applications. It will be up to NS Power, as the proponent, to marshal its resources and plan its approach to avoid this scenario.

[190] The Board expects NS Power to include, in its approval requests for the ECEI projects, all relevant information that should allow for an efficient and timely review of these applications.

3.10 Total Cost of Ownership for IT Projects and Electric Vehicles

[191] Total cost of ownership (TCO) is the cost to acquire an asset plus the cost to operate it over its useful life. It accounts for all the costs, both the upfront acquisition costs and those to be incurred to operate the asset. In addition to providing a comprehensive understanding of the cost of a capital investment, a TCO is considered a useful tool for comparing capital investment options to determine the best value for money.

[192] In its 2021 ACE Plan decision, the Board directed the stakeholder engagement to address whether NS Power should provide the Board with a TCO estimate for the PAM IT project (CI 49094), and whether NS Power should be directed to routinely

provide such information for IT projects with capital budgets over \$1 million. The 2021 Stakeholder Engagement Report indicated that although consensus was not reached with all stakeholders regarding whether a TCO for the PAM IT project was necessary, NS Power agreed to provide a TCO for IT projects over \$1 million if an alternative is available, and not cost prohibitive. If an alternative is not available or not available for a reasonable price, then it will provide additional explanatory information.

[193] In his evidence, Mr. Wilson noted that expensive IT projects are increasingly accounting for larger portions of NS Power's investments. Mr. Wilson considers that, given the short useful life of these investments, a TCO analysis should be brief and primarily use information from the project budget with assumptions regarding pricing after the contract term.

[194] Mr. Wilson recognized that there may be unanticipated costs from items that are out of the scope of a project when it is submitted to the Board for approval. Therefore, he considers that it is reasonable for NS Power to provide a TCO analysis at a Class 1 or 2 level of maturity.

[195] Mr. Wilson took issue with NS Power's limitation to providing additional evidence to the Board upon request for IT projects over a \$1 million dollars when an alternative is not available. He found three problems with this approach:

1. Other parties or the Board may have a different opinion on whether a proposed project is the only technically or economically feasible alternative;
2. The opportunity to obtain a TCO "on request," presumably in response to the only information request opportunity, denies parties the opportunity to question NS Power regarding the assumptions and methods it used to develop the TCO; and,
3. Even if there is no alternative to the proposed project, parties and the Board should understand the full implications of project approval. For example, the assumptions included in the TCO may indicate constraints that parties may wish to question in light of other planned investments by NS Power. Such review ensures that NS Power can demonstrate a full understanding of the requirements to maintain and further develop its IT investments.

[Exhibit N-10, p.41]

[196] Mr. Wilson recommended that NS Power submit a 10-year TCO for each IT project with a budget over \$1 million unless an EAM is prepared.

[197] NS Power stated that it will provide a TCO when there are technically feasible alternatives and an EAM is not provided; however, if the project is valued over \$1 million and an EAM is not provided to the Board, then NS Power will give explanatory information as to why there are no other alternatives.

[198] In the hearing, NS Power was asked by the Board whether a TCO is applied only to IT projects, or if it is referred to, or used in the CEJC, and if the TCO is different from other methods of analysis for capital projects:

Q. (Clarke) So how do you -- is the total cost of ownership different from something that else that's looked at when capital projects are put forward? Does it relate only to IT or only to electric vehicles? Obviously it's those two have been mentioned.

A. (Willett) So we've typically been talking about total cost ownership in relation to IT projects but as you mentioned, electric vehicles, so it is a relatively newer term that's been introduced in these proceedings and discussions on ACE approval.

Q. And does it get at the same information that you provide in other capital projects, in terms of looking at the cost of a piece of equipment or something else?

A. (Willett) So I would say in -- when we're comparing alternatives within a project in an EAM, it would be comparing all the capital and sustain operating costs. So a similar process would be undertaken in an economic analysis model.

Q. Okay. So since it's not referred to in the CEJC, do you feel that there should be any amendment to the CEJC to reflect that consideration, or is it adequately covered in the requirements that are set out there already?

A. (Willett) So I think that there could be some clarification on the TCO in that document to help with ensuring that there's clarity on what's being discussed when discussing TCO versus an EAM.

Q. And particularly, I guess as it relates to IT projects because that seems to be where it's most commonly used up to this point. Is that right, Mr. Cummings?

A. (Cummings) That's certainly where it's been discussed to date, Madam Chair.

[Transcript, pp. 338-339]

[199] The CA stated in his closing submission that the clarification to the CEJC would be a useful addition.

[200] In Undertaking U-12, NS Power submitted a TCO analysis for two vehicles it compared in 2019. NS Power elaborated:

While the TCO for the RAV4 HEV AWD is less than the Ford Escape ICE AWD, the cost of retrofitting the vehicles with custom equipment post purchase of the vehicles is not included in the TCO analysis. In addition, TCO analysis was not being completed as broadly in 2019 as it is today. Given the increase in the price of gasoline in 2022 and greater spread in the TCO between the two vehicles, NS Power's current planning for replacement of Ford Escape ICE AWD vehicles in a planned manner includes sourcing vehicles such as the Toyota RAV4 HEV (AWD) whenever it is beneficial for customers to do so.

[Exhibit N-19, U-12]

[201] Board Counsel requested that NS Power confirm that all vehicles being compared have the same useful life. Board Counsel asked:

Q. Is it possible, Mr. Drover, that eight years is what's being used for the analysis on all these vehicles?

A. (Drover) Subject to check. We have used eight years for our internal combustion vehicles in the past. Most of those were treated equal. As we're doing the analysis of the other vehicles, there are lots of unknowns that may factor into that as well.

Q. So, all right, would you confirm whether eight years is being used for all of the HEVs and the Ford ICE?

[Transcript, pp. 174-175]

[202] In Undertaking U-14, NS Power confirmed that eight years is used in the TCO of vehicles which is assumed for all types of vehicles.

[203] In its closing submission, NS Power stated that it considers it unnecessary to provide a TCO for every IT project over \$1 million. The company explains that when there is only one feasible option for an IT project, it will be justified in accordance with the CEJC and will include explanatory information as to why there is only one alternative. With respect to the CA's request for a 10-year timeframe for IT project TCOs, in its closing submission NS Power claims that:

... An examination of future costs associated with software/IT licensing requirements, for example, may not always be known with certainty beyond the short term, and so such an analysis over a 10-year period (as is being requested by Mr. Wilson) will not add meaningful value for customers.

[Exhibit N-22, p. 25]

3.10.1.1 Findings

[204] The Board finds the CA's request that NS Power use a 10-year timeframe for an IT project TCO is inflexible. NS Power is directed to use a TCO timeframe to match that of the expected useful life of the IT software and/or hardware. This approach is currently applied to other investments as demonstrated by NS Power's use of an eight-year TCO for vehicle purchases. The Board finds it appropriate for NS Power to have flexibility to select an appropriate timeframe for a TCO analysis that is in keeping with the useful life of an investment rather than a prescribed timeline.

[205] The Board considers that NS Power's offer to provide a TCO for IT projects over \$1 million only when there is a technically feasible alternative, and an EAM is not provided, is inadequate. The Board finds that a TCO provides a fulsome understanding of a project's costs over the course of its useful life, rather than just a tool for comparing options. Therefore, the Board directs NS Power to use a TCO for IT projects over \$1 million when an EAM is not provided, whether or not an alternative is available.

[206] The Board finds that the CEJC requires revision to include the TCO model in Section 6.3 Economic Analysis. NS Power is directed to revise the CEJC in consultation with Board staff and stakeholders. This consultation should be completed in time for a revised CEJC to be submitted to the Board with the 2023 ACE Plan application.

3.11 Impact of COVID-19 on Capital Spending and Lessons Learned

[207] Because of the number of projects deferred or cancelled in 2020 due to the COVID-19 pandemic, in its 2021 ACE Plan decision, the Board directed NS Power to

provide more detailed information in its quarterly reports to the Board on any projects deferred or cancelled due to the pandemic. NS Power has continued to provide that information.

[208] In its application, NS Power reported that it has adapted its processes to ensure that there is no material impact from COVID-19 on the reliability of the electricity system generally, and to ensure safety. The Board observes that in various documents in support of specific projects, suppliers or contractors referred to COVID-19 and its implications for safety and supply chain delays, which has impacted costs. The Board has already noted this in its discussion on the VJ1 projects in the 2022 ACE Plan earlier in this decision.

[209] The Board notes from various IR responses that there have been delays in work vehicle replacements (NSUARB IR-38), delivery of blades (NSUARB IR-63), and in the protocol of equipment spares due to supply chain disruptions (SBA IR-14) attributed to COVID-19. However, NS Power confirmed in Undertaking U-24 that while the pandemic has been a factor for consideration, no projects were deferred or cancelled in 2021 due to COVID-19, unlike 2020.

[210] The Board explored the implications of the pandemic with the NS Power witnesses:

Q. (Chair): ...Has there been a significant change in the impact of the COVID-19 over the past three years, starting in 2020? As I said, last year's plan talked about a lot of projects being deferred as a result of that. And then we had 2021 just passed, and now we're, I guess, at least up to today, still with the -- living with various restrictions.

So I'm wondering if there's been any change over that period of time?

A. (Dandurand) As you've noted, Madam Chair, we've also been adjusting to the restrictions related to the COVID-19 pandemic over time, and certainly, there's still impacts from the pandemic in the execution of our capital projects.

But the company, again, has adapted to those quite well, and has implemented, you know, the required practices and procedures in order to execute our capital programmes, as I believe we've been demonstrating over the last number of years. And

one of the things I would say that is relatively new that we have an eye to would be related to the supply chain, and so seeing supply chain impacts, or I should say, keeping an eye on supply chain impacts and the potential that that may have on the execution of our projects going forward.

...

...I would say that as per our prior comments and discussions through the 2021 ACE Plan, certainly, would have had to react to the impacts of the COVID-19 pandemic, but going into this year's ACE Plan and over the course of the last year, we've continued to adapt to the pandemic and incorporated the necessary elements within our execution plans in order to be able to execute as best we can in the face of what the pandemic brings.

Q. Mr. Dandurand, were there any projects deferred in 2021 specifically due to COVID-19?

A. (Dandurand) I'll just need to caucus on that for a moment, Madam Chair,

...

So for specific examples in that timeframe that you've mentioned, I would need to go and look at the cancelled and deferred list from the prior year's ACE Plan, from the 2021 ACE Plan, to see if there are specific projects that were cancelled or deferred exclusively for the reasons related to the COVID-19 pandemic.

But I would say that in general, there were some projects that were impacted in that timeframe, so for last year. And by that, I mean the COVID-19 pandemic would have had an impact on the execution of some of those projects, in terms of timing, in some cases, as the company adapted to working under those restrictions related to the pandemic.

...

Q. And continuing along that COVID vein, in the application at page 10, the company said it's continuing to adapt, and specifically, in quotes, "Changes continue to be implemented," and again in quotes, "Processes enhanced" regarding that.

So I'm wondering if you could describe the changes and process enhancements in somewhat greater detail?

...

A. (Dandurand) Yes, Madam Chair, I see it there now, and I would say that most of the changes that have been implemented would relate to the operational elements of our business, so both on the power production side of our business and on the T&D side of our business.

And as I'm sure you can appreciate, the nature of the work that our operational employees do, certainly there's a heightened level of risk for those employees, in the face of what the pandemic has brought, due to the nature of their work.

...

Q. Just to take it a little bit further, the application itself was filed in November of 2021. The situation then was different than it is now, hopefully, so is there any change that you're aware of in the current state, in the near future expectations?

A. (J. MacDonald) Madam Chair, this is Mr. MacDonald. I can speak to that.

So I would say one word for us that's changed with respect to the early days of the pandemic is just adaptability. We've built numerous procedures and processes, but we've also learned that we have to move and adapt very quickly, because from one day to the next, things can change, you know?

And just even over the last few months, we've had a number of employees have come down with Covid. We've had one plant in particular have over 30 employees infected through our peak season. So we've had to adapt buildings' contingency plans, so in the event that, you know, we got into a situation where we couldn't run a unit, we would move people from the other areas over. So we built contingency plans in the event that we had serious pandemic concerns at one site or another.

But, you know, I think daily pandemic calls in the morning, coordination calls, making sure everybody knows what's happening in every plant across the province, sharing resources, and building out strong procedures and processes, those are just a few elements of the change and improvements that we've made from onset of the pandemic.

Q. Mr. MacDonald, are those the kinds of improvements that you might see continuing even when there is no issue with Covid?

A. (J. MacDonald) Absolutely.

[Transcript pp. 343 to 350]

3.11.1.1 Findings

[211] The Board is satisfied that NS Power is working to ensure that COVID-19 does not negatively impact operation of the electricity system. The pandemic has been a challenge in all areas of business and, indeed all aspects of life, in the province. Challenges will continue, especially in relation to the supply chain, and there will undoubtedly be cost implications. While that requires NS Power to continue to be diligent in its procurement practices, as well as project management, the Board is encouraged by Mr. MacDonald's assurance that the company has learned lessons and improved practices that will continue in the future to the benefit of ratepayers. The Board expects nothing less.

4.0 SUMMARY

[212] The Board approves the 2022 ACE Plan and lists the approved projects in Schedule "A". The Board has provided comments on reliability investments, the EAM, ECEI projects, alignment with the IRP, and impact of COVID-19 in this decision.

[213] The Board directs NS Power to:

1. Provide a table in future ACE Plan applications similar to the table provided in NSUARB IR-10(e), modified in accordance with the direction in Paragraph 66 of this decision.
2. Continue to track the information referred to and as modified in Paragraph 67 and 68 of this decision.
3. Continue to provide examples of cost minimization efforts over the previous year in future ACE Plan applications as directed in Paragraphs 94, 95 and 98 of this decision.
4. Implement the Project Delivery Model (PDM) and engage with stakeholders regarding a capital cost estimating process in the PDM as discussed in Paragraphs 99 and 100.
5. Adopt the proposed criteria and capital cost thresholds to trigger post-project reviews as set out in Paragraph 101 of this decision.
6. Remove information as previously required on the impact of proposed capital spending on revenue requirement in the 2023 ACE Plan.
7. Provide greater clarity in its use of the estimated accuracy range from AACE guidelines as guidance to arrive at a contingency amount in the 2023 ACE Plan.
8. Implement the framework and reporting protocols referred to in Paragraph 102 in advance of the 2023 ACE Plan application.
9. Provide the information outlined in Paragraph 150 for all projects with a capital cost over \$1 million in the 2023 ACE Plan.
10. Regarding Total Cost of Ownership to:

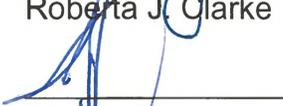
- a. Use a TCO timeframe to match the expected useful life of IT software and hardware;
- b. Use a TCO analysis for all IT projects over \$1 million when an EAM is not provided, whether or not an alternative is available; and
- c. Revise the CEJC in consultation with stakeholders and Board staff regarding TCO in time for a revised CEJC to be submitted to the Board with the 2023 ACE Plan application.

[214] An Order will issue accordingly.

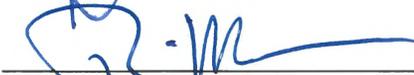
DATED at Halifax, Nova Scotia, this 9th day of June, 2022.



Roberta J. Clarke



Steven M. Murphy



Richard J. Melanson

SCHEDULE "A"			
2022 ACE Plan Approved Projects			
CI Number	Title	2022 Budget	Project Total
Generation			
C0038747	LIN1 L-0 Blade Replacement	\$1,289,669	\$6,066,800
C0029693	CT - VJ1 Generator Replacement	\$5,532,037	\$5,942,640
C0041906	PHB – 2022 Turbine Refurbishment	\$3,276,746	\$3,729,597
C0030529	TUC3 Generator Refurbishment	\$1,629,446	\$1,629,926
C0036368	HYD - Lower Great Brook Switchgear Replacement	\$1,126,746	\$1,362,281
C0024484	HYD - Fourth Lake Switchgear Replacement	\$930,499	\$1,145,245
C0029691	CT - VJ1 Control System Upgrade	\$751,417	\$1,016,225
Transmission			
C0041893	2022/2023 Transmission Right-of-Way Widening 69kV	\$2,536,790	\$5,312,315
C0041837	2022/2023 Substation Polychlorinated Biphenyl (PCB) Equipment Removal	\$2,299,568	\$3,805,434
C0041793	L7002 Replacements and Upgrades Phase 2	\$564,090	\$3,640,960
C0041805	L7005 Replacements and Upgrades Phase 2	\$1,399,971	\$3,182,518
C0041989	2022/2023 Sacrificial Anode Installation Program	\$646,705	\$3,015,107
C0041794	L5031 Replacements and Upgrades Phase 2	\$644,038	\$2,905,019
C0041789	L5550 Replacements and Upgrades Phase 2	\$702,915	\$2,698,515
C0041796	L6020 Replacements and Upgrades Phase 2	\$1,225,755	\$2,518,243
C0041810	L5022 Replacements and Upgrades	\$920,607	\$2,172,200
C0041791	L6551 Replacements and Upgrades	\$765,590	\$1,988,246
C0043571	2022/2023 Transmission Switch & Breaker Replacement	\$511,414	\$1,612,638
C0041790	L8001 Replacements and Upgrades Phase 2	\$696,045	\$1,395,537
C0043010	2022/2023 Wood Pole Retreatment Program	\$525,751	\$1,300,037
C0041800	L5537 Replacements and Upgrades	\$563,202	\$1,270,698
C0041804	2022 Line Retirement Program	\$454,663	\$1,242,178
Distribution			
C0041892	New Distribution Rights-of-Way Phase 7	\$2,940,175	\$9,854,291
C0043130	2022 Padmount Replacement Program	\$1,386,611	\$1,807,359
TOTAL APPROVED AMOUNT		\$33,320,452	\$70,614,010