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March 23, 2016

Alberta Utilities Commission
Fifth Avenue Place
4th Floor, 425 First Street, SW
Calgary, AB T2P 3L8

Attention: Olexandr Vasetsky
Application Officer

Dear Mr. Vasetsky:

Re: EPCOR Distribution & Transmission Inc. ("EDTI")
AUC-initiated next generation performance-based regulation generic proceeding
Proceeding ID 20414

1. Please find enclosed EDTI's Next Generation Performance Based Regulation Generic Proceeding Application for filing with the Commission.

2. Please contact me directly at (780) 441-7111 if you have any questions with respect to this filing.

Sincerely,

[Electronically submitted]

Jay Baraniecki
Director, Regulatory Affairs
EPCOR Distribution & Transmission Inc.

Attachments

cc: Jonathan M. Liteplo, Fasken Martineau DuMoulin LLP

EPCOR Distribution & Transmission Inc.

Next Generation
Performance-based Regulation Plan
Submission

March 23, 2016

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APPENDICES

SCHEDULES

1.0 OVERVIEW OF NEXT GENERATION PERFORMANCE BASED REGULATION SUBMISSION

1. EDTI provides this submission in response to the Commission's directions in its letter dated August 21, 2015, in which the Commission outlined the issues to be considered in this proceeding[1]. The three main issues are Rebasing and the Establishment of Going-In Rates; Productivity Offset (X factor); and The Treatment of Capital Additions. The Commission stated that it would also address the calculation of returns for reopener purposes (Rule 005 returns vs. "final" returns based on the actual capital tracker amounts).

2. EDTI's proposals for addressing these issues for its next generation Performance Based Regulation ("PBR") Plan build upon the strong foundation the Alberta Utilities Commission ("AUC" or "Commission") put in place in Decisions 2012-237 and 2013-435 for the first generation PBR Plan. EDTI's overarching objective in developing its proposals was to improve the elements of the current PBR Plan to provide more high-powered incentives for efficiency and to improve regulatory efficiency by reducing the degree of regulatory intervention required over the term of the next PBR Plan.

3. For purposes of preparing this submission, EDTI retained the services, and has relied on the advice and analyses, of two consultants who together have expertise spanning various aspects of incentive-based utility regulation and in particular the main issues identified in the Commission's letter of August 21, 2015:

- Dr. Dennis Weisman, Professor of Economics at Kansas State University. Dr. Weisman has provided evidence in numerous regulatory proceedings in relation to the economic and social impacts of regulatory policies, including incentive-based regulation. Dr. Weisman has advised electric power companies, telecommunications firms and regulatory commissions on economic pricing principles, the design of incentive regulation plans for utilities and competition policies.

  Dr. Weisman provided EDTI with expert advice and analysis respecting, among other things, the economic and public policy context for interpreting and applying the PBR principles set out by the Commission, the design of EDTI's proposal respecting the three main issues defined by the Commission for this proceeding,

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[1] Exhibit 20414-X0026.

and consideration of how EDTI's proposal is fully consistent with the AUC's PBR Principles and the relevant economics literature. A copy of Dr. Weisman's report entitled "Designing the Second-Generation PBR Framework: Commission Principles and Economic Foundations" is attached as Appendix A to this Submission, and his qualifications are included in his report.

- Dr. Mark E. Meitzen, Vice President of the economic consulting and research firm, Christensen Associates. Dr. Meitzen has provided research and evidence in regulatory proceedings in relation to incentive regulation, productivity, costing, and pricing in a number of network industries, including telecommunications, electricity, postal, and railroads.

  Dr. Meitzen provided EDTI with expert advice and analysis respecting, among other things, the establishment of the X factor for EDTI's next generation PBR plan. A copy of Dr. Meitzen's report entitled "Determination of the Second-Generation X Factor for the AUC Price Cap Plan for Alberta Electric Distribution Companies" is attached as Appendix B to this Submission, and his qualifications are included in his report.

4. EDTI designed its proposal for its next generation PBR Plan having regard to the determinations made in Decisions 2012-237 and 2013-435 in respect of the first-generation PBR Plan and the five principles set out in AUC Bulletin 2010-20. The Commission's five PBR principles are:

Principle 1: A PBR plan should, to the greatest extent possible, create the same efficiency incentives as those experienced in a competitive market while maintaining service quality.

Principle 2: A PBR plan must provide the company with a reasonable opportunity to recover its prudently incurred costs including a fair rate of return.

Principle 3: A PBR plan should be easy to understand, implement and administer and should reduce the regulatory burden over time.

Principle 4: A PBR plan should recognize the unique circumstances of each regulated company that are relevant to a PBR design.

> **Principle 5:** Customers and the regulated companies should share the benefits of a PBR plan.

5. Further, EDTI has restricted this submission to those elements set out in the Commission's August 21, 2015 issues list.

1.1 Rebasing and the Establishment of Going-In Rates

6. EDTI proposes two options for "rebasing" for purposes of transitioning into the second generation PBR Plan. Option 1 and EDTI's preferred method, is a streamlined method, designed to minimize the regulatory burden required for rebasing and consists of establishing a notional going-in year revenue requirement for EDTI based on an appropriate weighting of EDTI's actual operating costs in the middle three years of the first generation PBR term, and EDTI's actual capital costs in the final year of the first generation PBR term. The resulting revenue requirement would then form the basis for determining EDTI's notional going-in rates through the application of EDTI's phase II rate design methodology. This option, which Dr. Weisman refers to as the "innovative approach", preserves the Commission's desire for efficiency incentives while promoting regulatory efficiency. Dr. Weisman agrees and concludes that[2]:

> 45. … the innovative approach preserves the desired incentives for firm efficiency (AUC PBR Principle 1) and alleviates the need for the Commission to conduct comprehensive rate cases for each of the utilities at the end of the PBR regime which, in turn, promotes regulatory efficiency (AUC PBR Principle 3). The rate that consumers pay for the service can be partitioned into a CAPEX rate component and an OPEX rate component. The OPEX rate component is based on what are presumptively the three most efficient years of the first-generation PBR regime, which is a benefit to consumers. The return in the CAPEX rate component reflects the ECM calculated on the basis of what are potentially the highest ROE years of the first-generation PBR regime, which is a benefit to the regulated firm. This approach therefore allows both "customers and the regulated companies" to "share the benefits of a PBR plan" (AUC PBR Principle 5).

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[2] Appendix A, paragraph 45.

7. Option 2 would be based on a full Phase I and II Distribution Tariff Application for the 2018 Test Year. The approved cost of service Tariff would constitute EDTI's Distribution Tariff for 2018, and would form the basis for EDTI's going-in year tariff for the next PBR term. Full rebasing going into a subsequent generation of PBR is standard practice and is acceptable from an incentive perspective, but does not provide for regulatory efficiency. EDTI's view is supported by Dr. Weisman who concludes that[3]:

> 30. … a full rebasing of rates at the end of a first-generation PBR regime is standard fare and there are compelling arguments for not departing from this practice. The Commission's concerns about the reduced incentives for efficiency as the PBR term draws to a close are well-founded, but the ECM can be expected to mitigate these concerns to a certain degree. Nonetheless, this approach requires the Commission to conduct comprehensive rate cases for each of the utilities at the end of the first-generation PBR which may run counter to the objective of regulatory efficiency.

1.2 Productivity Offset (X Factor) in the Next Generation of PBR

8. Based on the analyses and recommendations of Drs. Meitzen and Weisman, EDTI requests that the Commission approve a modified method for determining the X factor for the second generation PBR Plan, and that it eliminate the use of a stretch factor. EDTI requests that the Commission approve a forward-looking X factor that relies on the general approach proposed by NERA for the first generation PBR Plan as adopted by the Commission in Decision 2012-237, but that utilizes an updated TFP data set that spans a shorter and more recent time period. More specifically, EDTI requests that the Commission establish the X factor for the next generation PBR Plan at the time of rebasing, and that it adopt Dr. Meitzen's recommended approach of basing the X factor on the average of the 10 and 15 year rolling averages of historical actual TFP growth over the most recent 15 years of data available at that time.

1.3 Treatment of Capital Additions

9. EDTI proposes two options for addressing the capital funding shortfall problem under the second generation PBR Plan. Option 1 consists of a combination of a K-bar mechanism (which EDTI refers to as an F factor adjustment) along with the limited use of capital trackers and is

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[3] Appendix A, paragraph 30.

EDTI's preferred option. The "K-bar" or F factor is a capital funding amount that would be designed to address the ongoing shortfall between capital funding and capital requirements for recurring (i.e., non-idiosyncratic) capital projects and programs. Had the F factor been available in 2017, the capital funding shortfall for 21 out of EDTI's total of 25 capital trackers would have been addressed by the F factor adjustment, leaving only three projects to be addressed under the capital tracker mechanism. Beyond that, the capital tracker mechanism would continue to be used to address idiosyncratic capital projects. EDTI's preferred proposal for the treatment of capital additions in the next generation PBR Plan will both increase the incentive properties of the PBR Plan while reducing regulatory effort for EDTI, the Commission and interested parties.

10. Option 2 consists of the continued use of capital trackers as established under the first generation PBR Plan, but with limited, prospective only, true-ups for recurring (i.e., non-idiosyncratic) capital projects and programs to strengthen incentives for efficiency.

1.4 Calculation of returns for reopeners

11. EDTI proposes that the calculation of return on equity ("ROE") for reopener purposes should be based on the method of calculating ROE currently used under Rule 005, modified to include an adjustment for capital tracker revenue. While the proposed calculation does not depart significantly from the current method for determining ROE for reopener purposes, EDTI's proposed modifications will serve to increase clarity in terms of the ROE to be used for reopener purposes in any given period during and over course of the next generation PBR Term.

1.5 Summary

12. To summarize, EDTI has designed its proposals for the next generation PBR Plan in a manner that is consistent with the Commission's objectives and principles and the relevant economic literature, and that meets EDTI's requirements. From EDTI's perspective, its proposals for the elements of the next generation PBR Plan that are to be considered in this proceeding reflect a reasonable balance of the various complex considerations, interests and risks that are associated with incentive based regulation for EDTI. Further, EDTI's proposals improve upon the current PBR Plan to provide more high-powered incentives for efficiency and to increase regulatory efficiency by reducing the degree of regulatory intervention required over the term of the next PBR Plan. Dr. Weisman concludes the following with respect to EDTI's proposals[4]:

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[4] Appendix A, paragraph 110.

> 110. In conclusion, EDTI's proposal for the second-generation PBR is fully aligned with the AUC's five PBR principles and the relevant economics literature. The proposal seeks to improve upon the first-generation PBR plan with respect to important dimensions of performance (including firm efficiency and regulatory efficiency) and therefore represents a best practices PBR regime for the 21st century.

1.6 Organization of Submission

13. The details of EDTI's PBR Plan are described below under the following main topic headings:

Section 2.0	Rebasing and Going-in Rates
Section 3.0	Productivity Offset (X Factor)
Section 4.0	Treatment of Capital Additions
Section 5.0	Calculation of Returns for Reopener Purposes

14. All of which is respectfully submitted on March 23rd, 2016.

EPCOR Distribution & Transmission Inc.

[Submitted Electronically]

Frank Mannarino
Senior Vice President, Electricity Operations
EPCOR Utilities Inc.

15. All notices and communications relating to this submission should be directed to EDTI and its counsel as follows:

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2.0 REBASING AND GOING-IN RATES

16. In this section, EDTI addresses the first issue in the Commission's issues list for this proceeding, which states as follows[5]:

> 1. Rebasing and the establishment of going-in rates:
>
> (a) How should going-in rates be set for the next PBR term?
> (b) Is it necessary to rebase prior to the next generation of PBR? What would rebasing involve?
> (c) What are the arguments for and against inserting a year of cost-of-service regulation after the current PBR term and prior to the start of the next generation PBR plan? What other possible methods are available to rebase rates for the start of the second generation PBR plans? Describe the arguments for and against these alternative approaches in terms of reducing regulatory burden, minimizing the perverse incentives inherent in a rate base rate of return application and enhancing the incentive properties of PBR.
> (d) How should the efficiency carryover mechanism approved in the first generation PBR plans be incorporated into the rebasing process or next generation PBR plans?
> (e) Timing and incorporation of results arising from Phase II proceedings. ***[footnote removed]***

2.1 Rebasing in the Next Generation PBR Plan

17. EDTI proposes two options for "rebasing" for purposes of transitioning into the second generation PBR Plan. An overview of each is provided below, followed by a more detailed description of their mechanics and underlying rationales, advantages and disadvantages.

18. Option 1 is a streamlined method, designed to minimize the regulatory burden required for rebasing (compared to, for example, rebasing through a full cost of service tariff application approach, as in Option 2 described below). Option 1 would consist of establishing a notional going-in year revenue requirement for EDTI (i.e., 2018 would be the first year of the second generation PBR term under this option) based on an appropriate weighting of EDTI's actual

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[5] Exhibit 20414-X0026, 2015-08-21 AUC Letter – Final Issues List.

operating costs in the middle three years of the first generation PBR term (i.e., 2014, 2015 and 2016), and EDTI's actual capital costs in the final year of the first generation PBR term (i.e., 2017). The resulting revenue requirement would then form the basis for determining EDTI's notional going-in rates through the application of EDTI's Phase II rate design methodology. In its Application for approval of its going-in revenue requirement and rates, EDTI would also seek Commission approval of a full depreciation study that EDTI plans to carry out in advance of rebasing, as well as any changes that might be necessary to EDTI's Terms and Conditions for Distribution Connection Service and Distribution Access Service (collectively, "Terms and Conditions") and Tariff Policies. Option 1 would also include the use of an appropriately modified ECM, as explained in more detail in section 2.3 below.

19. Option 2 would be based on a full Phase I and II Distribution Tariff Application for the 2018 Test Year including a full depreciation study, and incorporating the ECM approved by the Commission for the first generation PBR Plan. The approved cost of service Tariff would constitute EDTI's Distribution Tariff for 2018, and would form the basis for EDTI's going-in year tariff, including its distribution access service ("DAS") and system access service ("SAS") rates, for the next PBR term, which would commence in 2019.

20. In arriving at these proposed options, EDTI considered a number of potential rebasing methods, including a full cost of service application at the end of the first PBR term; resetting the going-in rates using actual results from the first PBR term; and simply extending the base rates from the first PBR term into the second PBR term, and variants of each.

21. Having considered a range of potential alternative approaches to rebasing, EDTI has concluded that its proposed options are superior to other potential methods, particularly when viewed through the lens of the Commission's five PBR principles and relevant economic considerations. As between Options 1 and 2, both offer a somewhat unique mix of advantages and disadvantages. However, EDTI prefers Option 1 over Option 2, primarily on the basis that Option 1 would involve substantially less regulatory burden than Option 2, consistent with one of the main objectives of PBR: to reduce the costs associated with utility regulation. Having said that, EDTI understands that the Commission may put a different emphasis on the relative advantages and disadvantages of the two options and, on balance, would be willing to accept either approach.

22. Dr. Weisman discusses the merits of EDTI's proposed approaches to rebasing in paragraph 15 of his evidence[6]:

> 15. EDTI proposes two approaches for rebasing and the establishment of going-in rates. The standard approach is a full rebasing of rates at the end of the current PBR regime that incorporates the ECM. The innovative approach (EDTI's preferred Option 1) calls for rebasing using a simple average of actual financial results from 2014, 2015 and 2016 and also incorporates an ECM. Both approaches (i) seek to preserve to the greatest extent possible the desirable incentive properties of PBR while recognizing that some degree of "true-up" is warranted at the end of the first-generation PBR; and (ii) recognize and at least partially correct for the regulated firm's weakened incentives for efficiency as it approaches the end of the PBR regime.

23. EDTI rejected the potential alternative of simply carrying its first generation PBR rates into the second PBR term. While this approach would be relatively simple and straightforward, EDTI does not consider it appropriate for a number of reasons. First, EDTI's base rates would remain at an unduly low level relative to the total revenue required for capital sufficiency. Specifically, the capital funding shortfall that would have to be addressed through the capital tracker mechanism or another capital funding shortfall recovery mechanism will be very large at the conclusion of the first PBR term and, as reflected in EDTI's Tracker Applications filed to date, will only continue to increase with each year of the second generation Plan. The large and constantly growing capital funding shortfall, when compared to the revenue included in EDTI's base rates, would continue to reduce the proportion of EDTI's capital costs that are included under the I-X mechanism. As such, this approach would have relatively weak incentive properties, because an ever diminishing portion of EDTI's overall capital funding requirements would fall within the I-X component of the PBR Plan, both in the first year of the next generation PBR term and in subsequent years.

24. Second, the approach would create unnecessary and increasing complexity and rate design issues with each passing year because an ever diminishing portion of EDTI's overall revenue requirement would fall within base rates tested in a recent Phase II proceeding. This would require that Phase II methodologies be applied to the constantly growing revenue requirement amount recovered through the capital tracker mechanism or another capital funding

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[6] Appendix A, paragraph 15.

shortfall recovery mechanism each year, thus unnecessarily increasing complexity and rate design issues. Third, the approach would not satisfy PBR Principle 5 because customers will not share in the ongoing cost savings realized by EDTI during the first PBR term.

25. EDTI's proposed options are discussed in more detail in the following sections. Dr. Weisman discusses each option at length in his evidence from the perspective of the Commission's PBR principles and economic principles generally.

2.2 Option 1 – Rebasing using actual results, incorporating an ECM

26. Option 1 would consist of establishing a "notional" going-in revenue requirement for EDTI for 2018 (which would be the first year of the second generation PBR term under this option) based on an appropriate weighting of EDTI's actual operating costs in the middle three years of the first generation PBR term (i.e., 2014, 2015 and 2016) and its capital costs at the conclusion of the first PBR term.

27. More specifically, EDTI is proposing that the operating cost portion of its going-in rates would be set based on a simple average of EDTI's actual operating costs (i.e., operating revenue requirement) in 2014, 2015 and 2016. The capital cost portion of EDTI's going-in rates would be set based on EDTI's actual capital costs (i.e., EDTI's return and depreciation on EDTI's 2017 actual mid-year rate base plus 2017 working capital costs) for 2017, the last year of the first PBR term. EDTI's going-in rates would then be determined based on the application of EDTI's Phase II rate design methodology. Finally, Option 1 would include the application of the ECM as directed in Decision 2012-237[7] and described in more detail in section 2.3 below.

28. EDTI's proposed use of actual operating and capital costs to determine its going-in rates provides an appropriate balance ensuring that EDTI's next generation PBR base rates are reasonable and minimizing the regulatory effort required of the Commission, EDTI and interested parties in transitioning into the next generation PBR Plan (PBR Principle 3) on the other. On the operating cost side, EDTI's second generation going-in rates under Option 1 would reflect its actual operating costs (which would include the operating cost savings realized by EDTI) over the middle three years of the first PBR term, during which EDTI would have had the strongest incentives for realizing operating cost savings. From a capital cost perspective, EDTI's going-in rates would reflect EDTI's actual 2017 rate base, which would have been

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[7] Decision 2012-237, paragraph 775.

scrutinized and substantially approved by the Commission through the Commission's rigorous Capital Tracker true-up approval process over the first PBR term.

29. The average of the three years of actual operating costs would be calculated in 2017 dollars. EDTI's actual operating costs for each of 2014, 2015 and 2016 would first be converted to 2017 dollars using the approved I factors for those years. Each year would be given equal weighting, yielding an average of actual (going-in) operating revenue requirement in 2017 dollars. The use of an equal weighting of each year does not favour any particular year and reduces incentives for inefficient and strategic behavior. In his written evidence Dr. Weisman notes that uniform weighting of the years is the default, with other weighting schemes reflecting various tradeoffs[8]:

> 33. The analysis now turns to the weights to be placed on each of the three admissible years. Let $w^i > 0$ denote the weight associated with year i of the PBR regime. The default weighting rule places equal weights on each year so that $w^{14} = w^{15} = w^{16} = ⅓$ and $w^{14} + w^{15} + w^{16} = 1$. This uniform weighting rule is EDTI's preferred option. It is natural to inquire, however, as to whether there is a principled basis for departing from the uniform weighting rule and the various tradeoffs that this may entail.

30. The use of actual operating costs from the middle three years of the first generation PBR term is appropriate for a number of reasons. To begin with, it ensures that actual results from the first PBR year (2013) are not used. EDTI's lack of familiarity with the newly approved PBR Plan in 2013, coupled with the substantial uncertainty surrounding capital recovery under the PBR Plan, precluded EDTI from achieving operating cost efficiencies that reasonably reflected the incentives present in the first generation Plan. In other words, including 2013 actual operating costs in the Option 1 calculation would in all likelihood result in a going-in year operating revenue requirement that fails to fully reflect (i.e., is higher than) the cost efficiencies that EDTI was actually able to achieve under the first generation PBR Plan, once these two factors (novelty and uncertainty) were no longer affecting EDTI.

31. Similarly, including actual operating costs from 2017 would not be appropriate due to the weakening of the incentives for cost efficiency that are typically present near the end of a PBR term, as well as the fact that EDTI would have known, in advance of 2017, that 2017 actual operating results would be used in the calculation. By contrast, ensuring that EDTI's 2017 actual

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[8] Appendix A, paragraph 33.

operating costs will not be included in the rebasing calculation would actually maintain a strong financial incentive for EDTI to continue to seek cost efficiencies in 2017. As Dr. Weisman highlights in his evidence[9]:

> 32. It is instructive to explain the rationale underlying the choice of the years 2014, 2015 and 2016 for the rebasing process. The year 2013 is excluded because it is the first year of the PBR regime and the company would not have been able to respond fully to the high powered incentives under PCR in terms of implementing all of the anticipated efficiency improvements. The year 2017 is likewise excluded because the company would have foreknowledge in 2017 of the rebasing rule and hence there may be incentives for inefficient and strategic behavior. It is for these reasons that only the intermediate years of the PBR regime (i.e., 2014, 2015 and 2016) survive the sorting process and are considered admissible.

32. The capital-related going-in revenue requirement would be set based on EDTI's actual mid-year rate base for 2017. The mid-year rate base would be determined based on the 2012 rate base approved for EDTI in Decision 2013-137 and the capital additions approved by the Commission in EDTI's capital tracker true-up applications in the first PBR term up to and including EDTI's true-up application for 2017. In the event that final approved (trued-up) capital additions are not available for any of the years in the first PBR term, the approved forecast capital additions for those years would be used as a placeholder and EDTI would true-up its going-in capital revenue requirement once final capital additions are approved. EDTI notes that while rebasing its capital-related going-in revenue requirement in this manner will minimize the capital funding shortfall at the outset of the second generation PBR term, it will not fully address it. In other words, EDTI will still have a capital funding shortfall under the second generation PBR Plan as it did under the first generation Plan, and will continue to require an incremental mechanism to address its capital funding shortfall such as capital trackers or a similar mechanism. EDTI describes its proposed mechanisms to address its capital funding shortfall in the second generation PBR Plan in section 4 of this submission.

33. Option 1 includes an ECM as directed in Decision 2012-237 with one modification. The ECM approved in Decision 2012-237 is a post PBR add-on to the approved ROE equal to one half of the difference between the simple average ROE achieved over the term of the Plan and the simple average approved ROE over the term of the Plan (providing the difference is

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[9] Appendix A, paragraph 32.

positive), multiplied by 50%, to a maximum of 0.5%. The "ROE adder" would apply for 2 years after the end of the PBR Plan. For purposes of the ECM, the approved ROE is the average approved generic ROE in place for each year during the PBR term; and the simple average ROE achieved over the term of the plan is the average of the actual ROE achieved calculated in the same way as the ROE reported in the companies' annual AUC Rule 005 filings.

34. EDTI proposes that, should the Commission approve the use of EDTI's Option 1 for rebasing, the ECM would be calculated using the middle three years of the PBR term rather than all five years of the term. This is because the middle three years are presumed to be the highest efficiency years of the PBR term, resulting in the lowering of the cost base. As the middle three years would have been used to set the cost base for the second PBR term, it follows that these same years should be used in the ECM in order to reflect any ROE increases realized during these years. Dr. Weisman states the following in this regard[10]:

> 44. Applying the ECM in this manner gives rise to the following performance properties. First, the cost benchmark for informing the going-in rates for the second-generation PBR regime is based on what are presumptively the highest efficiency years of the first-generation PBR regime. This has the effect of minimizing the cost benchmark for the second-generation PBR. Second, the highest efficiency years of the first-generation PBR regime may also represent the highest ROE years since lower costs imply higher returns, *ceteris paribus*. The lower cost base is coupled with a potentially higher efficiency carryover percentage.

35. The methodology used to calculate the ECM is described further in section 2.4 of this submission.

36. EDTI notes one vital aspect of its Option 1 proposal: for this option to make sense from the perspective of the Commission's PBR Principles, it is critical that EDTI's actual results be accepted on their face. As Dr. Weisman states[11]:

> 42. It is critical that the Commission not go back to the years, 2014, 2015 and 2016 in order to second guess the company's operations in an attempt to rewrite history. The "actuals" from these years are presumptively efficient because the regulated firm operates under a high-

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[10] Appendix A, paragraph 44.
[11] Appendix A, paragraph 42.

> powered regulatory regime. As a result, the Commission can be assured that the regulated firm would enlist its informational advantage to improve operating efficiency in a manner that closely approximates competitive market conditions (AUC PBR Principle 1). ***[footnotes removed]***

37. Any attempt to test and/or "re-engineer" EDTI's actual costs will inevitably result in a detailed and time-intensive regulatory approval process. Once out of the bottle, the Commission will not be able to stuff the genie back into it. If the Commission starts down the road of doing anything other than accepting EDTI's actual operating cost results "as-is" for rebasing purposes, then a complex, end-to-end review process will inevitably ensue that is similar in nature and scope to a cost of service revenue requirement application, negating the regulatory efficiencies to be gained from rebasing under Option 1. Without these regulatory efficiencies, the greater precision in the recalibration of rates to a target rate of return offered by Option 2 would render Option 2 substantially superior to Option 1.

38. EDTI proposes to calculate going-in rates for 2018 by applying its Phase II methodology to the notional going-in revenue requirement described above. The application of EDTI's Phase II methodology to the notional revenue requirement will result in "going-in" rates that will be used to calculate PBR rates for 2018. EDTI is planning to file a Phase II application with the Commission in the near future and anticipates that it will have a new, Commission-approved rate design methodology in place by the time of rebasing for EDTI's next generation PBR Plan. EDTI's planned Phase II application is discussed further in section 2.3 of this submission. EDTI proposes that its 2018 PBR rates be submitted in an annual rate adjustment filing on September 10, 2017 in accordance with the requirements of Decision 2012-237 as described further in section 2.2.1 of this submission.

39. Dr. Weisman discusses the advantages and disadvantages of Option 1 in his evidence in detail, and concludes as follows[12]:

> 45. In conclusion, the innovative approach preserves the desired incentives for firm efficiency (AUC PBR Principle 1) and alleviates the need for the Commission to conduct comprehensive rate cases for each of the utilities at the end of the PBR regime which, in turn, promotes regulatory efficiency (AUC PBR Principle 3). The rate that consumers pay for the service can be partitioned into a CAPEX rate component and an

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[12] Appendix A, paragraph 45.

> OPEX rate component. The OPEX rate component is based on what are presumptively the three most efficient years of the first-generation PBR regime, which is a benefit to consumers. The return in the CAPEX rate component reflects the ECM calculated on the basis of what are potentially the highest ROE years of the first-generation PBR regime, which is a benefit to the regulated firm. This approach therefore allows both "customers and the regulated companies" to "share the benefits of a PBR plan" (AUC PBR Principle 5).

2.2.1 Methodology

40. Option 1 would be implemented as follows.

41. EDTI would file a rebasing application in Q2 of 2017, seeking Commission approval of going-in DAS rates for the second generation PBR Plan calculated based on the approach outlined above (i.e., average of actual operating revenue requirement for 2014, 2015 and 2016; actual capital costs in 2017; application of EDTI's Phase II rate design methodology to determine going-in DAS rates).

42. Following receipt of Commission approval of its rebasing application (expected prior to September 1, 2017), EDTI would submit for Commission approval a 2018 annual PBR rate adjustment filing on or about September 10, 2017 which would include DAS PBR rates for 2018, SAS rates for 2018, Terms and Conditions and Tariff Policies. The 2018 DAS PBR rates would consist of the going-in rates (which would be in 2017 dollars), escalated by the Commission-approved I-X applicable to 2018 in accordance with the requirements of Decision 2012-237. If the Commission has not approved the rebasing application by that time, then EDTI's 2018 annual PBR rate adjustment filing will request approval of DAS PBR rates for 2018 on an interim refundable basis only. Such interim DAS rates for 2018 would be based on EDTI's proposed going-in DAS rates filed in the rebasing application (escalated by I-X) and, if required, will be trued-up in a separate true-up application after the going-in DAS PBR rates have been approved by the Commission on a final basis.

43. EDTI has included an illustrative model of the rebasing calculations as Schedule 1. The rebasing calculations would include the following steps.

Step 1 – Calculate EDTI’s going-in O&M revenue requirement in 2017 dollars (refer to tab 2.1 of Schedule 1)

i. Obtain the actual operating and maintenance costs by USA account for each of 2014, 2015 and 2016.

ii. Confirm the actual Y factor costs for each of 2014, 2015 and 2016.

iii. Calculate the base operating and maintenance costs for each of 2014, 2015 and 2016 for each USA account by subtracting the actual Y factor costs from the operating and maintenance costs for each of 2014, 2015 and 2016, respectively.

iv. Convert the 2014, 2015 and 2016 base operating and maintenance costs for each USA account to 2017 dollars using the approved I factors for each of 2014, 2015 and 2016 respectively.

v. Calculate the average base operating and maintenance costs in 2017 dollars for each USA account by adding together the costs from 2014, 2015 and 2016 for each USA account and dividing by three. The result is the average operating and maintenance cost from 2014, 2015 and 2016 for each USA account expressed in 2017 dollars. This forms a notional base operating and maintenance revenue requirement and will be used as the going-in base revenue requirement for the 2018 annual PBR rate adjustment filing.

Step 2 – Calculation of the Going-in Capital Revenue Requirement in 2017 dollars (refer to tab 2.0 of Schedule 1)

i. Obtain the 2017 capital additions by USA account from the approved 2017 forecast capital tracker application.

ii. Generate the mid-year rate base for 2017 using the 2017 capital additions from step i as an input for the Capital DLM model which contains EDTI’s ongoing asset history and continuity by each asset account.

iii. Calculate depreciation expense, the Cost of Debt and the Return on Equity using the 2017 mid-year net rate base including necessary working capital, the approved Cost of Debt rate, the approved Debt / Equity thickness for 2017 and the approved Return on Equity rate for 2017. The sum of these forms the going-in capital revenue requirement.

Step 3 – Calculation of the Going-in Total Revenue Requirement in 2017 dollars (refer to tab 1.0 of Schedule 1)

i. Add the notional base operating and maintenance revenue requirement from Step 1 to the notional capital revenue requirement from Step 2. This forms the total notional base (or "going-in") revenue requirement in 2017 dollars.

Step 4 – Calculation of the Going-in DAS Rates

i. Apply EDTI's Phase II rate design methodology to the notional going-in revenue requirement from Step 3 to determine EDTI's going-in DAS base rates in 2017 dollars. These going-in rates would then form the basis for calculating EDTI's 2018 PBR DAS rates in EDTI's annual adjustment filing for the 2018 PBR year. As noted earlier, EDTI's 2018 PBR DAS rates would simply be EDTI's going-in DAS base rates escalated by the Commission-approved I-X plus the Y, Z and K factors applicable to 2018 in accordance with the requirements of Decision 2012-237 as well as any additional factors approved by the Commission. As step 4 involves the application of EDTI's Phase II rate design methodology and the annual PBR rate adjustment filing process, it was not included in Schedule 1.

44. The following timeline outlines the high level steps to establish EDTI's 2018 DAS rates.

i. Q2 2017 – EDTI files 2018 rebasing application.
ii. Q3 2017 – EDTI files 2018 annual PBR rate adjustment filing.
iii. Q4 2017 – Final or interim DAS rates and final SAS rates approved for 2018.
iv. Q2 2018 – Final DAS rates approved for 2018 (if not approved prior to step iii).
v. Q2 2018 – EDTI files interim to final DAS rate true-up application for 2018 (if necessary).
vi. Q4 2018 – Interim to final true-up approved for DAS rates (if necessary).

2.3 Option 2 –Rebasing using a full cost of service approach, incorporating an ECM

45. As noted above, Option 2 consists of rebasing by way of a full Phase I and II Distribution Tariff Application for the 2018 Test Year, and incorporating an ECM as previously approved by the Commission (the ECM is described in more detail in section 2.4 below). From EDTI's

perspective, the primary advantage of this approach is that it would facilitate an accurate recalibration of EDTI's rates to the Commission's target rate of return for EDTI, by allowing the Commission to fully test and approve EDTI's forecast operating and capital costs for 2018, the year immediately prior to the start of the second generation PBR term (which would commence in 2019 under Option 2). This is consistent with the Commission's mandate under section 122 of the EU Act, and PBR Principle 2. Any ongoing efficiencies implemented during the first PBR term would also be reflected in EDTI's going-in rates for the second term in their entirety, consistent with PBR Principle 5.

46. Rebasing using a full cost of service approach would also simplify EDTI's second generation PBR rates and the mechanisms necessary to address them during the PBR term, by ensuring that EDTI's rates reflect all prudently incurred capital additions made during the first PBR term, and any prudent capital additions forecast to be incurred during the 2018 rebasing year. This, in turn, would reduce the size of the overall capital funding shortfall that EDTI will face at the commencement of the second generation PBR term, thus reducing the quantum of EDTI's capital funding requirements that would have to be addressed through the capital tracker mechanism or a similar mechanism. A smaller capital funding shortfall would lead to PBR rates that are easier to understand, implement and administer, consistent with PBR Principle 3.

47. In his evidence, Dr. Weisman notes that full rebasing of rates to achieve a target rate of return was the standard practice following the first-generation incentive regulation plans in the telecommunications industry[13]:

> 25. … a full rebasing of rates to achieve a target rate of return was the standard practice following the first-generation incentive regulation plans in the telecommunications industry. The case for rebasing in the electricity sector would appear to be even stronger. To wit, while competition is increasing in certain segments of the electric power industry (e.g., generation), the overall level of competitive intensity in the transmission and distribution sectors of the industry pales in comparison with the pervasive competition that has characterized the telecommunications industry over the last quarter century.

48. In terms of disadvantages, a rebasing of rates under Option 2 would require that EDTI file a comprehensive tariff application, which would require significant time and effort on the

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[13] Appendix A, paragraph 25.

part of the Commission, EDTI and interveners. As noted by Dr. Weisman, the significant regulatory burden associated with this level of effort is inconsistent with PBR Principle 3[14].

49. In addition, the use of a full cost of service approach for rebasing would also weaken the incentives inherent in the first generation PBR Plan. As the end of the first PBR term nears, EDTI will have reduced incentives for efficient operation because it is aware that any incremental savings accruing to the utility from productivity gains will be truncated at the end of the term. This weakening of incentives is mitigated to some extent by the inclusion of the ECM mechanism, as approved by the Commission in Decision 2012-237. As Dr. Weisman notes[15]:

> 28. … as the companies approach the end of the PBR regime, the incentives for efficient behavior begin to comport more closely with those of traditional RORR and less closely with those of PCR. These weakened incentives derive from the fact that the regulated firm's expected return from investment in productivity enhancing innovation are truncated toward the end of the PBR regime because the fruits of its cost-reducing efforts are retained for a relatively short duration. In addition, the regulated firm will have less than ideal incentives to: (1) operate with the least-cost technology; (2) operate with no waste; (3) diversify efficiently into new markets; (4) undertake efficient levels of cost-reducing innovation; (5) report its costs truthfully; and (6) eliminate abuse. Of course, the ECM will mitigate these adverse incentives to some degree by allowing the regulated firm to retain some portion of earnings in excess of the target rate of return for a limited period of time. ***[footnotes removed]***

50. Full rebasing using a cost-of-service approach is not entirely consistent with AUC PBR Principle 1 in that a full rebasing of rates would not reflect the operation of a competitive marketplace. As Dr. Weisman explains[16]:

> 29. … it may be difficult to reconcile a full rebasing of rates with AUC PBR Principle 1 in that the incentive structure will not in general reflect that of a competitive marketplace. The full rebasing of rates incorporates a "make-whole" property that is not present in competitive markets. Again,

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[14] Appendix A, paragraph 27.
[15] Appendix A, paragraph 28.
[16] Appendix A, paragraph 29.

> the ECM will serve to mitigate these concerns to some degree. ***[footnotes removed]***

51. Dr. Weisman summarizes the advantages and disadvantages of Option 2 as follows[17]:

> 30. In conclusion, a full rebasing of rates at the end of a first-generation PBR regime is standard fare and there are compelling arguments for not departing from this practice. The Commission's concerns about the reduced incentives for efficiency as the PBR term draws to a close are well-founded, but the ECM can be expected to mitigate these concerns to a certain degree. Nonetheless, this approach requires the Commission to conduct comprehensive rate cases for each of the utilities at the end of the first-generation PBR which may run counter to the objective of regulatory efficiency.

2.3.1 Methodology

52. To implement Option 2, in Q2 2017 EDTI would file for Commission approval a full Phase I and II Distribution Tariff Application for the 2018 Test Year. The Application would be similar in scope and detail to EDTI's last Distribution Tariff Application under cost of service regulation (EDTI's 2012 Phase I and Phase II Distribution Tariff Application[18]). The Commission-approved Tariff would form the basis for EDTI's DAS and SAS rates, Terms and Conditions and Distribution Tariff Policies for the 2018 Test Year. The approved Tariff would also constitute EDTI's 2018 "going-in year" Rates, Terms and Conditions and Tariff Policies for the next PBR term, which would commence in 2019.

53. Option 2 would include the ECM approved in Decision 2012-237. The ECM approved in Decision 2012-237 is a post PBR add-on to the approved ROE equal to one half of the difference between the simple average ROE achieved over the term of the Plan and the simple average approved ROE over the term of the Plan (providing the difference is positive), multiplied by 50%, to a maximum of 0.5%. The "ROE adder" would apply for 2 years after the end of the PBR Plan. For purposes of the ECM, the approved ROE is the average approved generic ROE in place for each year during the PBR term; and the simple average ROE achieved over the term of the plan is the average of the actual ROE achieved calculated in the same way as the ROE

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[17] Appendix A, paragraph 30.
[18] Proceeding ID 1596, Application No. 1607944.

reported in the companies' annual AUC Rule 005 filings. EDTI discusses in detail the methodology used to apply the ECM in section 2.3 of this submission.

54. EDTI proposes the following timeline for rebasing under Option 2:

- i. Q2 2017 – Filing of 2018 DAS and SAS Tariff Application
- ii. Q4 2017 – Interim DAS rates and final SAS rates approved for 2018
- iii. Q2 2018 – Final DAS rates approved for 2018
- iv. Q2 2018 – Filing of interim to final DAS rates true-up application for 2018
- v. Q3 2018 – Filing of 2019 annual rate adjustment filing for 2019 PBR rates
- vi. Q4 2018 – Interim to final true-up approved for DAS rates
- vii. Q4 2018 – 2019 PBR rates approved for 2019

2.4 Efficiency Carry-over Mechanism

55. Options 1 and 2 both incorporate the use of an ECM to address the weakening of PBR incentives toward the end of the first PBR term. As noted is section 2.2, EDTI is proposing a slight modification to the method used to calculate the ECM for rebasing Option 1.

56. In paragraph 775 of Decision 2012-237 the Commission approved ATCO Companies' proposed return on equity efficiency carryover mechanism for use by all utilities subject to the Commission's PBR Plan[19]:

> 775. The Commission agrees that ECMs are an innovative mechanism that will allow for a strengthening of incentives in the later years of the PBR term and may discourage gaming regarding the timing of capital projects. The Commission finds that the incentive properties of an ECM encourage companies to continue to make cost saving investments near the end of the PBR term. The Commission agrees with ATCO's proposal for an upper limit for earnings that can be carried over and finds the limit of 0.5 per cent to be reasonable. Accordingly, the Commission approves the ATCO companies' ROE ECM for inclusion in the ATCO companies' PBR plans. If any of the other companies wish to submit the same ECM in their PBR plans, they may do so in their compliance filings.

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[19] Decision 2012-237, paragraph 775.

57. The ATCO Companies described their proposed return on equity efficiency carry-over mechanism as follows[20].

> … a post PBR add-on to the approved ROE equal to one half of the difference between the simple average ROE achieved over the term of the Plan and the simple average approved ROE over the term of the Plan (providing the difference is positive), multiplied by 50%, to a maximum of 0.5%. The "ROE bonus" would apply for 2 years after the end of the PBR Plan.

58. In paragraphs 779 and 780 of Decision 2012-237 the Commission went on to clarify that the average generic ROE in place for each year during the PBR term should be used to calculate the amount of the ECM and that the actual ROE for purposes of calculating the ECM should be calculated in the same way as the ROE reported in the annual AUC Rule 005 filings[21]:

> 779. In the Commission's view, the correct ROE to use for the purposes of calculating the amount of the ECM is the average approved generic ROE in place for each year during the PBR term.
>
> 780. The actual ROE of the companies to be used for the purposes of calculating the amount of the ECM, will be the calculated in the same way as the ROE reported in the companies' annual AUC Rule 005 filings.

59. The form of the ECM proposed by EDTI to transition into the next generation PBR Plan is linked to the rebasing option chosen, as described below.

60. Under rebasing Option 1, the ECM would be implemented using an "add-on" to the PBR formula. The PBR add-on would be applied to the PBR formula and allocated to rates using EDTI's Phase II methodology similar to how the capital tracker K factor is added to the PBR formula and allocated to rates.

61. The ECM calculations for rebasing Option 1 would include the following steps.

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[20] Decision 2012-237, paragraph 766.
[21] Decision 2012-237, paragraphs 779 and 780.

Step 1 – Calculate the average approved ROE for 2014, 2015 and 2016

i. Confirm the approved ROE for each of 2014, 2015 and 2016.

ii. Calculate the average approved ROE by adding the ROEs for 2014, 2015 and 2016 and dividing by three. The result is the average approved ROE from 2014, 2015 and 2016. This forms the average approved ROE for calculating the ECM.

Step 2 – Calculate the achieved ROE for 2014, 2015 and 2016

i. Confirm the achieved approved ROE for each of 2014, 2015 and 2016 from Rule 005 filings.

ii. Calculate the average achieved ROE by adding the ROEs for 2014, 2015 and 2016 and dividing by three. The result is the average achieved ROE from 2014, 2015 and 2016. This forms the average achieved ROE for calculation of the ECM.

Step 3 – Calculate the “ROE bonus” percentage

i. Subtract the average approved ROE from Step 1 from the average achieved ROE from step 2. If the difference is greater than zero and less than or equal to 1%, divide by 2. The result is the amount of the ROE bonus. If the difference is less than or equal to zero then the ROE bonus is zero. If the difference is greater than 1% then the ROE bonus is limited to 0.5%.

Step 4 – Calculate the ROE add-on amount

i. Calculate the return on equity using the 2017 mid-year net rate base including necessary working capital, the approved Debt / Equity thickness for 2017 and the Return on Equity (ROE) add-on rate for 2017. This forms the going-in ROE add-on amount. Multiply this amount by the 2018 I-X factor. This forms the ROE add-on amount for 2018. Multiply this amount by the 2019 I-X factor. This forms the ROE add-on amount for 2019.

Step 5 – Allocate the ROE add-on amount to rates

i. Allocate the 2018 ROE add-on amounts to each 2018 rate using allocators from EDTI's Phase II methodology. Allocate the 2019 ROE add-on amounts to each 2019 rate using allocators from EDTI's Phase II methodology.

62. Under Option 2 (rebasing through a full Phase I and II cost of service tariff application for 2018), the ECM would be implemented by using an "add-on" to the revenue requirement for 2018 and an add-on to the PBR formula for 2019. The revenue requirement add-on would be allocated to rates using EDTI's Phase II rate design methodology similar to how the capital tracker K factor is added to the PBR formula and allocated to rates.

63. The ECM calculations under Option 2 rebasing would include the following steps:

Step 1 – Calculate the average approved ROE for 2013, 2014, 2015, 2016 and 2017.

i. Confirm the approved ROE for each of 2013, 2014, 2015, 2016 and 2017.
ii. Calculate the average approved ROE by adding the ROEs for 2013, 2014, 2015, 2016 and 2017 and dividing by five. The result is the average approved ROE from 2013, 2014, 2015, 2016 and 2017. This forms the average approved ROE for calculation of the ECM.

Step 2 – Calculate the achieved ROE for 2013, 2014, 2015, 2016 and 2017

i. Confirm the achieved ROE for each of 2013, 2014, 2015, 2016 and 2017 from Rule 005 filings.
ii. Calculate the average achieved ROE by adding the ROEs for 2013, 2014, 2015, 2016 and 2017 and dividing by five. The result is the average achieved ROE from 2013, 2014, 2015, 2016 and 2017. This forms the average achieved ROE for calculation of the ECM.

Step 3 – Calculation the "ROE bonus" percentage

i. Subtract the average approved ROE from Step 1 from the average achieved ROE from Step 2. If the difference is greater than zero and less than or equal to 1%, divide by 2. The result is the amount of the ROE bonus. If the difference is less than or equal to zero then the ROE bonus is zero. If the difference is greater than 1% then the ROE bonus is limited to 0.5%.

Step 4 – Calculation of the ROE add-on amount

i. Calculate the return on equity using the 2018 mid-year net rate base including necessary working capital, the approved Debt / Equity thickness for 2018 and the Return on Equity (ROE) add-on rate for 2018. This forms the 2018 ROE add-on amount. Multiply this amount by the 2019 I-X factor. This forms the ROE add-on amount for 2019.

Step 5 – Allocate the ROE add-on amount to rates

i. Allocate the 2018 ROE add-on amounts to each 2018 rate using allocators from EDTI's Phase II methodology. Allocate the 2019 ROE add-on amounts to each 2019 rate using allocators from EDTI's Phase II methodology.

2.5 Phase II Rate Design

64. Normally under cost of service regulation, Phase II applications are made concurrently with Phase I applications or soon after the utility's revenue requirement has been approved in a Phase I proceeding. The Commission anticipated the possibility of Phase II applications being filed during the first generation PBR Plan in paragraph 996 of Decision 2012-237[22]:

> 996. The Commission considers that PBR is unrelated to the requirement to periodically update rates through a Phase II process. However, during the PBR term the companies may file applications for Phase II adjustments to their rate design and cost allocation methodologies and the Commission will make a determination at that time as to whether the adjustments are warranted. For purposes of a cost of service study, the companies shall use the revenue requirement resulting from going-in rates adjusted by the PBR formula (including the I-X mechanism, K factors, Y factors and Z factors) and the latest updated billing determinants.

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[22] Decision 2012-237, paragraph 996.

65. EDTI is planning to file a Phase II application in Q2 of 2016. This application will request approval of a new Phase II rate design methodology for EDTI. EDTI intends to use this new methodology to calculate its notional going-in rates if its Rebasing Option 1 is approved by the Commission, or to calculate its 2018 cost-of-service (going-in) rates if its Rebasing Option 2 is approved. In the event that EDTI's proposed Phase II methodology is not approved by the Commission by the time EDTI files its 2017 rebasing application in Q2 of 2017, EDTI will base its application on its proposed Phase II methodology from its Phase II application and will revise the Rebasing application as necessary once the Phase II methodology is approved by the Commission.

2.6 Conclusion

66. EDTI has proposed two options for rebasing, both of which are appropriate in light of the Commission's PBR Principles and superior to other potential alternatives. For the reasons stated above, while EDTI would prefer Option 1, it would accept Option 2 if it were preferred by the Commission. Dr. Weisman summarizes his views with respect to EDTI's two proposed options as follows[23]:

> 106. EDTI's proposal for rebasing and the establishment of going-in rates seeks to preserve to the greatest extent possible the desirable incentive properties of PBR while recognizing that some degree of "true-up" is warranted at the end of the first-generation PBR regime. The ECM will serve to partly ensure that the incentives for superior performance are not weakened unduly as the end of the first-generation PBR is approached.
>
> 107. EDTI also developed an innovative approach that conditions rebasing on an average of actual financials over the intermediate years of the PBR regime along with an ECM based on those years. This approach addresses the Commission's concerns regarding the need to preserve high-powered incentives for efficiency and reduce the regulatory burden associated with conducting comprehensive rate cases for each of the utilities.

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[23] Appendix A, paragraphs 106 and 107.

3.0 PRODUCTIVITY OFFSET (X FACTOR)

67. The Commission posed two issues relating to the productivity offset (X factor) for the second generation PBR Plan[24]:

- How should the X factor be determined?
- Are modifications required to the stretch factor in the next generation of PBR?

68. EDTI engaged Dr. Mark Meitzen to recommend an appropriate productivity offset (i.e., X factor) for EDTI's second generation PBR Plan. As part of his analysis, EDTI asked Dr. Meitzen to also consider the ongoing appropriateness of a stretch factor for the second generation Plan and to recommend an appropriate stretch factor insofar as he determined it remained appropriate.

69. In addition, as part of his overall engagement for this proceeding, EDTI asked Dr. Weisman to address the X factor and stretch factor from a PBR principles and regulatory economics perspective.

70. Based on the analyses and recommendations of Drs. Meitzen and Weisman, EDTI requests that the Commission approve a modified method for determining the X factor for the second generation PBR Plan, and that it eliminate the use of a stretch factor. EDTI requests that the Commission approve a forward-looking X factor that relies on the general approach proposed by NERA for the first generation PBR Plan as adopted by the Commission in Decision 2012-237, but that utilizes an updated TFP data set that spans a shorter and more recent time period. More specifically, EDTI requests that the Commission establish the X factor for the next generation PBR Plan at the time of rebasing, and that it adopt Dr. Meitzen's recommended approach of basing the X factor on the average of the 10 and 15 year rolling averages of historical actual TFP growth over the most recent 15 years of data available at that time.

71. For the reasons discussed in detail in Dr. Meitzen's evidence, the applied-for approach is far superior to the NERA approach of using data back to 1972. Much of the older data used by NERA is demonstrably inapplicable, and bears no resemblance, to EDTI's and other utilities' present circumstances. Unlike the NERA approach, Dr. Meitzen's approach is likely to yield a superior estimate of a forward-looking X factor that actually reflects what EDTI and other

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[24] Exhibit 20414-X0026, 2015-08-21 AUC Letter – Final Issues List.

utilities are likely to experience in terms of actual TFP growth during the second generation PBR term.

72. In the remainder of this section, EDTI provides an overview of the key elements of Drs. Meitzen's and Weisman's evidence that, from EDTI's perspective, demonstrate the appropriateness and reasonableness of the requested approach in the context of the second generation PBR Plan, including vis-à-vis the NERA approach adopted by the Commission for the first generation Plan.

3.1 Principled Approach to Determining the X Factor

73. Dr. Weisman summarizes the importance of determining an appropriate X factor from a PBR principles perspective[25]:

> 55. It is important to recognize that all five of the AUC's PBR principles come into play in informing the proper development of the *X* factor and the properties that it should satisfy. For example, an *X* factor that is too high can undermine incentives for efficiency (AUC PBR Principle 1), deprive the regulated firm of a reasonable opportunity to recover its prudently incurred costs (AUC PBR Principle 2), and fail to recognize the unique circumstances of the regulated companies and hence result in an excessive capital funding shortfall (AUC Principle 4). ***[footnotes removed]***
>
> 56. An *X* factor that is too low fails to share equitably the benefits of PBR between consumers and the regulated firm (AUC PBR Principle 5). Finally, the *X* factor should be developed in accordance with a rigorous, coherent and accepted methodology that is transparent and produces results that can be replicated (AUC PBR Principle 3).

74. For the reasons stated by Dr. Weisman, EDTI's central concern with respect to the X factor going into the second generation PBR Plan is that the Commission approve an X factor that is "just right" in satisfying each of the AUC PBR Principles. As described in Dr. Meitzen's evidence and discussed further below, the X factor approved for the first generation PBR Plan failed to hit this mark by a substantial margin. In fact, Dr. Meitzen's analysis shows that the first

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[25] Appendix A, paragraphs 55-56.

generation X factor reflected an over-estimate of the actual TFP growth over the 2009 to 2014 period by more than 2% annually, which is roughly equivalent to $3.2 million in annual net income for EDTI based on EDTI's 2012 going-in year revenue requirement. As Dr. Meitzen notes[26]:

> 51. When viewed as a reasonable predictor of forward-looking productivity growth and the X factor, NERA's recommendation of average TFP growth of 0.96 percent over the 1972-2009 period (to which a 0.20 percent stretch factor was added for an X factor of 1.16 percent) is not supported by the available evidence and, thus, fails as a valid approach for determining the X factor. As documented above, industry TFP growth over the 2009-2014 period averaged -1.28 percent per year, meaning that NERA's recommendation over-predicted TFP growth by 2.24 percentage points per year. In essence, the original X factor based on NERA's recommendation contained a stretch factor that was more than 11 times the stated stretch factor of 0.20 percent. The significant magnitude of this over prediction can be illustrated by noting that, based on EPCOR's 2012 revenue requirement, this would amount to a revenue reduction of this would amount to a revenue reduction of $3.2, or approximately 7.5 percent of EPCOR's net income.
>
> 52. To further put this sizeable over-prediction in context, Figure 3 shows the cumulative difference in price cap indexes between the X factor based on NERA's recommendation and the actual path of TFP growth over the 2009-2014 period. As shown in Figure 3, by the end of the five-year price cap period, rates would have been 11.6 percent higher under the average actual industry TFP growth over this period (plus a 0.20 percent stretch factor) than they were under the implemented price cap with the 1.16 percent X factor based on NERA's recommendation. Clearly, the over-prediction of the X factor by NERA's method and the resulting restraint it put on rates contributed to the overall capital funding shortfall experienced by EPCOR with cumulative K factor amounts that were higher than would be the case had the X factor been set at a reasonable value. ***[footnotes removed]***

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[26] Appendix B, paragraphs 51 and 52.

75. As described further below, EDTI submits that Dr. Meitzen has provided an approach that meets the goals and objectives outlined by Dr. Weisman. Further, the approach will enable the Commission to establish an X factor for the second generation PBR Plan that retains the general approach that it adopted for the first generation Plan, but that incorporates an important refinement that will ensure that the X factor will, in fact, be forward looking, as the Commission determined to be appropriate in Decision 2012-237[27]:

> …In general terms, the X factor can be viewed as the expected annual productivity growth during the PBR term.

3.2 Method for Determining the X Factor

76. Dr. Meitzen summarizes his views with respect to NERA's approach to establishing the X factor for the first generation PBR Plan as follows[28]:

> … it is my opinion that the methodology employed in the NERA study is generally sound and provides an appropriate basis for determining the updated X factor. However, there is one critical adjustment required for updated NERA results to form an appropriate basis of the forward-looking X factor for Alberta electric distribution utilities. Namely, the time frame to use from the historical time period estimated by NERA. I strongly disagree with NERA's original assessment that the entire historical period of the study, dating back to 1972 should be used in establishing the forward-looking X factor. ***[footnotes removed]***
>
> …. NERA's criteria for use of anything other than the full 1972-2009 time period for establishing the X factor for the electric distribution industry are specious and create a non-credible, almost impossible standard for determining the appropriate forward-looking X factor from the historical record.

77. Dr. Meitzen began his analysis by first updating the NERA study to include data up to and including 2014. During his work, Dr. Meitzen discovered an error in the NERA study involving the measurement of labour input. The error and required correction are described in

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[27] AUC Decision 2012-237, paragraph. 252.

[28] Appendix B, paragraphs 26 and 30.

detail in paragraph 39 of his evidence[29]. The result of the correction is an increase in TFP for the 1972 to 2009 period to 0.98% compared with a TFP of 0.96% in the original (uncorrected) NERA study. Dr. Meitzen's update of the NERA study with data to 2014 resulted in a TFP of 0.71%. This compares to a TFP of 0.98% from the original NERA study (corrected) which was based on data from the years 1972 to 2009.

78. Results of the updated TFP study through 2014 are shown in Table 1 of Dr. Meitzen's written evidence[30], reproduced below for ease of reference. Dr. Meitzen included the period 1999-2009 in the table as being representative of the position taken by a number of experts and utilities in the first generation proceeding who disagreed with NERA's use of TFP data back to 1972 and instead proposed the use of that data beginning in or about 1999.

Table 1
Electric Distribution Industry Output, Input and TFP Growth
1972-2014

	Output	Input	TFP
1972-2009	2.10%	1.12%	0.98%
1999-2009	0.69%	1.29%	-0.60%
2009-2014	0.16%	1.44%	-1.28%
1972-2014	1.87%	1.16%	0.71%
1999-2014	0.51%	1.34%	-0.83%

79. Dr. Meitzen notes the following with respect to the updated TFP data[31]:

> 41. Table 1 shows that the negative trend in electric distribution industry TFP growth previously documented for the 1999-2009 period has continued and has accelerated. The decline in TFP growth has been largely driven by a decline in output growth and that trend has continued, and has even accelerated, into the 2009-2014 period as output growth substantially diminished from its 0.69 percent annual average over the 1999-2009 period to an annual average growth of 0.16 percent over the 2009-2014 period. In contrast, input growth has remained relatively constant and

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[29] Appendix B, paragraph 39.
[30] Appendix B, Table 1.
[31] Appendix B, paragraph 41.

> actually increased somewhat in the 2009-2014 period. ***[footnotes removed]***

80. Dr. Meitzen explains that the decline in TFP growth is due to a change in the long-term relationship between growth in economic activity and electricity use that started becoming apparent in the mid-1990s. Specifically, Dr. Meitzen states that the drop in output is due to the drop in electricity use[32]:

> 42. Independent research published in the *Electricity Journal* finds that this reduction in output growth can be explained by a change in the long-term relationship between growth in economic activity and electricity use. Since the 1970s electricity use and GDP had grown at comparable rates. However, the ratio of electricity consumption to GDP has been on a downward trend since the mid-1990s and, since 2007, the economy has generated GDP growth with almost no net growth in electricity demand:
>
>> [T]he correlation between electricity consumption and GDP expansion diverged after about 1996, when the GDP growth rate greatly exceeded the electricity consumption rate. … Electricity consumption growth and GDP growth occurred at a similar pace from 1973 to 1996; however, after 1996, the correlation deviated significantly. … [E]lectriciy consumption has remained flat from 2007 to 2014, even as real GDP grew 8 percent. ***[footnote removed]***
>
> The TFP data presented here reflects the findings of this research as it shows lower TFP growth resulting from the noted reduction in electricity consumption growth and, consequently, lower output growth. As shown in Table 2, over the period 1996 to 2014, output grew at an annual rate of 0.75 percent, input grew at an annual rate of 1.39 percent and TFP grew at an annual rate of -0.64 percent. This is in contrast to much higher average TFP growth in the 1972-1996 period, which was largely driven by significantly greater output growth. During the 1972-1996 period, output growth averaged 2.70 percent, input growth averaged 0.98 percent and TFP growth averaged 1.72 percent. Finally, coincident with the flat

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[32] Appendix B, paragraph 42 & Table 2.

> electricity consumption noted over the 2007-2014 period, output growth dropped sharply to an annual average rate of -0.72 percent, input grew at an annual rate of 1.35 percent and TFP grew at an annual rate of -2.07 percent.

Table 2
Electric Distribution Industry Output, Input and TFP Growth: Periods Marked by Changes in Energy Consumption-Economic Growth Relationship

	Output	Input	TFP
1972-1996	2.70%	0.98%	1.72%
1996-2014	0.75%	1.39%	-0.64%
2007-2014	-0.72%	1.35%	-2.07%

81. Dr. Meitzen goes on to further demonstrate the relationship between the drop in output and the drop in TFP growth as follows:[33]

> 43. Figure 1A shows electric distribution industry output, input and TFP depicted graphically for the 1972-2014 period and Figure 1B focuses on TFP. Consistent with the independent research cited, it is clear from Figure 1A that the primary driver of the reduction in TFP growth to its current negative state has been negative output growth. Figure 2 presents the annual growth rates in electric distribution industry TFP from 1972 to 2014. ***[footnotes removed]***

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[33] Appendix B, paragraph 43, Figure 1A and Figure 1B.

Figure 1A
Electric Distribution Industry Output, Input, and TFP
1972-2014

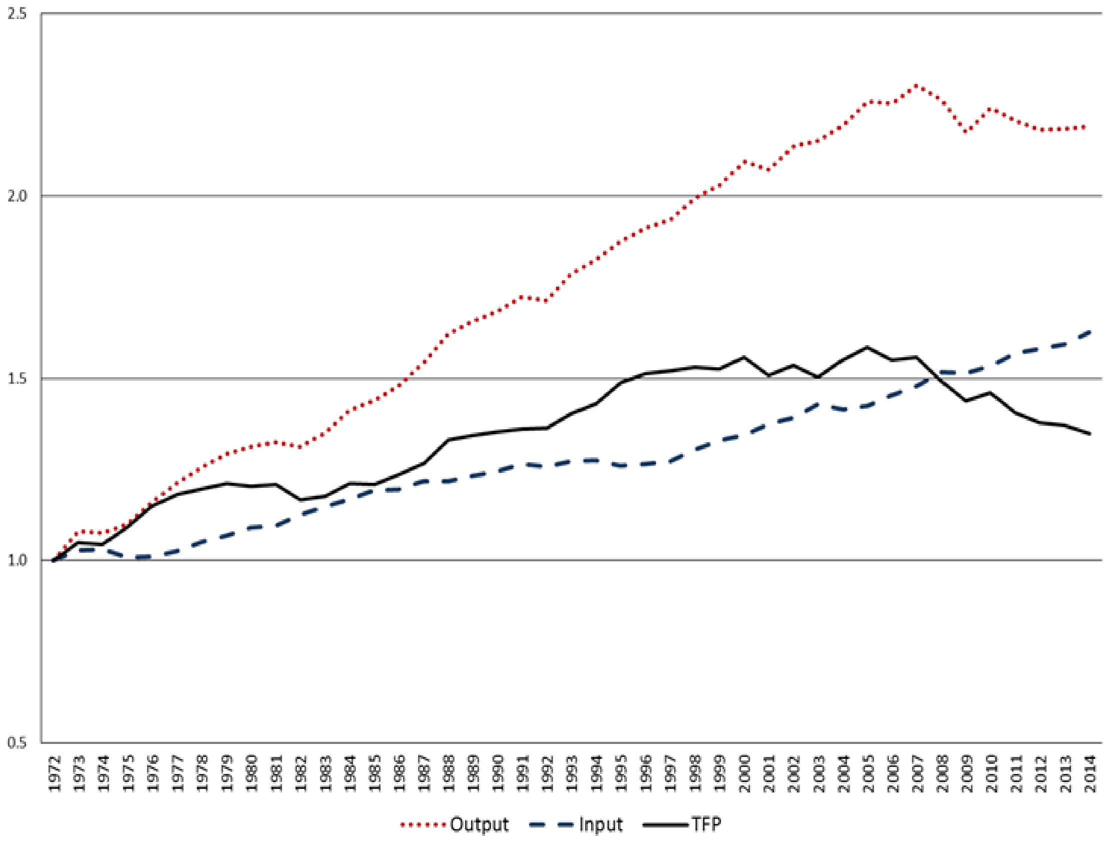
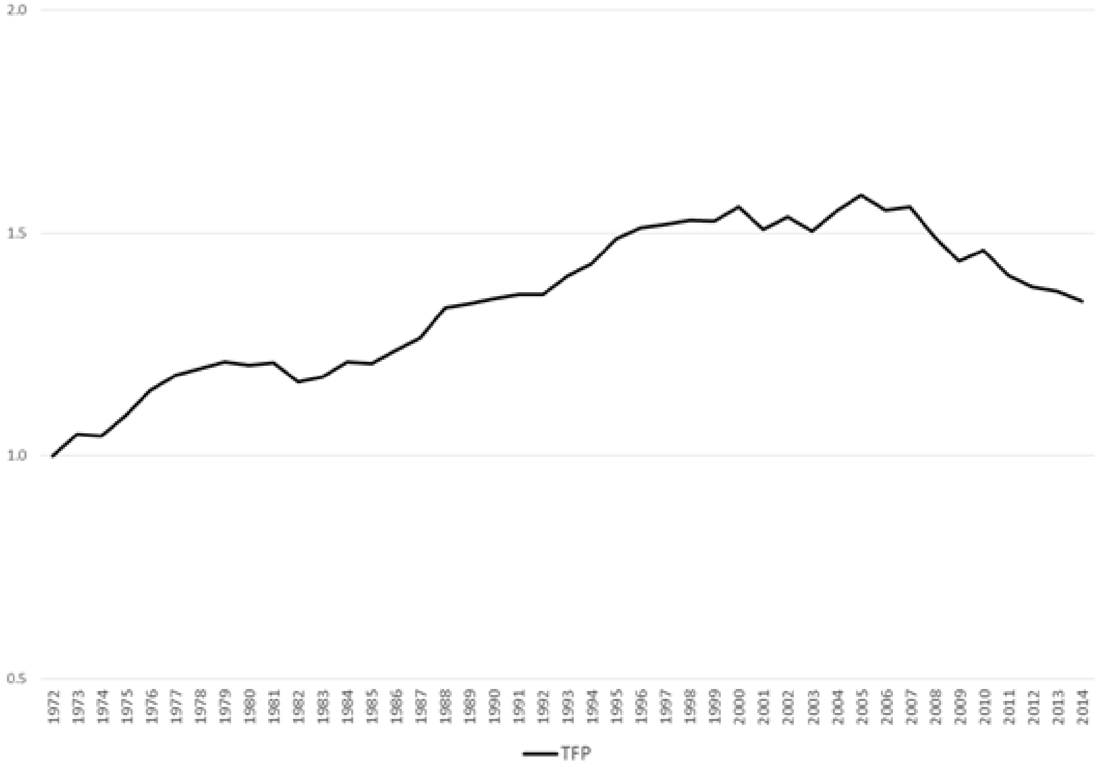


Figure 1B
Electric Distribution Industry TFP
1972-2014



82. Finally, Dr. Meitzen provides further explanation as to why it is entirely inappropriate to use the TFP data series going back to 1972[34]:

> 45. NERA's position that the entire 1972-2009 time period should be used to determine the X factor is untenable. In fact, NERA's own academic research and its 2010 submission in AUC Proceeding 566 clearly show that the series has changed over time, rendering its position that the entire time period be used not credible:
>
> > TFP growth … fluctuates considerably year to year and … in more recent years exhibits sharp declines. The fastest TFP growth occurred in 1976 at 4.96 percent while the slowest TFP growth occurred in 2008 at -5.26 percent.

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[34] Appendix B, paragraphs 45-49.

46. NERA’s reasoning that use of any other period for determining the X factor must be based on disinterested or scholarly sources is a red herring; it imposes an impractical, unnecessary standard on the determination of the X factor.

> [T]here is no evidence of which we are aware, from disinterested or scholarly sources outside this proceeding, of an event or a circumstance that so changed the nature of the utility businesses tracked by the FERC Form 1 as to invalidate the relevance of the longest period represented by those data. … We know of no ex ante basis to be selective regarding the time period used to compute average TFP growth for the industry. In the absence of such external or scholarly reasons for truncating the time period, we continue to support the use of the largest time period available for empirical study as the most objective basis for the TFP component of a well-structured PBR plan.

While there is no doubt that witnesses in this proceeding are providing testimony on behalf of interested parties, in my opinion it serves no useful purpose to impose such an unreasonable condition on a rational, valid investigation of the appropriate value for the forward-looking X factor for the Alberta electric distribution industry.

47. NERA’s position is logically flawed and demonstrably false. To illustrate, at one point, NERA blindly asserts that, “The conventional assumption that the industry productivity and input prices are characterized by a stable trend is valid.” NERA provides no support for its claim that the alleged stable trend represents “the conventional assumption,” and it employs strained logic to avoid testing the unconfirmed assertion of a stable trend:

> We have not attempted a structural break test, as we have seen no evidence from outside this proceeding to lead us to believe that the nature of the utility distribution business has changed in a way that would require such a break to be imposed on the available Form 1 data.

This statement by NERA is nothing more than a smokescreen to cover its flawed approach. NERA's reasoning is fallacious as a matter of scientific inquiry as it is fully contradicted by the types of "structural break" tests suggested by NERA itself. These tests do not require a priori or independent evidence of the existence of such a break as a pre-condition for testing. By design, the tests are purely statistical and "let the data do the talking;" the procedures are entirely dependent on the data and do not depend on, or require, any other information outside of the data. ***[footnotes removed]***

48. NERA's unsupported, faulty assertions only serve to divert attention from the determination of an informed, reasoned approach to the appropriate determination of the X factor. Bolstered by its erroneous and curious reasoning, NERA largely ignored the arguments and evidence set forth by various parties in AUC Proceeding 566. In contrast to NERA's reticence to admit there may have been relevant changes in the industry or that distant history was not relevant for the purposes of establishing the AUC X factor, a number of witnesses in AUC Proceeding 566 documented a variety of factors that would cause the trend rate of growth in the TFP data series to change over time. For example, the following were among the reasons provided for why the entire 1972-2009 period was inappropriate for establishing the forward-looking X factor:

- Changes in investment trends
- Technology deployments
- Changes in operating practices
- Changes in customer consumption patterns
- Regulatory incentives
- Industry restructuring
- Business cycles

49. While there may have been disagreement over the precise events and dates provided by the various witnesses, changes in the industry did have a significant impact on industry TFP growth, and the trend relied upon by NERA did change over time (as evidenced by Tables 1 and 2). At the very least, these factors provide ample evidence that using the TFP

> series dating back to 1972 was not an appropriate basis for establishing the forward-looking X factor. In addition, as I have cited above, disinterested, scholarly research has documented that the relationship between economic activity and electricity consumption has significantly changed in more recent years, further invalidating NERA's false and untested assertion of the existence of a stable trend in industry TFP.

83. As noted above, Dr. Meitzen demonstrates that the actual TFP growth from 2009 to 2014 was -1.28%[35], and that when compared to the X factor recommended by NERA for the first PBR term, NERA over-predicted the TFP growth by 2.24 percentage points[36]. Clearly, the NERA approach of using TFP data back to 1972 is fundamentally flawed, and failed to provide a basis for determining an X factor that was anywhere close to being appropriate.

3.3 Determination of a Forward Looking X Factor

84. The X factor for the second generation PBR Plan must be determined in a way that best predicts reasonable TFP growth for the term of that Plan. Dr. Weisman summarized the importance of using a forward looking X factor[37]:

> 72. … the adoption of a true forward-looking *X* factor for the second-generation PBR has a number of important benefits. Foremost among these benefits is that a forward-looking *X* factor is required to emulate competitive market outcomes (AUC PBR Principle 1). In addition, it may serve to reduce the overall capital funding shortfall the Commission would have to address going forward and thereby help to streamline the regulatory process (AUC PBR Principle 3).

85. Dr. Meitzen's analyses demonstrate that the use of the data series back to 1972 was not a good predictor of the X factor for the first generation PBR term and that, similarly, it will fail in achieving that objective for the second generation of PBR. As stated by Dr. Meitzen[38]:

> 54. Just as the entire 1972-2009 time period was not appropriate for determining the X factor for the initial AUC price cap plan, the entire

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[35] Appendix B, Table 1.
[36] Appendix B, paragraph 51.
[37] Appendix A, paragraph 72.
[38] Appendix B, paragraphs 54-55.

> updated period, 1972-2014, is not appropriate for determining the second-generation X factor for the Alberta electric distribution industry. NERA's proclamation of a "stable trend" over the entire period is simply not true for either the original sample or for the updated sample. Moreover, use of this "trend" as a predictor of the forward-looking X factor was and continues to be fundamentally deficient.
>
> 55. What is relevant in this case is not a discourse on what the long-term trend in industry TFP is or ought to be, but what is a good-faith, reliable estimate of the forward-looking X factor over the next five years of the plan, 2018-2022, at which time another review will take place. In this respect, the goal is to use the historical TFP series to produce a reasonable basis for the second-generation X factor. In achieving this goal, it is important to satisfy the Commission's desire for a transparent methodology that does not "cherry pick" results. By the same token, it is counterproductive to strive for an "optimal" methodology that is totally objective and devoid of judgement. This is simply not possible as any reasonable methodology will involve a degree of judgement. In this case, given the performance of electric distribution industry TFP, reasonable methodologies will likely produce a TFP basis for the second-generation AUC X factor less than zero. ***[footnotes removed]***

86. On this basis, Dr. Meitzen proposes that the X factor for the second generation PBR term be based on the average of the 10 and 15 year rolling average of the latest available data ("10/15 moving average method" or "10/15 method"). This method excludes the earlier (irrelevant) TFP data, smooths out the effects of economic events affecting the TFP over the ensuing years, and weights the most recent 10 years more heavily than the first five years of the 15 year period, recognizing that the most recent 10 years likely have more relevance to the next PBR term in terms of what is likely to occur in actual TFP growth. Dr. Meitzen describes the approach as follows[39]:

> 57. While judgement cannot be completely eliminated in the process of determining an appropriate X factor, by basing it on a moving average approach using the latest 10 or 15 years of available TFP data, independent of particular events and varying interpretations of these

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[39] Appendix B, paragraphs 57 and 58.

> events, the Commission's concern with cherry-picking dates or time periods would be addressed. In my opinion, this approach is superior to the NERA approach for "smoothing out of the effects of variations in economic conditions on the estimate of TFP growth, without engaging in a subjective exercise of picking the start and end points of a business cycle." Absent clear, unambiguous evidence of factors calling for specific time periods, this moving average approach best balances the desire for objectivity and transparency with the need to determine a reasonable and appropriate X factor.
>
> 58. For these reasons, I recommend basing the X factor for the second-generation AUC price cap plan on an average of the most recent 10- and 15-year intervals of industry TFP growth (the "10/15 moving average"). This approach effectively weights the most recent 10 years more heavily than the earliest five years of the 15-year interval. Thus, more recent experience counts more as a basis for the X factor, but this is tempered by the longer term represented by the earliest five years of the longer interval. Given the volatility of the electric distribution TFP series, this approach provides a balance between using more recent data that are likely to more heavily influence the short-term future (which is the relevant time frame for determining the forward-looking X factor) with the stability provided by longer-term averages. I further recommend that these averages would be rolled forward to the end point of the latest available at the time the next price cap review takes place. Averaging over these intervals that are specified without regard to particular events eliminates a significant degree of subjectivity in determining the appropriate interval for forecasting the forward-looking X factor. ***[footnotes removed]***

87. Compared to the use of the full data series back to 1972, the 10/15 method is a better predictor of historical TFP growth than the NERA method for every year since 1998. This can be seen in Figures 4a and 4b of Dr. Meitzen's evidence as follows[40]:

> 60. Figures 4a and 4b demonstrate that the 10/15 moving average has been a progressively better predictor of the next five-year average TFP growth than the NERA approach every year since 1998. The gap between

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[40] Appendix B, paragraph 60, Figure 4a and Figure 4b.

the two approaches has grown wider over time as old, irrelevant data has become increasingly problematic for the NERA approach. In 1998, the gap between the two approaches was only 0.07 percentage points, but by 2009 the gap had widened to 1.27 percentage points.

Figure 4a
Comparison of 10/15 Moving Average, NERA Average and Next Five-Year Average TFP Growth 1987-2009

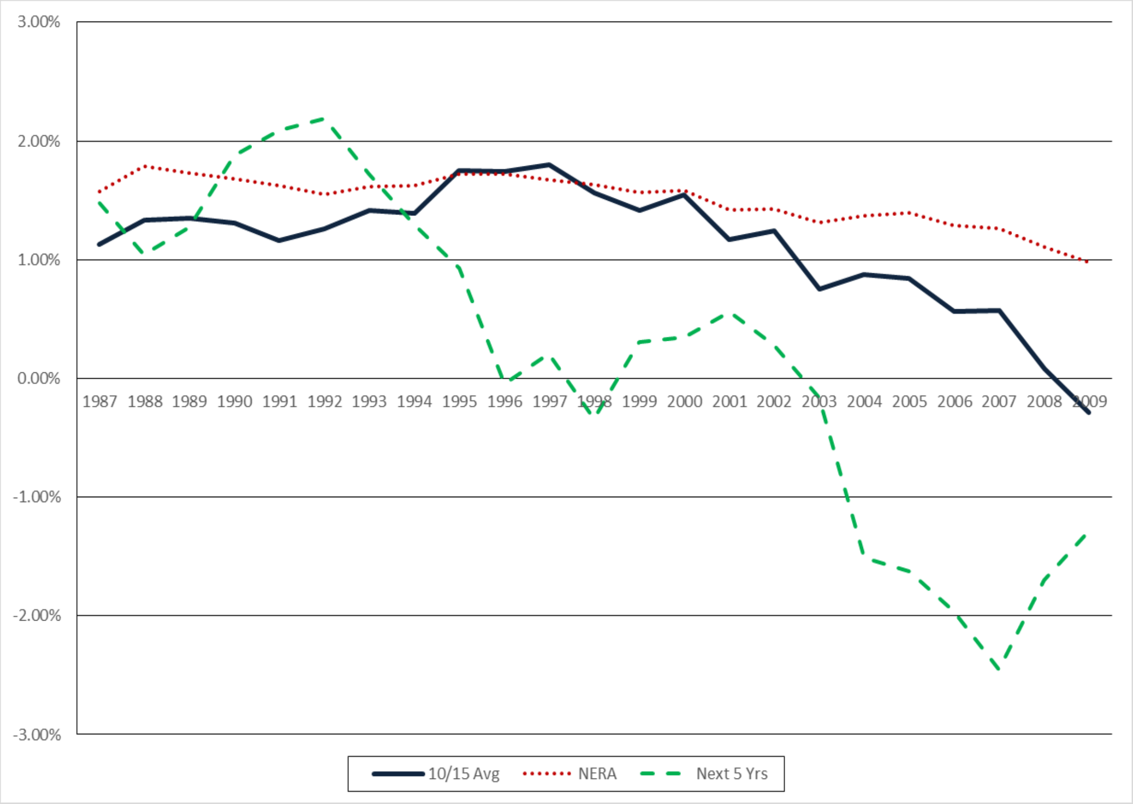

Figure 4b
10/15 Moving Average and NERA Approach Differences Relative to Next Five Year Average TFP Growth 1987-2009

88. Dr. Meitzen also points out that methods for calculating the X factor that use either the 10-year or 15-year moving average give similar results to the 10/15 method[41], further supporting the use of more recent data series as opposed to series dating back to 1972.

89. Using the 10/15 method with data from 2000 to 2014 results in an X factor of negative 1.11%[42]. Table 3 of Dr. Meitzen's evidence is reproduced below for ease of reference.

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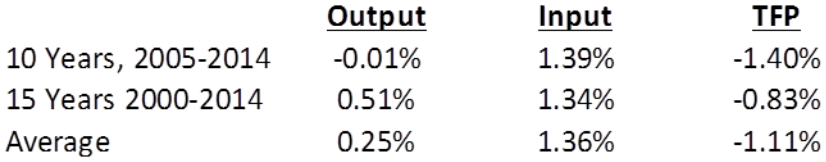
[41] Appendix B, paragraph 61.
[42] Appendix B, Table 3.

Table 3
Average Annual Growth Rates for 10-, and 15-Year Intervals Ending in 2014



	Output	Input	TFP
10 Years, 2005-2014	-0.01%	1.39%	-1.40%
15 Years 2000-2014	0.51%	1.34%	-0.83%
Average	0.25%	1.36%	-1.11%

90. Dr. Meitzen provides his views on the appropriateness and reasonableness of this method of determining the X factor as follows[43]:

> 63. It is my opinion that during the next five years of the AUC PBR plan until the next review, the 10/15 X factor would: (1) best balance the objectives of determining a reasonable X factor with the desire to minimize result-oriented analyses; (2) best address the needs of the industry to fund future investments and have the opportunity to recover its prudently incurred costs; (3) adequately protect Alberta consumers; and (4) enable the Commission to fulfill the goals of its PBR Principles that seek to design PBR so as to create the same incentive structure as a competitive market, stress regulatory efficiency and the balancing of the interests of regulated firms and their customers.

91. For the reasons summarized above and addressed in greater detail in Drs. Meitzen's and Weisman's evidence, EDTI requests that the Commission approve the 10/15 year method for calculating TFP growth as the basis for establishing a forward looking X factor for the second generation PBR Plan.

3.4 The need for a Stretch Factor

92. Dr. Meitzen notes that stretch factors are normally added to first generation PBR plans and that the need for stretch factors is diminished after the first PBR term:[44]

> 32. A stretch factor is often added to the X factor of first-generation PBR plans to account for the expected increase in productivity growth as an industry transitions from traditional cost of service regulation to PBR. Since the X factor is often based on studies of historic productivity growth

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[43] Appendix B, paragraph 63.
[44] Appendix B, paragraph 32.

> whose data represent a period before the industry moves to PBR, the stretch factor is seen as a forward-looking adjustment to the historically-measured productivity growth to account for the changes in incentives:
>
>> The purpose of a stretch factor is to share between the companies and customers the immediate expected increase in productivity growth as companies transition from cost of service regulation to a PBR regime. … The Commission agrees with Dr. Weisman that the transition from cost of service regulation to PBR provides an opportunity to realize more easily-achieved efficiency gains (the "low hanging fruit") due to increased incentives.
>
> Moreover, as the Commission has appropriately noted, the stretch factor is typically based on the regulator's judgement and is not quantitatively based:
>
>> [T]he determination of the size of a stretch factor is, to a large degree, based on a regulator's judgement and regulatory precedent and does not have a "definitive analytical source" like the TFP study represents. … Taking into account the fact that the companies are moving from a cost of service regulatory framework to PBR, and being cognizant of the uncertainties associated with the change in regulatory framework, the Commission is taking a conservative approach to setting a stretch factor. … The Commission has considered the recommended stretch factors and finds a 0.2 per cent stretch amount to be reasonable.
>
> As Dr. Weisman notes in his evidence, beyond first-generation PBR plans, the case for including a stretch factor becomes weaker in subsequent generations of a plan. ***[footnotes removed]***

93. Dr. Weisman elaborates on why stretch factors are often not appropriate in second generation PBR plans in his written evidence[45]:

> 59. Whatever the case for a stretch factor in a first-generation PBR

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[45] Appendix A, paragraph 59.

> regime, the case for its inclusion in subsequent generation plans is correspondingly weaker. The standard rationale is that the low-hanging fruit, in the form of discovering and implementing lower-cost production techniques, has already been picked and whatever opportunities remain are considerably more difficult to secure. To be clear, this does not imply that the industry suppliers are becoming less efficient, but rather that the rate at which they are becoming more efficient has leveled off. In addition, the inclusion of a stretch factor in the second-generation PBR regime would likely serve to exacerbate the overall capital funding shortfall.

94. A stretch factor is unnecessary and would be inappropriate for the second generation PBR Plan. Consistent with the evidence of Drs. Meitzen and Weisman, EDTI submits that there is no longer any credible basis for imposing a stretch factor on utility owners, particularly under Dr. Meitzen's "forward looking" X factor methodology, which yields an X factor that is likely to closely track, if not overstate actual TFP growth over the term in any event.

3.5 Conclusion

95. Based on the above, EDTI requests that the X factor for the second generation PBR plan be established at the time of rebasing, and that the Commission adopt Dr. Meitzen's recommended approach of basing the X factor on the average of the 10 and 15 year rolling averages of historical actual TFP growth over the most recent 15 years of data available at that time. Further, EDTI requests that the Commission eliminate the use of a stretch factor for purposes of the second generation plan.

4.0 TREATMENT OF CAPITAL ADDITIONS

96. In this section, EDTI addresses the third issue in the Commission's issues list for this proceeding, which states as follows[46]:

> 3. Treatment of capital additions:
>
> (a) Is an incremental funding mechanism such as capital trackers still required to provide adequate funding for capital additions in the next

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[46] Exhibit 20414-X0026, 2015-08-21 AUC Letter – Final Issues List.

generation PBR plans?

(b) If incremental capital funding is needed, are there alternatives to the capital tracker mechanism available that will provide the necessary funding while increasing regulatory efficiency during the next generation PBR term, while creating stronger incentives for companies to achieve efficiencies? For example, while the Commission is not suggesting its support for any particular alternative approach, parties have proposed several alternatives to the capital tracker mechanism during the process of establishing the first generation PBR plans, including:

  (i) Attempting to determine the average rate of growth of capital in the total factor productivity study and requesting funding for additional growth of capital beyond this level.
  (ii) Modifying the X factor to accommodate the need for higher capital spending (a form of building-blocks PBR plan).
  (iii) Excluding all capital from the going-in rates and the I-X mechanism (a hybrid PBR plan that focuses on operations and maintenance expenses only).
  (iv) Combining the incremental funding needed for certain types of capital beyond what is provided by the I-X mechanism with the going-in rates (referred to as the “K-bar” approach).

(c) If incremental funding is needed, and an alternative to capital trackers is not adopted, can the incentives to achieve cost efficiencies on capital additions be improved and regulatory efficiency be achieved by making modifications to the current capital tracker mechanism to reduce the frequency and complexity of capital tracker–related applications? For example, while the Commission is not suggesting its support for any particular modification to the capital tracker mechanism, parties have proposed several modifications to the capital tracker mechanism during the process of establishing the first generation PBR plans, including:

> (i) Eliminate or limit the amount of the true-up that is permitted on capital trackers to provide an incentive to be more efficient than the initial forecast for each capital tracker project or program.
>
> (ii) Eliminate the forecast component of capital trackers, requiring the companies to make capital investment decisions and undertake the investment prior to applying for recovery of their costs by way of a capital tracker.
>
> (iii) Other systemic mechanisms to incent project cost efficiencies and minimize regulatory burden, including streamlining options, particularly for multi-year capital tracker programs.

4.1 Capital Sufficiency in the Next Generation PBR Plan

97. In Decision 2012-237, the Commission determined that a capital funding mechanism was necessary under the first generation PBR Plan:

> … the Commission acknowledges that there are circumstances in which a PBR plan would need to provide for revenues in addition to the revenues generated by the I-X mechanism in order to provide for some necessary capital expenditures. The way in which this is accomplished is through a capital factor (K factor) in the PBR plan.[47]
>
> …
>
> The Commission has determined that a mechanism to fund certain capital-related costs outside of the I-X mechanism through a capital factor is required. … The Commission considers that the targeted criteria-based nature of a capital tracker limits the number of projects that are outside of the I-X mechanism, and as a result, the incentive properties of PBR are preserved to the greatest extent possible.[48]

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[47] Decision 2012-237, paragraph 549.

[48] Decision 2012-237, paragraph 586.

98. In paragraph 16 of its letter of August 21, 2015, the Commission stated that with the exception of the elements in the final issues list, the parameters of the next generation PBR plan will be unaltered from the first generation plan[49]:

> 16. Accordingly, the next generation PBR plans will commence, subject to possible rebasing considerations, following the expiration of the current PBR term, and the parameters of the next generation plans will be unaltered, with the exception of any changes arising from the elements to be considered in this proceeding. For the reasons set out in the sections of this letter that follow, the Commission considers that the present generic proceeding should be focused on three main issues: (i) rebasing and the going-in rates for the next PBR term, (ii) the X factor, and (iii) the treatment of capital. Each of these issues is discussed below.

99. Given that the parameters of the first generation PBR Plan that are relevant to capital funding under the PBR Plan will continue into the second generation Plan, it is clear that a capital funding mechanism will continue to be necessary to ensure that EDTI has sufficient funding to undertake the prudent capital projects necessary to enable EDTI to fulfill its obligation to provide electric distribution service and, in doing so, has a reasonable opportunity to recover its prudent costs and expenses, including a fair return (PBR Principle 2).

100. As Dr. Weisman points out in his evidence, the use of capital funding mechanisms in the electric power industry is now common and more the rule than the exception[50]:

> 74. The above observations notwithstanding, it is evident from a review of the literature that capital trackers are now common in the electric power and natural gas industries. In fact, the use of capital trackers is arguably more the rule than the exception to the rule. Hence, further analysis is properly placed on recognizing that capital trackers are a necessary institutional element of PBR in the electric and natural gas sectors and focusing on how best to improve their incentive properties. The remainder of the discussion in this section is concerned with these issues. ***[footnote removed]***

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[49] Exhibit 20414-X0026, 2015-08-21 AUC Letter – Final Issues List.

[50] Appendix A, paragraph 74.

101. As demonstrated in each of EDTI's capital tracker applications filed to date under the first generation PBR Plan, the I-X component of the Plan has left EDTI with a substantial, and growing, annual capital funding shortfall. Without the capital tracker mechanism, EDTI would have earned substantially less than its target rates of return over the term of the first generation Plan. Table 4.1-1 shows the capital costs that EDTI incurred versus the capital costs it recovered through the I-X component of EDTI's base rates for the years 2013 to 2017.

Table 4.1-1
ROEs without Capital Trackers
2013-2017
($ millions)

		A	B	C	D	E
		2013 A	**2014 A**	**2015 F**	**2016 F**	**2017 F**
	Revenues					
1	Revenues Before Y Factor Revenue	138.38	143.34	146.71	152.82	154.60
2	Y Factor Revenue	9.63	8.48	7.43	9.23	9.32
3	**Total Revenues**	**148.01**	**151.82**	**154.14**	**162.05**	**163.92**
	Expenses					
4	Operating Expenses	**65.84**	**66.98**	**70.50**	**71.67**	**71.01**
5	Depreciation	30.09	32.07	35.92	40.64	46.64
6	Cost of Debt	22.89	24.29	28.18	29.84	34.68
7	Y Factor Expenses	9.63	8.48	7.43	9.23	9.32
8	**Total Expenses**	**128.46**	**131.82**	**142.03**	**151.38**	**161.64**
	Return					
9	Return	19.56	20.00	12.12	10.67	2.28
10	**ROE %**	**7.25%**	**6.78%**	**3.72%**	**2.84%**	**0.52%**
11	**5 Year Average ROE**					**4.22%**
12	Approved ROE	8.30%	8.30%	8.30%	8.30%	8.30%

[1] Approved ROE for 2013, 2014 and 2015. Placeholder ROE for 2016 and 2017.

102. As shown in row 11, without capital trackers, EDTI would have earned an average ROE over the 2013 to 2017 Plan of 4.22%. The table demonstrates that had no capital funding mechanism been included in the Plan, EDTI's return on equity for the 2013-2017 period would have been far below, for example, the currently approved generic ROE of 8.3%.

103. In paragraph 737 of Decision 2012-237, the Commission established thresholds of +/- 500 basis points in one year and +/- 300 basis points for two consecutive years as the thresholds for triggering a re-opening of the PBR Plan. Using the currently approved ROE of 8.3%[51], the one year threshold was 3.3% and the two year consecutive threshold was 5.3%. Row 11 of Table 4.1-1 shows that had a capital funding mechanism not been approved for the first generation PBR Plan, EDTI's ROE would have been very near the one year threshold in 2015

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[51] Decision 2191-D01-2015, paragraph 277.

and would have dropped below the one and two year thresholds in 2016, thus triggering a re-opening of EDTI's PBR Plan in that year with all of the efficiency distortions attendant to such action.

4.2 Capital Funding Shortfall Under the PBR Plan

104. EDTI's various capital tracker applications to date demonstrate clearly that in the absence of an appropriate capital funding mechanism, the capital funding that is reflected in the I–X component of the PBR Formula will not generate sufficient revenues to fund the capital investment that EDTI will be required to make over the next generation PBR term to meet its legislated obligation to provide electric distribution service (which obligation includes such things as providing safe, reliable and economic delivery of electric energy; and operating and maintaining EDTI's electric distribution system in a safe and reliable manner).

105. Through modeling and other analyses, EDTI has determined that using estimated inflation factors (I) and an estimated productivity factor (X), the capital funding reflected in the I–X component of the PBR Formula will compensate EDTI, on average over an assumed 5 year PBR Plan, for 77% of the level of annual prudent capital investment that will be required over the assumed 5 year PBR Plan to enable EDTI to fulfill its legislated obligation to provide service, based on the average capital additions from the latter three years of the first generation PBR Plan (2015-2017). EDTI's three year annual average capital additions over the 2015-2017 period (approximately $176 million) is a reasonable yet very conservative proxy for the level of capital investment that will be required, at a minimum, to enable EDTI to meet its legislated obligation to provide service over the PBR Term. Having said that, EDTI notes that this level of capital does not reflect EDTI's uncontroverted evidence in its capital tracker proceedings that its required capital expenditure levels will increase dramatically in the near future as the substantial amount of aging infrastructure installed on EDTI's system in the 1960s and 1970s reaches the end of its useful life and requires replacement. In other words, the 2015-2017 three year annual average, if anything, understates the capital additions that will be required of EDTI the second generation PBR term.

106. EDTI's modeling results are summarized in the following two tables. Table 4.2-1 shows that the average annual capital additions that will be funded under the I–X component of the PBR Plan while allowing EDTI to achieve a hypothetical annual target ROE of 8.3% over the PBR Term is $146.4 million, or $44.25 million less than the average annual capital additions EDTI will be required to incur over the 2018 to 2022 PBR term, escalated to reflect inflation.

EDTI notes that these amounts take into account the expected effects of customer and load growth on EDTI's revenues over the PBR Term.

Table 4.2-1
Capital Additions Funding Shortfall Over the PBR Term
2018-2022
($ millions)

		A **2018**	B **2019**	C **2020**	D **2021**	E **2022**
	Revenues					
1	Revenues Before Y Factor Revenue	207.10	218.13	229.50	241.71	254.03
2	Y Factor Revenue	9.53	9.73	9.93	10.12	10.30
3	**Total Revenues**	**216.63**	**227.86**	**239.42**	**251.83**	**264.33**
	Expenses					
4	Operating Expenses	73.10	75.92	78.70	81.72	85.04
5	Depreciation (Based on Capital Additions in row 14)	51.91	56.38	60.64	64.78	69.09
6	Cost of Debt (Based on Capital Additions in row 14)	38.83	41.76	44.56	47.22	49.75
7	Y Factor Expenses	9.53	9.73	9.93	10.12	10.30
8	**Total Expenses**	**173.37**	**183.79**	**193.83**	**203.84**	**214.17**
	Return					
9	Return (row 3- row 8)	43.26	44.07	45.60	47.99	50.16
10	Mid Year Net Rate Base	1,221.03	1,313.28	1,401.17	1,484.86	1,564.33
11	**ROE % (row 9/(row 10 x 40%))**	**8.86%**	**8.39%**	**8.14%**	**8.08%**	**8.02%**
12	**5 Year Average ROE (Average row 11)**					**8.30%**
13	Hypothetical ROE			8.30%		
	Capital Additions					
14	Level of Capital Additions Allowed to Maintain an average ROE of 8.30% over the term	146.40	146.40	146.40	146.40	146.40
15	Forecast Level of Capital Additions Added to Rate Based on 2015-2017 Capital Additions (using a 3 year average escalated for inflation)	183.12	187.02	190.78	194.37	197.96
16	Capital Additions Shortfall in order to maintain an ROE of 8.30% (row 14 - 15)	(36.72)	(40.62)	(44.38)	(47.97)	(51.56)
17	5 Year Average Capital Additions Shortfall in order to maintain an ROE of 8.30% (Average row 16)					(44.25)

107. For purposes of Table 4.2-1, the rate of return of 8.3% was chosen as a hypothetical target ROE based on the currently approved ROE for 2013-2015. The revenue for 2018 in row 1 of column A was forecast having regard for actual costs from 2013 and 2014 and estimated costs for 2015-2017. The expenses in rows 4 to 7 of column A are forecasts of EDTI's expenses and were forecast having regard for actual costs from 2013 and 2014 and estimated costs for 2015-2017.

108. Revenues for 2019 to 2022 were calculated by escalating the 2018 revenue by estimated I-X and Q factors for the forecast years. The I factors were estimated using approved I factors from 2013 to 2016 and an estimated I factor of 0.95% for 2017. A placeholder of negative

1.11% was used for the X factor, calculated using EDTI's recommended X factor methodology for the second generation PBR Plan. The Y factor expenses in row 7 of columns B to E were calculated by escalating the 2018 Y factor expense by estimated I factors for the years 2019 to 2022. The Y factor revenues in row 2 of columns B to E were set equal to the Y factor expenses applicable to each year.

109. The depreciation and cost of debt in rows 5 and 6 of columns B to E were calculated based on the capital additions in row 14 of columns B to E. The capital additions in row 15 of columns B to E were based on the average of the approved capital additions from 2015 to 2017 escalated by estimated I factors. The resulting returns and return on equity percentages are shown in rows 9 and 11 of columns B to E. The capital additions in row 14 represent the average capital additions over the 2018 to 2022 period that would be required to achieve an average ROE of 8.3% over that period. This represents the amount of capital additions that are funded by the PBR base revenue while allowing the company a reasonable opportunity to achieve a fair return on equity. Row 16 is the difference between the required capital additions (based on historical approved additions) in row 15 and the amount of capital additions funded by the PBR formula in row 14.

110. For illustrative purposes, Table 4.2-2 shows the forecast ROE that EDTI will achieve over the PBR Term if the capital additions it incurs simply remain equal to its 2015 to 2017 three year historical average annual capital additions. The table shows an average forecast ROE over the PBR Term of 6.60%, or 1.70% less than the ROE of 8.3% that was approved in Decision 2191-D01-2015 for 2015. This equates to an average shortfall in *net income* of approximately $11 million annually, totaling approximately $55 million over the PBR Term.

Table 4.2-2
Estimated ROEs Calculated Based on 3 Year Historical Average Capital Additions 2018-2022
($ millions)

		A **2018**	B **2019**	C **2020**	D **2021**	E **2022**
	Revenues					
1	Revenues Before Y Factor Revenue	206.15	217.13	228.44	240.60	252.86
2	Y Factor Revenue	9.53	9.73	9.93	10.12	10.30
3	**Total Revenues**	**215.68**	**226.86**	**238.37**	**250.72**	**263.16**
	Expenses					
4	Operating Expenses	73.10	75.92	78.70	81.72	85.04
5	Depreciation	52.50	58.23	63.86	69.49	75.41
6	Cost of Debt	39.40	43.53	47.59	51.60	55.53
7	Y Factor Expenses	9.53	9.73	9.93	10.12	10.30
8	**Total Expenses**	**174.54**	**187.41**	**200.08**	**212.93**	**226.29**
	Return					
9	Return	41.14	39.46	38.29	37.79	36.88
10	**ROE with 3-Yr Average Capital Spend**	**8.30%**	**7.21%**	**6.40%**	**5.82%**	**5.28%**
11	5 Year Average ROE					6.60%
12	Hypothetical ROE	8.30%	8.30%	8.30%	8.30%	8.30%
13	**Variance (Actual ROE less Approved ROE**	**0.00%**	**(1.09%)**	**(1.90%)**	**(2.48%)**	**(3.02%)**
14	Average Variance					(1.70%)
15	ROE Shortfall	0.00	(5.99)	(11.40)	(16.08)	(21.10)
16	5 Year Total ROE Shortfall					(54.57)
17	5 Year Average ROE Shortfall					(10.91)
	Capital Additions					
18	Capital Additions	183.12	187.02	190.78	194.37	197.96

111. The detailed calculations forming the basis for Table 4.2-1 are provided in Schedule 2, and those for Table 4.2-2 are provided in Schedule 3. EDTI used a three year average in its model and calculations because it provides an overall view of the approximate base level of capital additions EDTI will require to sustain its system on a year over year basis throughout the PBR period.

112. Table 4.2-3 summarizes EDTI’s 2015-2017 actual and forecast capital additions for its Distribution function and shows the average, escalated for inflation, for the period.

Table 4.2-3
Actual & Forecast Capital Additions and Normalized Average
2015–2017
($ millions)

		A **2015**	B **2016**	C **2017**	D **3 Year Average ($ 2017)**
1	Capital Additions	135.87	177.96	213.27	175.70
2	Inflation Factor	2.65%	2.06%	-	NA
3	Normalized Additions	**142.34**	**181.63**	**213.27**	**179.08**

113. EDTI's capital tracker applications have included detailed conceptual explanations of why this phenomenon of a capital funding shortfall, requiring a capital funding mechanism, occurs. The reasons continue to apply, and clearly justify the continuing need for a capital funding mechanism in the next generation PBR Plan. For ease of reference, EDTI provides the following overview of its previous evidence in this regard.

114. In any given year, EDTI's rate base reflects capital investment made over the last three or four decades. As such, EDTI's rate base at the conclusion of the first generation PBR term will reflect, firstly, blended (or average) life cycle asset replacement rates that are lower than the replacement rates that EDTI is currently experiencing and will continue to face over the PBR Term. This is because in recent years, EDTI has not only had to install assets to address system growth, but has had to install assets to replace previously installed assets that have reached the end of their useful lives.

115. Secondly, EDTI's rate base at the end of the current PBR Plan will reflect blended (or average) asset installation costs that are lower than the asset installation costs that EDTI is currently incurring and will continue to incur over the next PBR Term. As EDTI adds assets on its system during the next PBR Term (whether for life cycle replacement purposes or to address system growth requirements), it will do so at current cost levels that far exceed the cost levels reflected in EDTI's rate base at the end of the first PBR Plan, which are a blend of the last three to four decades.

116. In essence, EDTI's rate base will be a "snapshot in time" that does not reasonably represent either the rate or cost of asset installations that EDTI will face over the next generation PBR Plan.

117. The combined effect of these two factors is seen in EDTI’s historical capital additions levels. Table 4.2-4 shows the substantial increases in EDTI’s capital additions over the 2013 to 2017 period.

Table 4.2-4
EDTI Historical Capital Additions and Rate Base Growth
2013-2017
($ millions)

		A **2013 A**	B **2014 A**	C **2015 F**	D **2016 F**	E **2017 F**
1	All Assets, Opening	898.07	965.72	1,055.42	1,179.23	1,334.83
2	Additions	78.62	100.87	135.87	177.96	213.27
3	Retirements/Sold	(10.96)	(11.17)	(12.06)	(22.35)	(10.02)
4	Adjustments	-	-	-	-	-
5	All Assets Closing	965.72	1,055.42	1,179.23	1,334.83	1,538.09
6	All Assets A/D, Opening	253.51	272.63	293.54	317.40	335.68
7	EDTI Depreciation	30.09	32.07	35.92	40.64	46.64
8	Retirements	(10.96)	(11.17)	(12.06)	(22.35)	(10.02)
9	Adjustments	-	-	-	-	-
10	All Assets, Closing A/D	272.63	293.54	317.40	335.68	372.31
11	Mid Year Property	931.89	1,010.57	1,117.32	1,257.03	1,436.46
12	Mid Year Accumulated Depreciation	263.07	283.08	305.47	326.54	354.00
13	Mid Year Net Property	668.82	727.48	811.86	930.49	1,082.46
14	Add: Working Capital	5.62	10.35	2.11	8.01	8.01
15	**Mid Year Rate Base**	**674.44**	**737.84**	**813.97**	**938.50**	**1,090.47**
16	% Increase in Mid Year Rate Base (row 15)		9.4%	10.3%	15.3%	16.2%
17	4 Year Average Increase in Mid Year Rate Base					12.8%
18	% Increase in Capital Additions (row 2)		28.3%	34.7%	31.0%	19.8%
19	4 Year Average Increase in Capital Additions					28.5%
20	% Increase in Depreciation (row 7)		6.6%	12.0%	13.1%	14.8%
21	4 Year Average Increase in Depreciation					11.6%

118. The table demonstrates that EDTI’s capital additions are growing far faster than reflected in EDTI’s growth in depreciation expense, which is resulting in a significant increase in EDTI’s rate base from year to year. EDTI’s capital additions have grown by an average of 28.5% over 2013-2017 with growth in EDTI’s rate base averaging 12.8% over the period, demonstrating that EDTI’s growth in depreciation is not offsetting its growth in rate base. The table also makes clear that under the PBR Plan as approved by the Commission, merely applying I–X to EDTI’s level of depreciation expense reflected in base rates will fail to fund EDTI’s required capital investment through the PBR Term, as EDTI’s depreciation expense has only grown by an average of 11.6% over 2013-2017. For the same reason, the PBR Plan without a capital recovery mechanism will fail to fund the approved return on that required capital investment.

119. In EDTI’s case, the shortfall identified above primarily stems from the fact that EDTI’s rate base reflects blended (or average) (i) life cycle asset replacement rates and (ii) asset installation costs, that are each substantially lower than the rates and costs that EDTI is currently experiencing and will continue to face over the second PBR Term. As a result, applying I–X to the capital costs (i.e., return and depreciation) reflected in EDTI’s base rates will fail to come anywhere close to funding EDTI’s required capital investment over the next generation PBR Term without a capital funding mechanism, just as it would have during the first generation PBR Plan. Shortfalls will also be evident in “growth” capital projects, as they were during the first PBR Plan.

120. EDTI proposes two options for addressing the capital funding shortfall problem under the second generation PBR Plan. An overview of each is provided below, followed by a more detailed description of their mechanics and underlying rationales, benefits and detriments.

121. Option 1 consists of a combination of a K-bar mechanism (which EDTI refers to as an F factor adjustment) along with the limited use of capital trackers and is EDTI’s preferred option. The “K-bar” or F factor is a capital funding amount that would be designed to address the ongoing shortfall between capital funding and capital requirements for recurring (i.e., non-idiosyncratic) capital projects and programs. Beyond that, the capital tracker mechanism would continue to be used to address truly idiosyncratic capital projects, projects that are not funded through the I-X component of the PBR plan to any extent and projects driven by third parties (other than growth projects).

122. Option 2 consists of the continued use of capital trackers as established under the first generation PBR Plan, but with limited, prospective only, true-ups for recurring (i.e., non-idiosyncratic) capital projects and programs to strengthen incentives for efficiency. However, all truly idiosyncratic capital projects, projects that are not funded through the I-X component of the PBR plan to any extent and projects driven by third parties (other than growth projects) will continue to be subject to retrospective true-up.

123. In the alternative, if the Commission does not approve EDTI’s Option 1 or Option 2, EDTI recommends that the Commission simply continue with the capital tracker mechanism as approved under the first generation Plan. The capital tracker mechanism will ensure that the capital funding shortfall problem is properly addressed, albeit with less regulatory efficiency than EDTI’s Option 1 and with weaker incentives for superior performance.

4.3 Option 1 –Capital Trackers with an F Factor ("K-bar") Adjustment

124. EDTI's Option 1 consists of an F factor with limited use of capital trackers. The F factor is a capital funding mechanism that will be used to address EDTI's capital funding shortfall for projects or programs that are ongoing or foreseeable, and that are partially but not fully funded through the I-X component of the PBR Plan. EDTI refers to these projects as "K bar" projects.

125. Under Option 1, the capital tracker mechanism as approved in Decision 2013-435 would continue to be used, but only to address truly idiosyncratic capital projects, projects that are not funded through the I-X component of the PBR plan to any extent and projects driven by third parties (other than growth projects). Based on EDTI's tracker projects and programs from the first generation PBR Plan, examples of the types of projects that would qualify for capital tracker treatment under Option 1 include the Work Centre Redevelopment project, the Advanced Metering Infrastructure project, and third party driven relocation-related projects as well as contributions for AESO required projects and contributions to Transmission projects for Distribution. Table 4.3-1 gives the projects from the first PBR term that would qualify as capital tracker projects in the second PBR term under EDTI's Option 1.

Table 4.3-1
Capital Tracker Projects Under Option 1

		A	B	C
	Project Name	**Section Ref.**[1]	**Business Case and Engineering Study Reference (Appendix)**[1]	**Exhibit**[1]
1	**Capital Trackers that are comprised of projects for which Tracker treatment was approved by the Commission in Decision 2013-435**	**3.1**		
2	**Relocation-Related Capital Trackers**	**3.1.1**		
3	SE and West LRT Distribution System Relocation	3.1.1.1	A-1-1	20407-X0115 to 20407-X0129
4	Franchise agreement driven relocations and conversions	3.1.1.2	A-1-2	20407-X0114
5	Walterdale Bridge replacement franchise relocations	3.1.1.3	B-1-3	20407-X0052
6	Queen Elizabeth II Highway & 41 Avenue SW Interchange Distribution System Relocations	3.1.1.4	C-2	20407-X0006 to 20407-X0008
7	NLRT distribution system relocations	3.1.1.5	-	
8	Poundmaker feeders	3.1.2	C-1	20407-X0009
9	**Applied-for Capital Trackers that are comprised of projects for which Tracker treatment was approved by the Commission in Decision 3100-D01-2015**	**3.1**		
10	OMS/DMS Life Cycle Replacement	3.1.18	A-18	20407-X0083
11	**Capital Trackers that are comprised of projects that have not been previously approved by the Commission for Tracker Treatment**	**3.2**		
12	Advanced Metering Infrastructure	3.2.1	A-19	20407-X0082
13	Work Centre Redevelopment	3.2.2	A-22	20407-X0075

[1] Proceeding ID 20407, 2014 PBR Capital Tracker True-up and 2016-2017 PBR Capital Tracker Forecast.

126. The “K-bar” approach adds a forward-looking F factor to the price cap formula to address the capital funding shortfall incurred by EDTI in respect of the vast majority of its capital projects. For example, in 2017, the capital funding shortfall for 21 out of EDTI’s total of 25 capital trackers would have been addressed by an F factor adjustment had it been in place, leaving only three projects to be addressed under the capital tracker mechanism.

127. The K-bar concept was first introduced on the record of Proceedings 566[52] and 2131[53], and is further explained by Dr. Weisman in his evidence as follows[54]:

> 78. Under a price cap plan with an *F* factor adjustment, a single *I-X* index governs the company’s earnings. The *X* factor reflects industry total factor productivity growth rates and any stretch factors that may be determined by the Commission. The company identifies at the start of the PBR regime any additional *F* (forward-looking) factor adjustment that is required for (expected) revenue sufficiency. In essence, the *F* factor reflects the extent to which the standard *I-X* index fails to provide the company operating in a steady-state environment with the opportunity to earn a fair return on its foreseeable, prudent capital investments over the course of the PBR regime (AUC PBR Principle 2). ***[footnote removed]***

128. The F factor would be filed with the Commission for approval as part of EDTI’s rebasing application and would be approved prior to, and for use during, the second generation PBR term.

129. It is important to note that the use of an F factor limits the use of capital trackers to extraordinary, truly idiosyncratic capital projects, projects that are not funded through the I-X component of the PBR plan to any extent and projects driven by third parties (other than growth projects) (as described above) with the F factor eliminating the capital funding shortfall for the remaining projects. The combination of capital trackers and an F factor would substantially reduce the number of capital trackers EDTI would require, thereby reducing regulatory burden consistent with PBR Principle 3. As Dr. Weisman notes in his evidence[55]:

> 80. It is instructive to clarify the relationship between this approach and the three categories of capital trackers that EPCOR identified in the

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[52] Proceeding ID 566, T10:1918.
[53] Exhibit 263.02.EDTI Final Argument, section 2.3.
[54] Appendix A, paragraph 78.
[55] Appendix A, paragraph 80.

> capital tracker proceeding. Under this approach, EPCOR's Category 1 and Category 3 trackers would be addressed via K factors, whereas EPCOR's Category 2 trackers would be addressed via the F factor. This bifurcation has the advantage of restricting K factors to those categories of capital trackers that were initially envisioned in the 2012 PBR proceeding as being the proper domain for K factor adjustments (i.e., extraordinary, idiosyncratic investments). This approach duly recognizes that even if Category 1 and Category 3 trackers are adequately addressed through K factor adjustments, the company could still be left with an exogenous revenue deficiency (i.e., a revenue deficiency through no fault of its own). ***[footnote removed]***

130. The combined use of F factors and capital trackers has four primary advantages. First, it promotes strong incentive properties by decoupling revenues from costs for all operating costs and all capital expenditures recovered by base rates and the F factor. The certainty of sufficient revenues from base rates and the F factor will incent EDTI to focus on identifying and implementing efficiency measures rather than expending the considerable effort that has been required through the capital tracker regulatory approval process to obtain sufficient funding. This will help to better achieve PBR Principle 1 as well as Principles 2 and 4.

131. Second, the combined use of F factors and capital trackers will improve regulatory efficiency for both EDTI and the Commission. Efficiency will be improved by reducing the number and magnitude of capital tracker applications. This will reduce regulatory burden and help to better achieve PBR Principle 3.

132. Third, this approach will help to achieve allocative efficiency because, with reasonable certainty of capital sufficiency, EDTI will be able to choose the most cost efficient investment to provide service. This will help to better achieve PBR Principle 1.

133. Dr Weisman addresses the benefits of EDTI's Option 1 in detail in his written evidence[56].

> 81. The potential advantages of a price cap plan with an *F* factor adjustment include the following seven. First, the plan allows the company a reasonable opportunity to earn a fair return even in the presence of significant changes in capital costs and capital investment needs (AUC

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[56] Appendix A, paragraphs 81-83.

> PBR Principle 2). Second, the plan can encourage the company to undertake comprehensive operations planning. Third, the plan provides incentives for the company to limit overall production (capital and operating) costs and to employ capital and non-capital inputs in cost-minimizing proportions (AUC PBR Principle 1). These desirable efficiency properties follow directly from the basic PCR framework and the fact that the firm is operating under what is essentially a fixed-price contract.
>
> 82. Fourth, a plan of this type streamlines the regulatory process after the initial forward-looking assessment of prudent capital investment (AUC PBR Principle 3). Fifth, the plan leverages familiarity with telecommunications style price-cap regulation while explicitly accounting for the unique characteristics of the energy sector. Sixth, to the extent that foreseeable capital expenses are pre-approved, the plan can encourage investment by reducing the financial risk the company faces.
>
> 83. Seventh, this plan provides for a clear line of demarcation between issues of ongoing financial solvency (Category 2 trackers) and the AUC's initial conception of the qualifying criteria for a capital tracker (Category 1 and Category 3 trackers). By limiting capital trackers to exogenous CAPEX, this approach puts in place more high-powered incentives relative to those reflected in the AUC's current capital tracker approach.

134. EDTI's proposed use of the F factor and limited capital trackers improves upon the first generation PBR Plan and in particular reduces the regulatory burden and improves the incentive properties of the plan. As noted by Dr. Weisman[57]:

> 85. In summary, this first-best approach to capital additions preserves to the greatest extent possible the high-powered incentive properties of PCR and is therefore fully aligned with AUC PBR Principle 1. In addition, this approach minimizes the degree of regulatory intervention required over the course of the PBR regime and is therefore consistent with AUC PBR Principle 3. There is no other approach to capital additions that can

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[57] Appendix A, paragraph 85.

claim these high-powered incentive properties while providing for this level of regulatory efficiency.

4.3.1 F Factor Methodology

135. In the first year of the second generation PBR Plan, the F factor amount would equal the F factor amount approved in EDTI's rebasing application. EDTI refers to the F factor amount that would be approved in the rebasing application as the "base F factor". The base F factor represents the amount of the capital funding shortfall that needs to be added to revenues each year in order to support the required capital additions. In each subsequent year, the F factor amount for the year would be equal to the base F factor amount escalated by the applicable I-X factor to convert it to an F factor that is appropriate to the year in question. As such, the base F factor amount would be escalated by the same I-X factor as EDTI's base rates.

136. The total F factor amount for a PBR year would be equal to the F factor calculated for that year plus the F factor from the previous year. In other words, the total F factor for each year would include the revenue necessary to address the capital funding shortfall for that year plus the revenue necessary to address the capital funding shortfalls from the previous years of the PBR term.

137. For example, the F factor in year two of the PBR Plan would be equal to the base F factor escalated by the year two I-X factor, plus the F factor amount from year one.

138. The F factor for each year would be calculated using the following formula.

$$F_t = F_{t-1} + F_{base} \times (1 + (I_t - X)) \times (1 + (I_{t-1} - X))\ldots$$

F_t = F factor for current year
F_{t-1} = F factor from the previous year
F_{base} = base F factor
I_t = inflation factor for current year
I_{t-1} = inflation factor from the previous year
X = productivity factor
$(1 + (I_{t-1} - X))\ldots. = (1 + (I - X))$ multipliers for all previous years

139. A schedule showing the calculation of F factor amounts for each year from 2018 to 2022 is included as Schedule 4.

140. EDTI has identified two potential methods to calculate the F factor. Each method would base the F factor on the capital funding shortfall for K bar projects in the first year of the second generation PBR Plan. Under the first method, the capital cost incurred would be calculated using the average actual capital additions for the K bar projects during the first PBR term. Under the second method, the capital cost incurred would be calculated using a forward looking forecast of capital additions.

4.3.2 F Factor Calculation – Method 1

141. Under Method 1, the base F factor would be equal to the capital funding shortfall for all K bar projects and would be calculated in a manner similar to that currently used to calculate the capital funding shortfall for capital tracker purposes. The capital funding shortfall would be calculated as the difference between the capital cost to be incurred for K bar projects in 2018 and the capital cost to be recovered for K bar projects under the I-X component of the PBR Plan (i.e., EDTI's base rates in 2018). The capital costs to be incurred for K bar projects would be calculated based on the 2017 mid-year rate base plus the average of the capital additions for K bar projects from the years 2013 to 2017 adjusted to 2018 dollars. The capital cost to be recovered in base rates for K bar projects would be calculated based on the capital cost for K bar projects in the 2017 mid-year rate base multiplied by the 2018 I-X and Q factors. The F factor would be calculated as the sum of the capital funding shortfall for all K bar projects.

142. EDTI has included an illustrative model of its F factor calculations for Option 1, Method 1 in Schedule 5. The F factor calculations would include the following steps.

Step 1 – Calculate EDTI's incurred revenue requirement for K bar projects for 2018 (refer to tab 2 of Schedule 5)

i. Determine the capital additions for each K bar project for each of 2013 to 2017. These amounts are found in the capital tracker schedules in EDTI's capital tracker and capital tracker true-up applications for 2013 to 2017. The most recent capital additions for 2013 to 2017 can be found in tab 1 of Schedule 4 (Exhibit 21430-X005) from EDTI's 2014 True-up and 2016-2017 PBR Capital Tracker Compliance Filing (Proceeding ID 21430). The forecast capital additions will be used for any years that do not have final approved K factors, or where a K bar project was not included as a K factor (i.e., capital tracker) in a year. Where EDTI relies on a forecast capital addition for a K factor project in a year, the forecast addition for that project will be trued-up once the final approved K factor is known.

ii. Convert the K bar capital additions by project from Step 1 for each year to 2017 dollars using the approved I factor for each year.

iii. Calculate the average K bar capital additions by project in 2017 dollars for the 2013 to 2017 period.

iv. Convert the average K bar capital additions by project to 2018 dollars using the 2018 I factor.

v. Calculate the amount of K bar capital cost incurred for 2018 by project based on the 2018 capital additions from step iv and the 2017 mid-year rate base using the method for calculating incurred capital costs from the capital tracker accounting test approved in Decision 2013-435.

Step 2 – Calculate EDTI's revenue requirement to be recovered for K bar projects for 2018 (refer to tab 4 of Schedule 5)

i. Calculate the amount of K bar capital additions by project recovered in base rates for 2018 using going-in capital costs by project and the method for calculating recovered capital costs from the capital tracker accounting test approved in Decision 2013-435.

Step 3 – Calculate EDTI's Base F factor for 2018 (refer to tab 3 of Schedule 5)

i. Calculate the difference between the 2018 K bar capital cost incurred by project (from Step 1) and the 2018 K bar capital cost recovered by project (from Step 2). The result is the capital funding shortfall amount for 2018 for each project.

ii. Sum the capital funding shortfall amounts for each project from step i to get the total base F factor for 2018.

143. This method for calculating the F factor is based on previously filed annual capital forecasts and, in the case of K bar projects that were included as K factors, on approved capital tracker projects which were tested and approved through first generation capital tracker forecast and true-up applications. As a result, the Commission and interested parties can be assured that no strategic behaviour or over forecasting is built into the K-bar (or F factor) amount. Further, the use of average capital additions from 2013 to 2017 to set the F factor eliminates the

possibility of the F factor being set too high by smoothing out the capital additions over the period, and precluding the F factor from being set based on a single year of unusually high capital additions. Finally, this method of establishing the F factor results in far less regulatory burden when compared to capital tracker applications or cost of service applications, due to the elimination of the need to file annual capital tracker applications for K bar projects.

4.3.3 F Factor Calculation – Method 2

144. Under Method 2, the base F factor would be equal to the capital funding shortfall for K bar projects in 2018 and would be calculated in a manner similar to the capital funding shortfall for capital trackers. The capital funding shortfall would be calculated as the difference between the capital cost to be incurred for K bar projects in 2018 and the capital cost to be recovered for K bar projects under the I-X component of the PBR Plan (i.e., EDTI's base rates in 2018). The capital cost to be incurred for K bar projects would be calculated based on the 2017 mid-year rate base plus a forecast of capital additions for K bar projects for 2018. The capital cost to be recovered in base rates for K bar projects would be calculated based on the capital cost for K bar projects in the 2017 mid-year rate base multiplied by the 2018 I-X and Q factors.

145. EDTI has included an illustrative model of the Method 2 F factor calculations in Schedule 6. The F factor calculations would include the following steps.

Step 1 – Calculate EDTI's incurred revenue requirement for K bar projects for 2018 (refer to tab 2 of Schedule 6)

i. Prepare a capital additions forecast for K bar projects for 2018.
ii. Calculate the amount of K bar capital cost incurred for 2018 by project based on the 2018 capital additions forecast from step i and the 2017 mid-year rate base using the method for calculating incurred capital costs from the capital tracker accounting test approved in Decision 2013-435.

Step 2 – Calculate EDTI's revenue requirement to be recovered for K bar projects for 2018 (refer to tab 4 of Schedule 6)

i. Calculate the amount of K bar capital additions by project recovered in base rates for 2018 using going-in capital costs by project and the method for calculating recovered capital costs from the capital tracker accounting test approved in Decision 2013-435.

Step 3 – Calculate EDTI's Base F factor for 2018 (refer to tab 3 of Schedule 6)

i. Calculate the difference between the 2018 K bar capital cost incurred by project (from Step 1) and the 2018 K bar capital cost recovered by project (from Step 2). This gives the capital funding shortfall amount for 2018 for each project/project group.
ii. Sum the capital funding shortfall amounts for each project from step i to get the total base F factor for 2018.

146. This method of calculating the F factor is based on a forecast of capital additions for 2018; it recognizes the unique circumstances of the company and is easy to understand, thus helping to achieve PBR Principles 3 and 4. However, because the F factor is based on a forecast of capital expenditures, a utility owner may be incented to inflate its 2018 forecast of capital costs. This is not an issue under Option 1, Method 1. Further, because this method would require what roughly amounts to a proceeding to set the F factor that is slightly more involved than a capital tracker proceeding, it would require significantly more regulatory effort to implement compared to Method 1.

147. EDTI submits that if the Commission approves Option 1, then it should approve calculation Method 1 for determining the F factor. Method 1 relies on previously filed and scrutinized capital expenditures, and it eliminates the opportunity for the utility owner to over estimate the F factor. And because Method 1 relies on previously filed capital additions and the previously approved capital tracker method for calculating the capital funding shortfall, it minimizes the regulatory burden required to set the F factor by eliminating the need to test the expenditures. Similarly, the use of the capital tracker method to calculate the capital funding shortfall eliminates the need to test a new method of calculating the shortfall further reducing the regulatory burden.

148. Any capital funding shortfall for extraordinary, idiosyncratic projects and projects not included in the base F factor will be addressed using the capital tracker methodology approved by the Commission in Decisions 2012-237 and 2013-435.

4.4 Option 2 – Capital Trackers with limited, prospective-only true-ups

149. As an alternative to EDTI's Option 1, the continued use of capital trackers but with limited, prospective only true-ups for certain tracker projects or programs could be used to

address the capital funding shortfall problem. This option consists of the use of capital trackers as established by Decisions 2012-237 and 2013-435 in the first generation PBR plan, but with the elimination of retrospective true-ups for projects or programs that are ongoing or foreseeable, and that are partially but not fully funded through the I-X component of the PBR Plans.

150. The advantages of this option are that it would ensure capital funding sufficiency (i.e., it provides EDTI with a reasonable opportunity to earn a fair return on its capital investment, consistent with PBR Principle 2), and it would improve upon the incentive properties reflected in the first generation plan (which allows for retrospective true-ups for trackers). Incentive properties would be improved over the current plan by eliminating EDTI's ability to fully true-up its trackers to its actual capital costs for projects or programs that are ongoing or foreseeable, and that are partially but not fully funded through the I-X component of the PBR Plan. In this way, EDTI will be incented to minimize actual capital costs below approved amounts during execution of capital projects, consistent with PBR Principle 1.

151. In his evidence, Dr. Weisman discusses these advantages in paragraphs 88 and 89. Dr. Weisman further summarizes the advantages of this option in paragraph 103 of his evidence where he points out that the elimination of the retrospective true-up strengthens the incentive properties of the PBR plan using capital trackers, and provides for a closer alignment with the AUC's PBR principles[58].

152. The disadvantages of this option are that it may encourage the utility owner to over-state its capital requirements, and a significant regulatory burden would still be imposed on EDTI and the Commission over the entire PBR term. The incentive to overstate capital requirements violates PBR Principle 1. The significant regulatory burden violates PBR Principle 3.

153. While EDTI's Option 2 will achieve improvements over the current treatment of capital additions in the current PBR plan, it has disadvantages related to PBR Principles 1 and 3. Specifically, its incentive properties are not as strong as those in EDTI's Option 1 and it has a higher regulatory burden when compared with Option 1. For these reasons, EDTI's Option 1 provides a better overall alternative.

4.5 Continuing with the Capital Tracker Mechanism "As-is"

154. In the alternative, if the Commission does not approve EDTI's Option 1 or Option 2,

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[58] Appendix A, paragraph 103.

capital trackers as established under the first generation PBR Plan could continue to be used for purposes of the second generation plan (i.e., the use of capital trackers as established by Decisions 2012-237 and 2013-435 for the first generation PBR Plan).

155. The advantages of this approach are that it allows the utility owner a reasonable opportunity to earn a fair return on investment and recognizes the unique circumstances of each utility. EDTI will be afforded a reasonable opportunity to earn a fair return by allowing capital trackers and the associated K factor adjustments. This will help satisfy PBR Principle 2. The availability of capital trackers will allow EDTI to apply to recover its unique capital requirements thus satisfying PBR Principle 4. Dr. Weisman notes that the current capital tracker method is "tried and true" but is a second-best choice[59]:

> 103. In summary, this second-best approach to capital additions has the benefit of being "tried and true" in the sense that the Commission adopted an approach that has by all accounts worked reasonably well over the course of the first-generation PBR regime. EPCOR has identified opportunities to further strengthen the incentive properties of this approach by adopting a more high-powered true-up process that requires the company to bear greater risk. This modification is properly viewed as a refinement of the original approach that facilitates a closer alignment with the AUC's PBR principles and the relevant economics literature.

156. The disadvantages of this alternative are that it may encourage the utility owner to over-state its capital requirements, and a significant regulatory burden would still be imposed upon EDTI and the Commission over the entire PBR term. The incentive to overstate capital requirements violates PBR Principle 1. The significant regulatory burden violates PBR Principle 3.

157. While use of capital trackers as-is would provide a viable alternative for the treatment of capital additions, it has disadvantages that should not be ignored. Specifically, its incentive properties are not as strong as those in EDTI's Option 1 or Option 2 and it has a much higher regulatory burden when compared with both Option 1 and Option 2. For these reasons, EDTI's Option 1 provides a better overall alternative.

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[59] Appendix A, paragraph 103.

4.6 Conclusion

158. EDTI has demonstrated that under the second generation PBR Plan, as under the first generation Plan, EDTI will continue to incur a substantial capital funding shortfall that will have to continue to be addressed outside of the I-X component of the Plan through a supplemental or incremental capital funding mechanism.

159. For the reasons provided above, a combination of a K-bar (or F factor) approach and limited use of capital trackers represents the best alternative having regard to the Commission's PBR principles, including the objectives of incenting cost reducing behavior on the part of the utility, achieving allocative efficiency and reduced regulatory burden. These objectives are being met to varying degrees with capital trackers but can be enhanced with the elimination of retrospective capital tracker true-ups or the use of a K-bar approach.

5.0 CALCULATION OF RETURNS FOR REOPENERS

160. In its August 21, 2015 issues list, the Commission included the following[60]:

> 4. Calculation of returns for reopener purposes (Rule 005 returns vs. "final" returns based on the actual capital tracker amounts).

161. EDTI submits that the calculation of return on equity ("ROE") for reopener purposes should be based on the method of calculating ROE currently used under Rule 005, modified to include an adjustment for capital tracker revenue. An adjustment for capital tracker revenue is required due to the regulatory lag associated with capital tracker revenue and the resulting impact on the return on equity calculation. The regulatory lag has an impact on the ROE as currently reported under Rule 005 as there are differences in timing as to when capital tracker revenue is recognized in EDTI's financial statements and when capital tracker revenue is billed to EDTI's customers. These differences arise as a result of the lag inherent in reflecting AUC decision amounts in customer rates.

162. By way of example, under the current capital tracker process, there can be a lag of up to 3 years from the year in which a one-year capital project is first applied-for as a capital tracker to the time that the final capital tracker revenue amount is approved by the Commission and

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[60] Exhibit 20414-X0026, 2015-08-21 AUC Letter – Final Issues List.

reflected in customer rates (i.e., a project proposed in 2014 as a capital tracker for 2015 will be included in 2015 rates on a forecast basis, and the capital tracker revenue true-up will be incorporated into rates in 2017 following the approval of the true up application in 2016). Without an adjustment mechanism, ROE calculations would be imprecise and misleading, because they would be subject to increases and decreases related to the regulatory lag associated with finalizing the capital costs associated with trackers under the PBR Plan.

163. The adjustment for capital tracker-related revenue would involve updating the capital tracker revenue to a combination of, as applicable to each capital tracker project:

- The actual capital tracker amount for each project that has been approved by the Commission on a final basis through the capital tracker true-up application process.
- To the extent a final approved actual capital tracker amount for a tracker project is not available at the time the ROE calculation is made, EDTI's applied-for actual capital tracker amount for the project.
- To the extent that neither of the first two amounts is available at the time the ROE calculation is made, the Commission-approved forecast capital tracker amount for that tracker.
- To the extent that none of the first three amounts is available at the time the ROE calculation is made, EDTI's applied-for forecast capital tracker amount for the project.

164. The calculation of ROE for reopener purposes with the adjustment for capital tracker revenue would be made each year as of the date of the annual PBR rate adjustment filing. This calculated ROE, and only this calculated ROE, would be used for reopener purposes.

165. The proposed capital tracker revenue adjustment will ensure that the ROE calculation for reopener purposes reflects the best information respecting capital tracker revenues that is available at the time the ROE calculation is made.

166. EDTI proposes to reflect the capital tracker revenue adjustment, as described above, in the Return on Equity line in Schedule 2 of the Rule 005 template, which would then be filed annually with its annual PBR rate adjustment filing. EDTI would use the updated ROE dollar amount to recalculate its ROE percentage. The resulting adjusted ROE percentage would form the basis for calculating its ROE for reopener purposes.

167. Using 2015 as an example, EDTI would submit its Rule 005 filing for 2015 on May 1, 2016. The ROE in that filing would reflect an approved place holder for EDTI's capital tracker revenue for 2015. The approved placeholder was approved for inclusion in EDTI's 2015 DAS rates in Decision 2014-346. On September 10, 2016 EDTI would file its 2017 annual PBR rate adjustment filing. In that filing EDTI would include a calculation of the 2015 ROE for reopener purposes reflecting the 2014 true-up approved in Decision 20407-D01-2016 (for which EDTI expects to have a final decision on by September 10, 2016) and EDTI's 2015 forecast capital tracker amounts approved in Decision 3100-D01-2015. In this way the 2015 ROE for reopener purposes would utilize the most up to date, Commission-approved capital tracker amounts for 2015. While EDTI acknowledges that the ROE for 2015 will change once its 2015 trackers are approved on a final (actual cost) basis in a future 2015 tracker true-up application, EDTI submits that its proposed approach will result in a fair, reasonable and timely means of calculating an ROE for re-opener purposes.

Designing the Second-Generation PBR Framework: Commission Principles and Economic Foundations

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March 21, 2016

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1. Introduction

1.1 Professional Qualifications

1. My name is Dennis L. Weisman. I am Professor *Emeritus* of Economics at Kansas State University. My business address is P.O. Box 1646, Eagle, Colorado 81631.

2. I received a B.A. in economics and mathematics from the University of Colorado, an M.A. in economics from the University of Colorado, and a Ph.D. in economics from the University of Florida with a specialization in industrial organization and economic regulation. I have testified in numerous regulatory proceedings to the economic and social impacts of regulatory policies and have served as an advisor to telecommunications firms, electric power companies and regulatory commissions on economic pricing principles, the design of incentive regulation plans and competition policies.

3. In the United States, I have presented testimony or filed affidavits before regulatory commissions in Arkansas, California, Colorado, Florida, Kansas, Missouri, Oklahoma and Texas. I have also submitted testimony or filed affidavits with the Federal Communications Commission, the United States Court of Appeals for the District of Columbia and the Kansas State Legislature. In Canada, I have presented testimony before the Canadian Radio-Television and Telecommunications Commission and the Alberta Utilities Commission.

4. My primary research interests are in industrial organization, economic regulation and applied microeconomics. I have authored or co-authored more than one-hundred articles, books and book chapters. My research has appeared in the *Antitrust Bulletin*, *Economics Letters*, the *Journal of Regulatory Economics*, the *Yale Journal on Regulation*, the *Southern Economic Journal*, the *Journal of Policy Analysis and Management*, the *Journal of Competition Law and Economics* and the *Federal Communications Law Journal*. My research has also been cited by the U.S. Supreme Court,[1] and the United States Court of

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[1] Verizon Communications Inc. v. FCC, 535 U.S. 467 (2002).

Appeals for the District of Columbia.[2] I am the co-author of DESIGNING INCENTIVE REGULATION FOR THE TELECOMMUNICATIONS INDUSTRY, published by the MIT Press and the AEI Press in 1996, and THE TELECOMMUNICATIONS ACT OF 1996: THE "COSTS" OF MANAGED COMPETITION, published by Kluwer in 2000. I am also the author of PRINCIPLES OF REGULATION AND COMPETITION POLICY FOR THE TELECOMMUNICATIONS INDUSTRY - A GUIDE FOR POLICYMAKERS, which was published by The Center for Applied Economics in the College of Business at the University of Kansas in 2006.

5. I currently serve on the editorial boards of the *Journal of Regulatory Economics* and *Information Economics and Policy*. I previously served as an editor for the *Review of Network Economics*. In 2003, I served as a guest editor for a special issue of the *Review of Network Economics* on incentive regulation. Finally, I am a member of the Board of Academic Advisors for The Free State Foundation. My curriculum vitae provides a complete description of my academic and professional background.

1.2 Objectives and Overview

6. My direct testimony in this proceeding has four primary objectives. First, I provide the proper economic and public policy context for interpreting and applying the PBR (performance-based regulation) principles set out by the Alberta Utilities Commission (AUC). Second, I provide an overview of the EPCOR Distribution & Transmission Inc. PBR framework (hereafter, EDTI PBR) for the three main issues the Commission has identified for adjudication in this proceeding (Rebasing and the Establishment of Going-In Rates; Productivity Offset (X Factor) in the Next Generation of PBR; and The Treatment of Capital Additions).[3] Third, I demonstrate that the EDTI PBR is fully consistent with the AUC's PBR Principles and the relevant economics literature. Finally, throughout the analysis, I underscore key differences between the electric power and telecommunications sectors to assist the Commission in navigating through the complexities associated with designing the second-generation PBR regime.

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[2] Comcast Cable Communications v. FCC, 2013 U.S. App. LEXIS 10639.

[3] Alberta Utilities Commission, Generic Proceeding to Establish Parameters for the Next Generation of Performance-based Regulation Plans, Proceeding 20414, Final Issues List, August 21, 2015.

7. The remainder of my direct testimony is organized as follows. Section 2 reproduces the five principles that the AUC established to serve as guidelines for the PBR plans of the companies and discusses the alignment of EDTI's proposal with those principles and the relevant economics literature. An overview of EDTI's proposal with respect to the three main issues under consideration in this proceeding is contained in Section 3. Section 4 provides the economic rationale underlying EDTI's proposal on rebasing and the establishment of going-in rates. Section 5 provides the (theoretical) economic rationale underlying EDTI's proposal on the productivity offset (X factor) in the next PBR regime. Section 6 provides the economic rationale underlying EDTI's proposal on the treatment of capital additions. A brief summary and conclusion is presented in Section 7. Appendix 1 contains my curriculum vitae and Appendix 2 contains the academic analysis commissioned by EPCOR entitled "Assessing the Treatment of Capital Expenditure in Performance-Based Regulation Plans."

2. The Commission's PBR Principles

2.1 Statement of Principles

8. On July 15, 2010, the AUC issued Bulletin 2010-20 in which it articulated the guiding principles for PBR in Alberta. Because these principles are referenced throughout my evidence and are foundational to the analysis, they are reproduced below in their entirety.

The AUC's PBR Principles

Principle 1. A PBR plan should, to the greatest extent possible, create the same efficiency incentives as those experienced in a competitive market while maintaining service quality.

Principle 2. A PBR plan must provide the company with a reasonable opportunity to recover its prudently incurred costs including a fair rate of return.

Principle 3. A PBR plan should be easy to understand, implement and administer and should reduce the regulatory burden over time.

Principle 4. A PBR plan should recognize the unique circumstances of each regulated company that are relevant to a PBR design.

Principle 5. Customers and the regulated companies should share the benefits of a PBR plan.

2.2 Aligning EDTI's Proposal with the PBR Principles and the Economics Literature

9. EDTI's PBR proposal builds upon the strong foundation the AUC put in place with the first-generation PBR regime. The Commission recognized that "Regulatory policy can affect infrastructure investment differently than it affects innovative effort and investment designed to reduce operating costs."[4] As a result, the first-generation PBR regime combines elements of both price cap regulation (PCR) and rate of return regulation (RORR). EDTI's overarching objective in developing its proposal is therefore to (1) identify elements of the current PBR regime that can be improved upon in the sense of providing for more high-powered incentives for firm efficiency;[5] and (2) identify opportunities to improve regulatory efficiency by reducing the degree of regulatory intervention required over the term of the PBR regime.

10. The Commission identified three major issues to be addressed in this proceeding: (1) Rebasing and the Establishment of Going-In Rates; (2) Productivity Offset (X Factor) in the Next Generation of PBR; and (3) The Treatment of Capital Additions. EDTI seeks through its proposal in this proceeding to build upon the strengths and improve upon the few remaining weaknesses in the first-generation PBR regime. The primary objective of the EDTI PBR proposal is essentially to refine the first-generation PBR regime so that the second-generation PBR regime is more closely aligned with the AUC's PBR principles and the relevant economics literature.

11. The regulatory economics literature recognizes that a primary objective of economic regulation is to emulate a competitive market standard. To this end, Professor Alfred Kahn observes that "the single most widely accepted rule for the governance of the regulated industries is regulate them in such a way as to produce the same results as would be

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[4] Mark Armstrong and David E. M. Sappington, "Regulation, Competition and Liberalization," *Journal of Economic Literature* Volume XLIV, June 2006, p. 340.

[5] A high-powered regulatory regime is one in which the regulated firm is responsible for a large share of its actual costs. In contrast, a low-powered regulatory regime is one in which the regulated firm is typically able to affect a high degree of pass through of cost changes in the form of rate changes. See, for example, Jean-Jacques Laffont and Jean Tirole, A THEORY OF INCENTIVES IN PROCUREMENT AND REGULATION, Cambridge MA: The MIT Press, 1993, p. 11.

produced by effective competition, if it were feasible."[6] In similar fashion, Professor James Bonbright observes that "Regulation, then, as I conceive it, is indeed a substitute for competition; and it is even a partly imitative substitute."[7]

12. A natural question that presents itself concerns precisely what it is that economic regulation seeks to emulate in adopting a competition standard. In the following passage, Professor Bonbright discusses the various attributes of the competition standard and why dynamic efficiency should take precedence over static efficiency.[8]

> Under unregulated competition, the price system is supposed to function in two ways with respect to the relationship between the price of the product and the cost of production. In the first place, the rate of output of any commodity will so adjust itself to the demand that the market price will tend to come into accord with production costs. But in the second place, competition will impel rival producers to strive to reduce their own production costs in order to maximize profits and even in order to survive in the struggle for markets. This latter, dynamic effect of competition has been regarded by modern economists as far more important and far more beneficent than any tendency of "atomistic" forms of competition to bring costs and prices into close alignment at any given point of time.[9, 10]

13. In similar fashion, it is recognized that the focus of PCR is placed on fostering the process of innovation and discovery.

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[6] Alfred E. Kahn, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS, Volume I, New York: John Wiley and Sons, 1970, p. 17.

[7] James C. Bonbright, PRINCIPLES OF PUBLIC UTILITY RATES, New York: Columbia University Press, 1961, p. 107.

[8] Static efficiency entails both allocative and productive (technical) efficiency. Allocative efficiency refers to the relationship between the price of the service and the underlying marginal (incremental) cost of the service at any given point in time. Productive (technical) efficiency is concerned with production at the lowest possible cost. A firm is technically efficient if it (i) uses the minimum possible amount of inputs to produce its output; or, equivalently, (ii) produces the maximum possible amount of output from any given quantity of inputs. Dynamic efficiency is concerned with the optimal investment over time in capital formation, cost-reducing innovation and product innovation. Dynamic efficiency is particularly critical in infrastructure industries that serve as key drivers of economic growth.

[9] James C. Bonbright, PRINCIPLES OF PUBLIC UTILITY RATES, New York: Columbia University Press, 1961, p. 53.

[10] See also Richard Gilbert, "New Antitrust Laws for the 'New' Economy"? Testimony before the Antitrust Modernization Commission, November 8, 2005; and William F. Baxter, "The Definition and Measurement of Market Power in Industries Characterized by Rapidly Developing and Changing Technologies," *Antitrust Law Journal*, Volume 53, October 1984, pp. 717-732.

> It [RPI – X] does not assume costs and demands are given or known; indeed, the problem is to provide adequate incentives for the company to discover them. The aim is to stimulate alertness to lower cost techniques and hitherto unmet demands. The emphasis is on productive rather than allocative efficiency (and even the $RPI - X$ price caps reflects distributional rather than allocative considerations).[11]

14. In terms of the economic implications for the design of a PBR regime, these observations suggest that the Commission should be willing to accept some transitory distortions in static efficiency (prices that diverge from competitive levels) in order to encourage dynamic efficiency (optimal investment in innovation over time).[12] In point of fact, as discussed in greater detail below, this is the rationale underlying the Commission's decision to incorporate an efficiency carry-over mechanism (ECM) in the first-generation PBR regime.

3. Overview of EDTI's Proposal on the Three Major Issues

3.1 Rebasing and the Establishment of Going-In Rates

15. EDTI proposes two approaches for rebasing and the establishment of going-in rates. The standard approach is a full rebasing of rates at the end of the current PBR regime that incorporates the ECM. The innovative approach (EDTI's preferred Option 1) calls for rebasing using a simple average of actual financial results from 2014, 2015 and 2016 and also incorporates an ECM. Both approaches (i) seek to preserve to the greatest extent possible the desirable incentive properties of PBR while recognizing that some degree of "true-up" is warranted at the end of the first-generation PBR; and (ii) recognize and at least partially correct for the regulated firm's weakened incentives for efficiency as it

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[11] Michael. E. Beesley and Stephen. C. Littlechild, "The Regulation of Privatized Monopolies in the United Kingdom," *Rand Journal of Economics*, Volume 20(3), Autumn 1989, p. 467. See also Dennis L. Weisman and Johannes P. Pfeifenberger, "Efficiency as a Discovery Process: Why Enhanced Incentives Outperform Regulatory Mandates," *The Electricity Journal*, Volume 16(1), January/ February 2003, pp. 55-62.

[12] Professor Stephen Littlechild, who was the original proponent of price cap regulation in the U.K. and also presided over its implementation, observes that the focus of price cap regulation was not cast in traditional negative terms—the "prevention of excess profits"—but rather on improving efficiency and expanding the range of profitable opportunities through innovation and discovery. Stephen Littlechild, "The Birth of RPI-X and Other Observations," in Ian Bartle (ed.), THE UK MODEL OF UTILITY REGULATION, London: CRI, September 2003, pp. 31-49.

approaches the end of the PBR regime.

3.2 Productivity Offset (X Factor) in the Next Generation of PBR

16. EDTI's proposal for the productivity offset (X factor) is to adopt a forward-looking approach rather than an historical approach. It is axiomatic that economic regulation should seek to emulate, however imperfectly, a competitive market outcome. To that end, this approach recognizes that competitive markets compel firms to pass along realized industry productivity gains to consumers in the form of lower prices for goods and services. To the extent that this approach more accurately captures the achievable productivity gains of industry suppliers going forward, it offers the added benefit of potentially reducing the overall capital funding shortfall that must be addressed through capital tracker applications or a similar mechanism.

3.3 Treatment of Capital Additions

17. EDTI proposes two options for the treatment of capital additions. The first option seeks to provide for revenue sufficiency for the regulated firm operating in a steady-state environment through a modification of the basic price cap formula and thereby limit capital trackers over the course of the PBR regime to extraordinary, idiosyncratic investments of the type that were envisioned in the 2012 PBR proceeding. The second option modifies the Commission's current capital tracker approach with a true-up process that seeks to put in place more high-powered incentives for efficiency. Two alternatives for the true-up process are proposed and evaluated for the second option.

4. Rebasing and the Establishment of Going-In Rates

4.1 Historical Practice: Rebasing Rates Prior to Second-Generation PBR

18. It is standard practice for an incentive regulation plan to be reviewed after some stipulated period of time. This review may be limited to a reexamination of the parameters of the price cap formula, such as the X factor, or entail a recalibration of the regulated firm's rates to achieve a target rate of return. Recalibrating rates to achieve a target rate of return gives rise to inefficient and possibly strategic behavior, including cost-shifting and sub-optimal investment in cost-reducing innovation, not unlike those associated with traditional earnings sharing. Traditional earnings sharing can be thought of in terms of a "tax" on the

firm's earnings over the course of the PBR regime. The true-up of rates to a target rate of return can be thought of in terms of a "tax" on the firm's earnings at the end of the PBR regime.

19. The regulated firm will have less than ideal incentives to innovate and discover efficiencies if it believes that the regulator will simply claw back these efficiency gains and pass them on to consumers in the form of lower rates. These adverse incentives are particularly pronounced toward the end of the PBR regime. These weakened incentive derive from the fact that the regulated firm's expected returns from investment in productivity enhancing innovation are truncated toward the end of the PBR regime because the fruits of its cost-reducing efforts are retained for a relatively short period of time. The Commission adopted an ECM in the first-generation PBR regime to address these concerns.[13]

20. There are countervailing incentives that should be taken into account. A full true-up of rates to a target rate of return provides weaker incentives for cost reduction, but also decreases the period of time over which prices may diverge from competitive levels. A limited true-up of rates to a target rate of return provides stronger incentive for cost-reduction, but also increases the period of time over which prices may diverge from competitive levels.[14]

21. In essence, the tradeoffs at work are those between static and dynamic efficiency. The less complete the true-up of earnings at the end of the PBR regime, the more high-powered the regulatory regime and the stronger the firm's incentives to invest in cost-reducing

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[13] In its 2012 PBR Decision, the AUC made the following observations.

> A company's incentive to find efficiencies weakens as the end of the PBR term approaches, because there is less time remaining for the company to benefit from any efficiency gains. The purpose of an efficiency carry-over mechanism (ECM) is to address this problem by permitting the company to continue to benefit from any efficiency gains after the end of the PBR term.

Alberta Utilities Commission, *Rate Regulation Initiative: Distribution Performance-Based Regulation*, Decision 2012-237, September 12, 2012, ¶ 759.

[14] For a discussion of the relevant tradeoffs in setting the length of the price cap plan, see David E. M. Sappington, "Price Regulation" in Martin Cave, Sumit Majumdar, and Ingo Vogelsang, eds. HANDBOOK OF TELECOMMUNICATIONS ECONOMICS, Amsterdam: North-Holland, 2002, Chapter 7, pp. 251-252.

innovation. Conversely, when there is a full true-up of rates at the end of the PBR regime, the differences between PCR and RORR are less pronounced.

> As a rough characterization, under rate-of-return regulation reviews are infrequent, and the regulatory lag is endogenous because either side can request a review, whereas under price caps the lag is relatively long, and the date of the next review is fixed in advance. The difference is one of degree rather than kind.[15]

4.2 EDTI's Proposed Approach

22. EDTI proposes two approaches for rebasing and the establishment of going-in rates. The standard approach calls for a true-up of earnings to a target rate of return at the end of the PBR regime. The innovative approach (EDTI's preferred Option 1) proposes that going-in rates for the second PBR regime be based on a simple average of actual financial results for the intermediate years of the first-generation PBR regime. Each of these approaches are discussed in turn.

4.2.1 Standard Approach – Full Rebasing and Incorporation of ECM

23. The standard approach contemplates a true-up of earnings at the end of the PBR regime based on a 2018 forward test year combined with the ECM. There are both advantages and disadvantages associated with this approach. The advantages include the following. First, this is the first PBR regime initiated by the AUC for the electric power and natural gas industry. The design of an incentive regulation regime is a complex undertaking. Consequently, there can be no guarantee that the first-generation PBR regime produced a set of rates that satisfies the multi-faceted objectives articulated in the Commission's PBR principles. Hence, a full rebasing provides the Commission with an opportunity to correct any "errors on the field of play" identified in the course of the first-generation PBR regime.

24. Second, the standard approach provides the Commission with an opportunity to recalibrate the PBR parameters that govern the changes in those rates over time. The standard approach therefore enables the Commission to ensure that any identified rate distortions that inadvertently follow from the first-generation PBR regime are not compounded and

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[15] Mark Armstrong, Simon Cowan and John Vickers, REGULATORY REFORM, Cambridge MA: The MIT Press, 1994, p. 172.

carried over into the second-generation PBR regime. Third, incorporating the ECM into the rebasing process mitigates some of the adverse incentive effects associated with a full true-up of rates to a target rate of return at the end of the PBR regime.

25. Fourth, a full rebasing of rates to achieve a target rate of return was the standard practice following the first-generation incentive regulation plans in the telecommunications industry. The case for rebasing in the electricity sector would appear to be even stronger. To wit, while competition is increasing in certain segments of the electric power industry (e.g., generation), the overall level of competitive intensity in the transmission and distribution sectors of the industry pales in comparison with the pervasive competition that has characterized the telecommunications industry over the last quarter century.

26. This increasing competitive intensity in the telecommunications industry led to fundamental changes in the structure of incentive regulation plans, including less stringent X factors that were no longer tied directly to productivity and input price growth differentials, limited or no true-up of earnings and longer duration, even open-ended, incentive regulation regimes. These changes reflect the fact that regulators in the telecommunications industry were working with a “safety net” of sorts in that errors in setting the parameters for the regulatory regime would presumably be self-correcting at the hand of market forces.[16] The reality is that there is no analogous safety net operating in the electric power sector at the present time.

27. The disadvantages associated with the standard approach include the following. First, the full rebasing of rates amounts to what is essentially a comprehensive rate case for each of the Alberta utilities. As the Commission is well aware, this is an unavoidably long and burdensome process that may not satisfy the objective for regulatory efficiency (AUC PBR Principle 3). This observation notwithstanding, it is possible that the Commission would not have to engage in a similar process at the end of the second-generation and subsequent generation PBR plans given the increased confidence in the validity of the price cap

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[16] David, E. M. Sappington and Dennis L. Weisman, “Price Cap Regulation: What Have We Learned from Twenty-Five Years of Experience in the Telecommunications Industry?” *Journal of Regulatory Economics*, Volume 38(3), December 2010, p. 227-257.

parameters that would be expected to develop over time. In addition, subsequent generation PBR plans may well be of longer duration.

28. Second, as the companies approach the end of the PBR regime, the incentives for efficient behavior begin to comport more closely with those of traditional RORR and less closely with those of PCR. These weakened incentives derive from the fact that the regulated firm's expected return from investment in productivity enhancing innovation are truncated toward the end of the PBR regime because the fruits of its cost-reducing efforts are retained for a relatively short duration. In addition, the regulated firm will have less than ideal incentives to: (1) operate with the least-cost technology; (2) operate with no waste; (3) diversify efficiently into new markets; (4) undertake efficient levels of cost-reducing innovation; (5) report its costs truthfully;[17] and (6) eliminate abuse.[18] Of course, the ECM will mitigate these adverse incentives to some degree by allowing the regulated firm to retain some portion of earnings in excess of the target rate of return for a limited period of time.

29. Third, it may be difficult to reconcile a full rebasing of rates with AUC PBR Principle 1 in that the incentive structure will not in general reflect that of a competitive marketplace. The full rebasing of rates incorporates a "make-whole" property that is not present in competitive markets. Again, the ECM will serve to mitigate these concerns to some degree.[19]

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[17] Ronald Braeutigam and John C. Panzar, "Diversification Incentives Under 'Price-Based' and 'Cost-Based' Regulation," *Rand Journal of Economics*, Volume 20(3), 1989, pp. 373-391. See also Dennis L. Weisman, "Superior Regulatory Regimes in Theory and Practice," *Journal of Regulatory Economics*, Volume 5(4), December 1993, pp. 355-366.

[18] In this context, abuse refers to resources consumed by the regulated firm for which the realized costs exceed the benefits. In other words, abuse represents expenditures on resources that the regulated firm would not undertake if it had to bear their full cost. See Glenn Blackmon, INCENTIVE REGULATION AND THE REGULATION OF INCENTIVES, Boston MA: Kluwer Academic Publishers, 1994.

[19] The Commission adopted an asymmetric ECM for the first-generation PBR regime. There is no true-up of earnings in the event of deficient returns, but fifty percent of any excess returns can be carried over into the second-generation PBR regime for a period of two years. Alberta Utilities Commission, Decision 2012-237, September 12, 2012, ¶¶ 775-776.

30. In conclusion, a full rebasing of rates at the end of a first-generation PBR regime is standard fare and there are compelling arguments for not departing from this practice. The Commission’s concerns about the reduced incentives for efficiency as the PBR term draws to a close are well-founded, but the ECM can be expected to mitigate these concerns to a certain degree. Nonetheless, this approach requires the Commission to conduct comprehensive rate cases for each of the utilities at the end of the first-generation PBR which may run counter to the objective of regulatory efficiency.

4.2.2 Innovative Approach – Rebasing with Average of Intermediate Year Actuals

31. The rebasing process contemplated with the standard approach would make use of a 2018 forward test year. With the innovative approach (EDTI’s preferred Option 1), the rebasing process would be based on an average of actual OPEX financial results in 2014, 2015 and 2016. The CAPEX financial results would already be known to the Commission as part of the capital tracker process which explains the focus on OPEX.

32. It is instructive to explain the rationale underlying the choice of the years 2014, 2015 and 2016 for the rebasing process. The year 2013 is excluded because it is the first year of the PBR regime and the company would not have been able to respond fully to the high powered incentives under PCR in terms of implementing all of the anticipated efficiency improvements. The year 2017 is likewise excluded because the company would have foreknowledge in 2017 of the rebasing rule and hence there may be incentives for inefficient and strategic behavior. It is for these reasons that only the intermediate years of the PBR regime (i.e., 2014, 2015 and 2016) survive the sorting process and are considered admissible.

33. The analysis now turns to the weights to be placed on each of the three admissible years. Let $w^i > 0$ denote the weight associated with year i of the PBR regime. The default weighting rule places equal weights on each year so that $w^{14} = w^{15} = w^{16} = ⅓$ and $w^{14} + w^{15} + w^{16} = 1$. This uniform weighting rule is EDTI’s preferred option. It is natural to inquire, however, as to whether there is a principled basis for departing from the uniform weighting rule and the various tradeoffs that this may entail.

34. In the last of the three admissible PBR years, 2016, it is conceivable that the company would have foreknowledge of the weighting structure that would be proposed and therefore could strategically alter its behavior to maximize expected returns. While this possibility cannot be ruled out completely it would seem to be a low probability event since there would be no guarantee that the Commission would actually accept the weighting structure proposed by the company. This suggests that the Commission assign a medium weight to 2016.

35. In the first of the three admissible PBR years, 2014, the company may still not have fully implemented all of the anticipated efficiency improvements. Hence, 2014 does not score particularly high as a model year for high-powered incentives. As a result, the Commission should opt for a somewhat lower weight on 2014.

36. Finally, the weight attached to the admissible year 2015 should be relatively high. This is the case for two primary reasons. First, the company would have implemented the vast majority of its efficiency improvements by this time. Second, the company would not have had foreknowledge of the rule that would be used for purposes of rebasing. Hence, if the Commission chooses to depart from a uniform weighting structure for the reasons discussed above, one possible alternative is the following: $w^{14} = 0.15$, $w^{15} = 0.5$ and $w^{16} = 0.35$.

37. The ranking of high-powered incentives and the associated year weights are illustrated in Table 1, where **L**, **M** and **H** correspond to low, medium and high, respectively. For example, the admissible year 2015 corresponds to high incentives for efficiency and therefore a high year weight. In contrast, the admissible year 2014 corresponds to low/medium incentives for efficiency and therefore a low year weight. Based on this analysis, if the Commission opts to depart from EDTI’s preferred option of a uniform weighting rule, it should assign the highest weight to 2015, the lowest weight to 2014 and a medium weight to 2016. Years 2013 and 2017 should receive zero weight for the reasons discussed above.

PBR Year	**2013**	**2014**	**2015**	**2016**	**2017**
High-Powered Incentives	**L**	**L/M**	**H**	**H/M**	**L**
Specific Year Weight	**Zero**	**Low**	**High**	**Medium**	**Zero**

Table 1. Optimal Weighting Structure for Rebasing

38. There are both advantages and disadvantages associated with the innovative approach and these are discussed in turn. The advantages include the following. First, omitting years 2013 and 2017 can mitigate some of the adverse incentive effects associated with a full true-up based on the actual financial results at the end of the PBR regime. Hence, this approach would seemingly be more consistent with AUC PBR Principle 1. This is the case because the admissible years are limited to those for which the firm would (i) have been able to respond to the high-powered incentives under PCR; and (ii) not have had foreknowledge of the weighting rule used for rebasing and therefore would not have incentives to engage in inefficient or strategic behavior.

39. Second, this approach mitigates to some degree the financial "make-whole" provision associated with the standard approach. In other words, there would be no assurances that the company's financials would be trued-up to an actual target rate of return at the end of the first-generation PBR regime. Third, this approach eliminates the burdensome rate cases that the Commission would have to conduct for each of the utilities at the end of the PBR regime (provided the Commission does not attempt to "re-engineer" the actual financial results).[20]

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[20] In this context, the term "re-engineer" refers to any attempt by the Commission to second guess the operating decisions of the company for purposes of altering the actual financial metrics. This was a problem in the telecommunications industry with PCR regimes that incorporated earnings sharing. See, for example, Alberta Utilities Commission, Rate Regulation Initiative, Application No. 1606029, Proceeding ID No. 566, Proceedings, Volume 10, April 27, 2012, p. 1887; and David, E. M. Sappington and Dennis L. Weisman, "Price Cap Regulation: What Have We Learned from Twenty-Five Years of Experience in the Telecommunications Industry?" *Journal of Regulatory Economics*, Volume 38(3), December 2010, p. 246. The problem arises from the fact that disallowing costs raises the reported rate of return which, in turn, forces the regulated firm to share more of its actual earnings with consumers.

40. The disadvantages of this approach include the following. First, because the true-up is not based on a simple average of the actual financials over the course of the PBR regime, there will necessarily be a variance in actual returns across the utilities—both above and below the target rate of return. Second, there can be no guarantee that this approach will provide each utility with a reasonable opportunity to recover its prudently incurred costs and earn a fair rate of return (AUC PBR Principle 2). Third, the absence of a true-up based on the actual financial results at the end of the PBR regime may cause some parties to question whether the resulting rates are "just and reasonable."[21] In certain instances, the rates may be too high and in other instances they may be too low compared to rates based on the actual financial results at the end of the PBR regime.

41. In a very real sense, this last concern is a red herring. To illustrate, suppose that a firm with high-powered incentives has an incremental cost for the service it provides of 10 whereas a firm with low-powered incentives has an incremental cost for the service it provides of 12. A rate of 11 for the firm with high-powered incentives might not be considered "just and reasonable" because the regulated firm realizes a positive margin whereas the rate of 12 for the regulated firm with low-powered incentives might be considered "just and reasonable" because the firm does not realize a positive margin. The irony is that consumers are actually worse off with the rate that satisfies the "just and reasonable" standard in this example.

42. It is critical that the Commission not go back to the years, 2014, 2015 and 2016 in order to second guess the company's operations in an attempt to rewrite history. The "actuals" from these years are presumptively efficient because the regulated firm operates under a high-powered regulatory regime.[22,23] As a result, the Commission can be assured that the

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[21] This example underscores the fundamental problem with the use of a cost standard to determine whether rates are "just and reasonable." See, for example, Alfred E. Kahn, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS, Volume I, New York: John Wiley and Sons, 1970, pp. 28-31; and Jordan Jay Hillman and Ronald Braeutigam, PRICE LEVEL REGULATION FOR DIVERSIFIED PUBLIC UTILITIES, Boston MA: Kluwer Academic Publishers, 1989, pp. 80-81.

[22] The superior incentive properties of price cap regulation derive in large measure from breaking the link between allowed earnings and costs. Specifically, because the regulated firm retains the entirety of its efficiency improvements beyond those guaranteed *ex ante* through the X factor, it has ideal incentives to strive for maximum efficiency.

regulated firm would enlist its informational advantage to improve operating efficiency in a manner that closely approximates competitive market conditions (AUC PBR Principle 1).

43. Any residual concerns that the Commission may harbor with respect to the admissible years 2014 and 2016 should be addressed by altering the weights attached to these years rather than by "re-engineering" the actual OPEX financials. It should be recognized that this approach is designed to avoid weakening incentives for superior performance that typically accompanies the end of a PBR regime. The ECM is retained with this approach as a reward to the firm for superior performance, but the computation of the carryover amount would be based on the three intermediate years of the PBR regime rather than a simple average of all five years of the PBR term.

44. Applying the ECM in this manner gives rise to the following performance properties. First, the cost benchmark for informing the going-in rates for the second-generation PBR regime is based on what are presumptively the highest efficiency years of the first-generation PBR regime. This has the effect of minimizing the cost benchmark for the second-generation PBR. Second, the highest efficiency years of the first-generation PBR regime may also represent the highest ROE years since lower costs imply higher returns, *ceteris paribus*. The lower cost base is coupled with a potentially higher efficiency carryover percentage.

45. In conclusion, the innovative approach preserves the desired incentives for firm efficiency (AUC PBR Principle 1) and alleviates the need for the Commission to conduct comprehensive rate cases for each of the utilities at the end of the PBR regime which, in turn, promotes regulatory efficiency (AUC PBR Principle 3). The rate that consumers pay for the service can be partitioned into a CAPEX rate component and an OPEX rate component. The OPEX rate component is based on what are presumptively the three most

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[23] Even under a relatively low-powered regulatory regime, such as RORR, the regulator does not so much determine that the regulated firm's costs are prudent as it does that they are not imprudent. In other words, the costs incurred by the regulated firm are presumptively prudent absent credible evidence to indicate that they are not. See Alfred E. Kahn, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS, Volume I, New York: John Wiley and Sons, 1970, pp. 28-31. See also Alberta Utilities Commission, 2012 Performance-Based Regulation Capital Tracker Filings, Application No. 1608827, Proceeding ID No. 2131, Proceedings, Volume 6, July 16, 2013, pp. 1049-52.

efficient years of the first-generation PBR regime, which is a benefit to consumers. The return in the CAPEX rate component reflects the ECM calculated on the basis of what are potentially the highest ROE years of the first-generation PBR regime, which is a benefit to the regulated firm. This approach therefore allows both "customers and the regulated companies" to "share the benefits of a PBR plan" (AUC PBR Principle 5).

5. Productivity Offset (X Factor) in the Next Generation of PBR[24]

46. The discussion and analysis of the X factor is partitioned into theoretical issues and empirical issues. My evidence addresses the theoretical issues while Dr. Meitzen's evidence addresses the corresponding empirical issues.

5.1 The Theory Underlying the X Factor

47. At the outset of a price cap regime, the regulated firm's prices are typically set to generate a stipulated target rate of return. Prices, P, are then permitted to increase, on average, at the rate:

$$\dot{P} = I - X + \mathrm{Z}\,. \tag{1}$$

48. The I in equation (1) is an economy-wide measure of retail price inflation. X is the productivity offset,[25] which reflects the extent to which productivity in the regulated industry is expected to increase more rapidly and industry input prices are expected to increase less rapidly than in the economy as a whole.[26] [When an input price inflation measure rather than an output price inflation measure is used in equation (1), which is the case in the AUC's current PBR plan, X represents industry productivity growth rather than the productivity growth differential.] In competitive markets, average industry productivity gains and reduced rates of input price growth are passed along to consumers in the form of

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[24] The discussion in this section is based, in part, on David E. M. Sappington and Dennis L. Weisman, "The Disparate Adoption of Price Cap Regulation in the U.S. Telecommunications and Electricity Sectors," *Journal of Regulatory Economics*, June 2016 forthcoming; and David E. M. Sappington and Dennis L. Weisman, "The Price Cap Regulation Paradox in the Electricity Sector," *The Electricity Journal*, April 2016 forthcoming.

[25] Jeffrey Bernstein and David E. M. Sappington, "Setting the X Factor in Price Cap Regulation Plans," *Journal of Regulatory Economics*, Volume 16(1), July 1999, pp. 5-25.

[26] For ease of exposition subsequent discussion of the X factor will not explicitly reference the relevant differences in input price growth rates.

lower prices. The price cap formula and the X factor in particular is designed to approximate this competitive process.

49. The exogenous factor (Z) in equation (1) permits adjustments to the authorized rate of price increase in response to certain changes in the firm's costs (or revenues) that reflect exogenous departures from historic experience.[27] Z factor adjustments effectively introduce an element of RORR into PCR, but only for unusual, exogenous events rather than for all of the firm's activities.

50. Equation (1) indicates that the economy as a whole effectively serves as a benchmark for the regulated firms under this form of PCR. If industry productivity is expected to increase at the same rate that economy-wide productivity increases, then absent Z factor adjustments the regulated firms are permitted to increase their prices at the same rate that prices increase elsewhere in the economy. In contrast, if regulated firms are deemed capable of achieving more rapid productivity growth than other firms in the economy, then the regulated firms are required to pass this differential productivity growth onto consumers in the form of prices that increase less rapidly than prices elsewhere in the economy.

51. The X factor (productivity offset) in a price cap plan determines the maximum rate at which the inflation-adjusted prices of the firm's regulated services can increase, on average, each year until the price cap plan is reviewed. For example, if the rate of inflation is 3% and the X factor is 2%, the price cap formula would permit the regulated firm to raise prices on average a maximum of 1% (= 3% – 2%) per year, *ceteris paribus*.

52. In Canada and the United States, the development of the X factor tends to be more mechanistic in nature, with explicit linkages to productivity and input price growth, compared to Europe and the United Kingdom, in particular. This may be explained, in part, by the fact that a more mechanistic approach may help North American regulators, who

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[27] Z factor adjustments typically require that the relevant event: (i) be beyond the control of the regulated firm (i.e., exogenous); (ii) be of sizable financial magnitude; and (iii) affect the regulated firm disproportionately, so that its financial impact is not fully reflected in the inflation index in the prevailing price cap formula. Examples of events that can trigger Z factor adjustments include changes in tax policy, natural disasters, and major changes in regulatory policy.

typically operate in more litigious environments, to reduce the risk that their decisions would be overturned by the courts.[28]

53. When changes in the X factor are conditional on the regulated firm's actual performance, the regulatory regime is said to incorporate a "ratchet effect" and the firm's incentives for superior performance are adversely affected as a result.[29] To illustrate the nature of the incentive problem associated with a "ratchet effect," suppose the X factor is initially set at 2% and the regulated firm works diligently to discover opportunities to innovate and improve operating efficiency. As a result of these efforts, the regulated firm is able to realize efficiency gains of 3% per year. The regulator, having observed that the firm is able to realize efficiency gains at a rate that exceeds the X factor, determines that the X factor can safely be ratcheted upward, the effect of which is to further reduce the rate of increase in the prices that consumers pay.

54. The regulated firm learns over time that "no good deed goes unpunished" in that greater effort to secure efficiency gains will simply be appropriated by the regulator in the form of lower rates to consumers. This type of strategic behavior undermines the regulated firm's incentives to discover and implement efficiency improvements consistent with the competitive market benchmark (AUC PBR Principle 1).[30]

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[28] Professors Beesley and Littlechild observe that regulators in the UK typically are not required to justify in full detail every element of their decisions. See Michael Beesley and Stephen Littlechild, "The Regulation of Privatized Monopolies in the United Kingdom," *RAND Journal of Economics*, Volume 20(3), Autumn 1989, pp. 454-472. Indeed, Professor Stephen Littlechild, the original proponent of PCR in the UK, viewed the X factor as "a number to be negotiated." Stephen Littlechild, "Regulation of British Telecommunications' Profitability," Report to the Secretary of State, Department of Industry, February 1983, ¶13.17.

[29] This practice is sometimes referred to as "moving the goal posts." See Dennis L. Weisman, "Is There '*Hope*' for Price Cap Regulation," *Information Economics and Policy,* Volume 14(3), September 2002, pp. 349-70.

[30] In order to preserve ideal incentives for cost-reducing innovation, it is necessary for the regulated firm to perceive that the X factor is invariant to its own performance—what is sometimes referred to as the immutability condition. This condition is satisfied if the criteria for adjustments to the X factor exclude data on the firm's own performance. Alternatively, this condition is satisfied if the regulated firm's share of total industry output is so small that it perceives no direct linkage between its own performance and that of the industry. See Andrei Schleifer, "A Theory of Yardstick Competition," *Rand Journal of Economics*, Volume 16(3), 1985, pp. 319-327.

55. It is important to recognize that all five of the AUC's PBR principles come into play in informing the proper development of the X factor and the properties that it should satisfy. For example, an X factor that is too high can undermine incentives for efficiency (AUC PBR Principle 1),[31] deprive the regulated firm of a reasonable opportunity to recover its prudently incurred costs (AUC PBR Principle 2), and fail to recognize the unique circumstances of the regulated companies and hence result in an excessive capital funding shortfall (AUC Principle 4).

56. An X factor that is too low fails to share equitably the benefits of PBR between consumers and the regulated firm (AUC PBR Principle 5). Finally, the X factor should be developed in accordance with a rigorous, coherent and accepted methodology that is transparent and produces results that can be replicated (AUC PBR Principle 3).

5.2 The Theory Underlying the Stretch Factor

57. Regulators have recognized that past performance may not always be the best predictor of future performance, especially during an initial transition from RORR to PCR. Indeed, one reason for replacing RORR with PCR is to motivate regulated firms to discover new ways to reduce their operating costs and enhance productivity.[32] Consequently, some regulators have added a stretch factor (S) (sometimes referred to as a "consumer productivity dividend") to the basic price cap formula, particularly when PCR is first implemented.[33]

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[31] Luis M.B. Cabral and Michael H. Riordan, "Incentives for Cost Reduction Under Price Cap Regulation," *Journal of Regulatory Economics*, Volume 1, 1989, pp. 93-102. An X factor that is too high can dampen incentives for investment in cost-reducing effort and cause the regulated firm to exercise the option of the re-opener triggered by chronically low financial returns. See Alberta Utilities Commission, Decision 2012-237, ¶ 737.

[32] Michael. E. Beesley and Stephen. C. Littlechild, "The Regulation of Privatized Monopolies in the United Kingdom," *Rand Journal of Economics*, Volume 20(3), Autumn 1989, pp. 454-472; Dennis L. Weisman and Johannes P. Pfeifenberger, "Efficiency as a Discovery Process: Why Enhanced Incentives Outperform Regulatory Mandates," *The Electricity Journal*, Volume 16(1), January/February 2003, pp. 55-62; and Stephen Littlechild, "The Birth of RPI-X and Other Observations," in Ian Bartle (ed.), THE UK MODEL OF UTILITY REGULATION: A 20TH ANNIVERSARY COLLECTION TO MARK THE 'LITTLECHILD REPORT' – RETROSPECT AND PROSPECT, London: University of Bath, July 2003, pp. 31-50 (http://www.bath.ac.uk/management/cri/pubpdf/Conference_seminar/31_Model_Utility_Regulation.pdf).

[33] The AUC instituted a stretch factor of 0.2 in its 2012 PBR plan for electricity and natural gas suppliers. Alberta Utilities Commission, Decision 2012-237, ¶ 499.

58. The stretch factor is an estimate of the extent to which the productivity growth rate in the regulated industry is expected to increase above historic levels due to the enhanced incentives for efficient operation under PCR.[34] Thus, under a common first-generation price cap regime, the regulated firm's prices are permitted to rise, on average, at the rate:

$$\dot{P} = I - X_h + Z - S = I - (X_h + S) + Z, \tag{2}$$

where X_h is the rate at which productivity growth in the regulated industry has exceeded historical productivity growth in the aggregate economy. The term $(X_h + S)$ in equation (2) may be interpreted as the efficient historical productivity offset. This is the differential productivity growth rate that would have been observed if industry suppliers had been operating efficiently.

59. Whatever the case for a stretch factor in a first-generation PBR regime, the case for its inclusion in subsequent generation plans is correspondingly weaker. The standard rationale is that the low-hanging fruit, in the form of discovering and implementing lower-cost production techniques, has already been picked and whatever opportunities remain are considerably more difficult to secure. To be clear, this does not imply that the industry suppliers are becoming less efficient, but rather that the rate at which they are becoming more efficient has leveled off. In addition, the inclusion of a stretch factor in the second-generation PBR regime would likely serve to exacerbate the overall capital funding shortfall.

5.3 The Forward-Looking *X* Factor

60. A forward-looking X factor is the productivity growth differential that would be expected to prevail if industry suppliers, on average, operated efficiently over the course of the subsequent PBR regime. PCR of the form summarized in equation (2) can allow a regulated firm to secure extra-normal earnings if it can realize productivity growth rates that exceed historic growth rates. In contrast, this form of regulation can constrain the

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[34] Although the stretch factor often accounts for changes in incentives that are expected to lead to higher levels of realized productivity growth, it typically does not account for likely changes in maximum attainable industry productivity growth. This can be problematic for electric utilities because the combination of declining demand and environmental mandates can reduce maximum attainable industry productivity growth rates below historic levels.

firm's earnings unduly if the firm is incapable of achieving historic productivity growth rates.

61. At the time when PCR adoption was increasing most rapidly in the U.S. telecommunications sector, sustained or increasing productivity growth rates often were feasible for two primary reasons. First, the demand for communications services was increasing. Second, information processing costs (which are a key component of the costs of supplying switched telecommunications services) were declining.[35] Increasing output levels and declining input costs both promote increasing productivity growth rates.[36]

62. Corresponding demand-increasing and cost-reducing forces have not been as prevalent in the transmission and distribution components of the electricity sector in recent years.[37] In addition, stagnant or declining demand can cause productivity growth rates to fall below historic levels, particularly when fixed costs account for a large proportion of total production costs. This is the case because costs do not decrease proportionately with the decrease in demand.[38]

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[35] Moore's Law describes the rapid decline in the cost of computing power, which translates directly into reduced costs of supplying switched telecommunications services. As Nuechterlein and Weiser observe, Moore's Law roughly states that "the cost of a given amount of computing power halves every 18 months." Jonathan Nuechterlein and Philip Weiser, DIGITAL CROSSROADS. Cambridge MA: The MIT Press, Second Edition, 2013, p. 149. See also Bret Swanson, "Moore's Law at 50: The Performance and Prospects of the Exponential Economy," American Enterprise Institute, November 2015.

[36] As Mitchell and Vogelsang observe, "In telecommunications networks, production facilities have well-determined capacities, and the costs of operation are nearly independent of the flow of services through those facilities." As a result, productivity increases as output increases. Bridger Mitchell and Ingo Vogelsang, TELECOMMUNICATIONS PRICING: THEORY AND EVIDENCE. New York: Cambridge University Press, 1991, p. 9.

[37] Joskow concludes that "the opportunities for cost savings [in the U.S. electricity sector] in the medium run are significant, but not enormous." Paul Joskow, "Restructuring, Competition and Regulatory Reform in the U.S. Electricity Sector," in Hung-Po Chau and Hillard Huntington (eds.), DESIGNING COMPETITIVE ELECTRICITY MARKETS, New York: Springer Science and Business Media, 1998, p. 17.

[38] It is noteworthy that since the mid-1990s in the U.S., electricity consumption has not increased proportionately with economic output, which represents a reversal of a long-term trend. Richard Hirsh and Jonathan Coomey, "Electricity Consumption and Economic Growth: A New Relationship with Significant Consequences?" *The Electricity Journal*, Volume 28(9), November 2015, pp. 72-84.

63. The limited growth in demand for electricity in recent years reflects in part concerted efforts by policymakers to promote energy conservation. Although the price reductions and corresponding increased consumption that PCR can promote may be highly valued in the telecommunications sector, they are often viewed less favorably in the electricity sector because they can work at cross purposes with efforts to promote energy conservation.

64. It is apparent that the standard implementation of PCR in equations (1) and (2) can impose considerable earnings risk on the regulated firm if industry productivity growth rates are subject to substantial variation over time.[39] To limit this risk, the standard implementation of PCR can be modified to incorporate a forward-looking, industry factor (F_I). This "F_I factor" is the difference between the historic (X_h) productivity offset and the corresponding future offset (X_f) that is expected to prevail if industry suppliers operate efficiently. Formally:

$$F_I \;=\; X_h - X_f \;=\; \Delta X.^{40} \tag{3}$$

65. When the F_I factor is added to the basic price cap formula in equation (1), industry prices are permitted to increase at the rate:

$$\dot{P} \;=\; I - X_h + Z + F_I = \; I - X_h + Z + \Delta X \;=\; I - X_f + Z. \tag{4}$$

66. The maximum permissible rate of price increase under the formula in equation (4) exceeds the corresponding rate under the standard price cap formula in equation (1) when the estimated future productivity offset (X_f) is less than the offset that reflects historic data (X_h). Therefore, use of a F_I factor (i.e., a forward-looking X factor) may address, in

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[39] Professors Crew and Kleindorfer recognize that the implementation of PCR may transcend the standard price cap equations in (1) and (2). Specifically, they note that the identification of a properly calibrated X factor "involves a number of issues beyond productivity" (p. 218) and "requires considerable judgement" (p. 220). Michael Crew and Paul Kleindorfer, "Incentive Regulation in the United Kingdom and the United States: Some Lessons," *Journal of Regulatory Economics,* Volume 9(3), May 1996, pp. 211-226.

[40] The forward-looking, industry factor can also be expressed as $F_I = -S + [(X_h + S) - X_f]$, where S is the (stretch factor) adjustment for the difference in incentives under PCR and RORR, and $(X_h + S) - X_f$ is the difference between the efficient historical and future productivity offsets. Hence, F_I accounts for the expected change in productivity growth due to both the change in incentives and the change in the maximum attainable productivity growth for the industry.

part, the financial solvency issue that may have discouraged the adoption of PCR in the electricity sector.

5.4 The Prospective Linkage Between *X* Factors and *K* Factors

67. A key issue that arose in the course of the AUC's 2012 PBR proceeding was the need for "reopening" the price cap formula to address additional capital expenditures required by the utilities over the course of the PBR regime. In a certain sense, the need to re-open the regime for such purposes was surprising because no such conventions were incorporated in the price cap plans in the telecommunications industry. This begs the question as to why re-opening the price cap formula is required in the electricity sector when it was typically not required in the telecommunications sector.

68. While there is probably no single explanation for these formulaic differences in the price cap plans across the two industries, it is reasonable to believe that the development of the X factor provides at least part of the answer. Specifically, it is standard practice with the implementation of PCR to make use of historic industry productivity growth data to predict likely future industry productivity growth. Even when this methodology is applied uniformly across industries, it can differentially disadvantage regulated suppliers in the electricity sector, where the potential for increased productivity growth tends to be relatively limited.

69. As discussed above, it is generally recognized that Moore's Law has operated to dramatically reduce the cost of providing telecommunications services over time. Moore's Law operates to a lesser degree in electric power than it does in telecommunications. Hence, one possibility is that X factors based on historical, industry productivity growth trends understate forward-looking productivity growth in the telecommunications industry at the same time that they overstate forward-looking productivity growth in the electric power industry. This may also help to explain why PCR has been widely deployed in the

telecommunications sector, but its adoption in the electricity sector has been far less ubiquitous.[41]

70. If this is indeed the case, revenue sufficiency for electric power providers under PCR would necessitate some adjustment to the basic price cap formula. This adjustment may well have taken the form of the capital factor (K factor). In other words, if the X factor was overstated because of directional biases inherent in the historical basis for its development, it might be expected to result in an excessive capital funding shortfall for the company, *ceteris paribus*.

71. While this argument is admittedly heuristic in nature, it is seemingly consistent with the institutional history with PBR in Alberta. First, there was protracted debate over the appropriate value of the X factor. Second, the Commission ultimately adopted the K factor adjustment to recognize the need to revisit capital requirements over the course of the PBR regime. Finally, the capital funding shortfall may have exceeded what the Commission envisioned for the first-generation PBR regime. Hence, it is conceivable that a misspecified X factor has to a certain degree worked at cross purposes with AUC PBR Principle 3 and its call for regulatory efficiency by requiring the Commission to address a capital funding shortfall that was perhaps larger than would have been the case otherwise. This observation duly recognizes “that the various components of a regulatory scheme are interrelated.”[42]

72. As discussed in greater detail in the following section, the adoption of a true forward-looking X factor for the second-generation PBR has a number of important benefits. Foremost among these benefits is that a forward-looking X factor is required to emulate competitive market outcomes (AUC PBR Principle 1). In addition, it may serve to reduce the overall capital funding shortfall the Commission would have to address going forward and thereby help to streamline the regulatory process (AUC PBR Principle 3).

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[41] David E. M. Sappington and Dennis L. Weisman, The Disparate Adoption of Price Cap Regulation in the U.S. Telecommunications and Electricity Sectors,” *Journal of Regulatory Economics*, June 2016 forthcoming.

[42] Graeme Guthrie, “Regulating Infrastructure, the Impact on Risk and Investment,” *Journal of Economic Literature*, Volume XLIV, December 2006, p. 966.

6. Treatment of Capital Additions

6.1 Background on Capital Trackers

73. Perhaps no single issue garnered more attention in the 2012 PBR proceeding than that of the treatment of capital in PBR regimes. The Commission's acceptance of the use of capital trackers within the PBR regime was not immediate. In fact, the adoption process was an iterative one as the concept of a capital tracker and its implementation was shaped and reshaped over the course of the 2012 PBR proceeding and the 2013 capital tracker proceeding. In light of the fact that capital trackers were largely unprecedented with PCR regimes in the telecommunications industry, it was reasonable to presume that they would not be required in the electric power industry.

74. The above observations notwithstanding, it is evident from a review of the literature that capital trackers are now commonplace in the electric power and natural gas industries. In fact, the use of capital trackers is arguably more the rule than the exception.[43] Hence, further analysis is constructively placed on recognizing that capital trackers are a necessary institutional element of PBR in the electric and natural gas sectors and focusing on how best to improve their incentive properties. The remainder of the discussion in this section is concerned with these issues.

6.2 Purpose of Capital Trackers and Tie-in to PBR Principles

75. In the 2012 PBR proceeding, the Commission recognized the need to incorporate into the price cap formula a mechanism through which to revisit capital expenditures for the companies over the course of the PBR regime. This mechanism took the form of a capital factor (*K* factor). The following passages are instructive.

> Nevertheless, the Commission acknowledges that there are circumstances in which a PBR plan would need to provide for revenues in addition to the revenues generated by the I-X mechanism in order to provide for some necessary capital

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[43] See, for example, Mark Lowry, Mathew Makos, and Gretchen Waschbusch, "Alternative Regulation for Emerging Utility Challenges: 2015 Update," Edison Electric Institute, November 2015; and Jeff Makholm, Agustin Ros, and Stephen Collins, "North American Performance-Based Regulation for the 21st Century," *The Electricity Journal*, Volume 25(4), May 2012, pp. 33-47.

> expenditures. The way in which this is accomplished is through a capital factor (K factor) in the PBR plan.[44]
>
> The Commission has determined that a mechanism to fund certain capital-related costs outside of the I-X mechanism through a capital factor is required. … The Commission considers that the targeted criteria-based nature of a capital tracker limits the number of projects that are outside of the I-X mechanism, and as a result, the incentive properties of PBR are preserved to the greatest extent possible.[45]

76. In adopting the *K* factor approach, the Commission recognized the need to provide for the unique circumstances of the individual companies in the PBR plan (AUC PBR Principle 4) and that the failure to do so could deprive the companies of a reasonable opportunity to earn a fair rate of return (AUC PBR Principle 2). In addition, the Commission sought to preserve the incentive properties of PBR to the greatest extent possible (AUC PBR Principle 1). The discussion that follows proposes two primary alternative approaches to the treatment of capital additions that foster an even closer alignment with the AUC's PBR principles and the relevant economics literature.

6.3 EDTI's Proposed Approaches and Economic Rationale

77. In the fall of 2014, EPCOR commissioned an academic study of alternative approaches to the treatment of capital in PBR regimes. That study, which I co-authored with Professor David Sappington, is provided in Appendix 2. The purpose of this study is to objectively evaluate the advantages and disadvantages associated with each of the eleven different approaches to the treatment of capital in PBR regimes that had been identified. The recommendations developed in that study form the basis for the two options that EDTI proposes as part of this proceeding. Both of these options provide stronger incentives for firm efficiency (AUC PBR Principle 1) and a more streamlined and efficient regulatory process (AUC PBR Principle 3). Each of these two options is discussed in turn.

6.3.1 Capital Trackers with an *F* Factor ("*K* -Bar") Adjustment[46]

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[44] Alberta Utilities Commission, Decision 2012-237, ¶ 549.

[45] *Id.*, ¶ 586.

[46] The reference to "*K*-Bar" here, which denotes a steady state or baseline level of capital expenditures, follows the acronym that was used to describe this approach in the PBR proceeding and subsequently in the initial capital tracker proceeding. See Alberta Utilities Commission, Rate Regulation Initiative,

78. Under a price cap plan with an F factor adjustment, a single $I - X$ index governs the company's earnings. The X factor reflects industry total factor productivity growth rates and any stretch factors that may be determined by the Commission. The company identifies at the start of the PBR regime any additional F (forward-looking) factor adjustment that is required for (expected) revenue sufficiency. In essence, the F factor reflects the extent to which the standard $I - X$ index fails to provide the company operating in a steady-state environment with the opportunity to earn a fair return on its foreseeable, prudent capital investments over the course of the PBR regime (AUC PBR Principle 2).[47]

79. To the extent that the Commission adopts a forward-looking X factor, as opposed to an X factor based on historic industry total factor productivity growth rates, it is conceivable that the F factor would be smaller than would otherwise be the case. During the PBR regime, the company can apply for capital trackers that reflect capital investments that arise over the course of the PBR regime.[48] These capital trackers can reflect unique life cycle replacement projects or projects required by a third party for which the $I - X$ component of the PBR formula does not provide compensation.

80. It is instructive to clarify the relationship between this approach and the three categories of capital trackers that EPCOR identified in the capital tracker proceeding.[49] Under this approach, EPCOR's Category 1 and Category 3 trackers would be addressed via K factors,

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Application No. 1606029, Proceeding ID No. 566, Proceedings, Volume 10, April 27, 2012, pp. 1906-1920; and Alberta Utilities Commission, 2012 Performance-Based Capital Tracker Filings, Application No. 1608827, Proceeding ID No. 2131, Proceedings, Volume 7, July 17, 2013, pp. 1335-1354.

[47] The F factor can change over the course of the PBR regime. However, the specific values of the F factor that will prevail in each year should be specified clearly at the outset of the regime to ensure that the F factor does not devolve into a "make-whole" safety net for the regulated firm. Various permutations may also be considered, such as updating the F factor at the midpoint in the PBR regime.

[48] Consideration may also be given to various permutations of this approach. These include permitting capital tracker applications only at two-year intervals or only at the midpoint of the PBR regime.

[49] Category 1: Trackers that consist of capital projects that are outside the normal course of EDTI's ongoing operations. Category 3: Trackers included for the primary purpose of recovering the capital funding shortfall due to the effect of the Mid-Year Rule on EDTI's 2012 going-in year rates. Category 2: Trackers included for the primary purpose of recovering the capital funding shortfall inherent in the PBR plan approved by the Commission for EDTI.

whereas EPCOR's Category 2 trackers would be addressed via the *F* factor. This bifurcation has the advantage of restricting *K* factors to those categories of capital trackers that were initially envisioned in the 2012 PBR proceeding as being the proper domain for *K* factor adjustments (i.e., extraordinary, idiosyncratic investments). This approach duly recognizes that even if Category 1 and Category 3 trackers are adequately addressed through *K* factor adjustments, the company could still be left with an exogenous revenue deficiency (i.e., a revenue deficiency through no fault of its own).

81. The potential advantages of a price cap plan with an *F* factor adjustment include the following seven. First, the plan allows the company a reasonable opportunity to earn a fair return even in the presence of significant changes in capital costs and capital investment needs (AUC PBR Principle 2). Second, the plan can encourage the company to undertake comprehensive operations planning. Third, the plan provides incentives for the company to limit overall production (capital and operating) costs and to employ capital and non-capital inputs in cost-minimizing proportions (AUC PBR Principle 1). These desirable efficiency properties follow directly from the basic PCR framework and the fact that the firm is operating under what is essentially a fixed-price contract.

82. Fourth, a plan of this type streamlines the regulatory process after the initial forward-looking assessment of prudent capital investment (AUC PBR Principle 3). Fifth, the plan leverages familiarity with telecommunications style price-cap regulation while explicitly accounting for the unique characteristics of the energy sector. Sixth, to the extent that foreseeable capital expenses are pre-approved, the plan can encourage investment by reducing the financial risk the company faces.

83. Seventh, this plan provides for a clear line of demarcation between issues of ongoing financial solvency (Category 2 trackers) and the AUC's initial conception of the qualifying criteria for a capital tracker (Category 1 and Category 3 trackers). By limiting capital trackers to exogenous CAPEX, this approach puts in place more high-powered incentives relative to those reflected in the AUC's current capital tracker approach.

84. The potential disadvantages of a price cap plan with an *F* factor adjustment include the following four. First, the forward-looking approach the plan entails may provide the

companies with incentives to exaggerate actual capital investment needs.[50] Second, the initial forward-looking assessment of prudent capital investment may require substantial regulatory resources (AUC PBR Principle 3). Third, the line of demarcation between so-called baseline CAPEX, as reflected in the F factor, and incremental CAPEX, as reflected in the K factor, may be difficult to identify with precision. (It is my understanding, however, that this problem has been satisfactorily addressed through the use of the Capital Funding Shortfall Model and is no longer a significant concern.) Fourth, the companies may have an incentive to identify (and possibly exaggerate) "positive" capital trackers, but overlook (or understate the impact of) "negative" capital trackers.

85. In summary, this first-best approach to capital additions preserves to the greatest extent possible the high-powered incentive properties of PCR and is therefore fully aligned with AUC PBR Principle 1. In addition, this approach minimizes the degree of regulatory intervention required over the course of the PBR regime and is therefore consistent with AUC PBR Principle 3. There is no other approach to capital additions that can claim these high-powered incentive properties while providing for this level of regulatory efficiency.

6.3.2 Capital Trackers with True-Up Alternatives

86. In its 2012 PBR decision, the AUC adopted a price cap plan with capital trackers and associated K factors. Under this plan, a single $I - X$ index governs the company's earnings. The X factor reflects industry total factor productivity growth rates and any stretch factors that may be determined by the Commission. This index can be modified during the PBR regime by a K factor that reflects the financial consequences of specific capital investment projects as identified in the capital trackers. The projects in question must satisfy the Commission's three-part criteria to qualify as a capital tracker.[51]

87. To be considered for a K factor adjustment, each individual capital tracker must exceed a materiality threshold.[52] There is no linkage between the magnitude of K factor adjustments

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[50] These undesirable incentives can be mitigated to some extent via *ex post* prudence reviews and ongoing comparisons between projected and actual capital investments.

[51] Alberta Utilities Commission, Decision 2012-237, ¶ 592.

[52] The materiality threshold is a minimum dollar amount that each proposed capital project must satisfy in order to be given consideration as a capital tracker.

and the company's prevailing earnings. The Commission adopted this PBR plan in large part to limit the dilution of the high-powered incentives that arise under pure PCR and in competitive markets (AUC PBR Principle 1).[53]

88. The potential advantages of this PBR plan include the following five. First, the plan provides incentives for the company to limit overall production costs (both capital costs and operating costs) and to employ capital and non-capital inputs in cost-minimizing proportions (AUC PBR Principle 1). Again, these efficiency properties are a direct result of the basic price cap framework employed in the PBR regime. Second, by admitting K factor adjustments, the plan can afford the company a reasonable opportunity to earn a fair return on its investment even in the presence of significant changes in capital costs and capital investment needs (AUC PBR Principle 2).

89. Third, the plan may limit a company's uncertainty about its ultimate recovery of capital costs, and thereby encourage capital investment. Fourth, the plan may help to limit rate shock by allowing for rate adjustments (reflecting K factor adjustments) during the course of the PBR regime (AUC PBR Principle 5). Fifth, the plan can help to conserve regulatory resources by only considering capital trackers that exceed a specified materiality threshold (AUC Principle 3).

90. The potential disadvantages of this plan include the following six. First, price changes based on an X factor that reflect historic industry productivity changes may not ensure adequate compensation for the regulated company when costs are unavoidably increasing over time (AUC Principle 2). Indeed, this was the issue addressed by EPCOR's Category 2 Capital Trackers that were proposed to address capital funding shortfalls under the $I - X$ index.[54] It is conceivable that a properly calibrated, forward-looking X factor may lessen this particular revenue sufficiency concern to some degree.

91. Second, in practice, it can be difficult to distinguish between projects that are outside of the

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[53] Alberta Utilities Commission, Decision 2013-435, Distribution Performance Based Regulation, 2013 Capital Tracker Applications, December 6, 2013, ¶ 586.

[54] EPCOR Distribution & Transmission Company, Inc. 2012 PBR Capital Tracker Application, Application, No. 1608827, Proceeding ID No. 2131, December 14, 2012, pp. 67-68.

normal course of the company's ongoing operations and those that are not. Again, my understanding is that this problem has been satisfactorily addressed through the use of the Capital Funding Shortfall Model and is no longer a significant concern.

92. Third, the plan may provide the company with an incentive to identify (and possibly exaggerate) "positive" capital trackers, but overlook (or understate the impact of) "negative" capital trackers.[55] Fourth, ongoing adjustments for unusual capital projects might limit incentives to minimize overall production costs (AUC PBR Principle 1).[56] Incentives can be diluted particularly severely by a full true-up of actual CAPEX associated with the capital tracker and forecast CAPEX.[57]

93. Fifth, despite the project-specific materiality threshold, substantial resources may be required to identify and quantify relevant capital trackers, unless the opportunity to do so is explicitly limited (AUC PBR Principle 3).[58] In essence, the regulator is required to second-guess the company's operating practices, a task that is fraught with difficulty. Sixth, the company may not be able to secure adequate earnings if many unanticipated investment projects arise, each of which entails costs below the specified project-specific materiality threshold (AUC PBR Principle 2). In essence, the company risks "death by a thousand cuts."

94. A full true-up of forecast CAPEX and actual CAPEX can undermine incentives for cost containment and work at cross purposes with the high-powered incentives the Commission had sought to preserve in adopting this approach (AUC PBR Principle 1). EPCOR identified this concern in its final argument in the capital tracker proceeding.[59] EPCOR

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[55] It may be possible to limit this incentive with true-ups and annual *ex ante* reviews of capital tracker projects.

[56] A requirement to demonstrate that the benefit of the proposed new capital investment could not have been achieved at lower cost through other means can help mitigate this potential problem.

[57] EPCOR Distribution & Transmission Company, Inc. Final Argument, Rate Regulation Initiative, Application, No. 1608827, Proceeding ID No. 2131, August 16, 2013, ¶¶ 60-66.

[58] Adjustments for capital trackers might only be permitted at a limited number of times during the PBR regime.

[59] EPCOR Distribution & Transmission Company, Inc. Final Argument, Rate Regulation Initiative, Application, No. 1608827, Proceeding ID No. 2131, August 16, 2013, § 2.2.

proposed a full true-up of forecast CAPEX and actual CAPEX for Category 1 Trackers. This approach is consistent with sound incentive regulation principles.

95. EPCOR proposes two alternatives for strengthening the incentives for cost containment associated with its Category 2 Trackers, which are referred to as Alternative A and Alternative B. Each of these alternatives and their incentive properties is discussed in turn.

96. Under Alternative A, EPCOR would be permitted to true-up its Category 2 Trackers on a prospective basis only, rather than the full, retrospective basis contemplated in the Commission's PBR Decision. In other words, EPCOR would not be allowed to true-up its capital trackers to actual costs for the period of time between the approval of the Category 2 Tracker and the Commission's approval of the true-up. Instead, only a prospective true-up would be permitted, beginning at the time the true-up is approved. The prospective true-up would occur only after a stipulated period of time, ranging from the time remaining in the calendar year to the full remaining term of the PBR regime. When EPCOR effectively is held responsible for cost variances during the period of time between the approval of the Category 2 Capital Tracker and the true-up to actual costs, the company faces strong incentives to undertake only necessary, efficient capital projects.

97. Under Alternative B, EPCOR's ability to true-up its Category 2 Trackers during the PBR term would be limited to the share of the company's annual forecast capital cost for each Category 2 Tracker that is funded by the approved Capital Tracker K factor adjustment (i.e., to the portion of the company's annual forecast capital cost that is not funded by the $I - X$ mechanism). It is noteworthy that the AUC was sufficiently interested in a mechanism by which the incentives for cost containment could be strengthened that it provided the Commission's Aid to Panel Questioning (Exhibit 229) in the capital tracker proceeding.

98. Table 2 is a slightly modified form of Exhibit 229 that demonstrates how the true-up mechanism might work in practice. Scenario 1 considers a CAPEX addition in which 50% of the required capital is funded under the $I - X$ index and 50% is funded under the capital tracker. Scenario 2 considers a CAPEX addition in which 60% of the required capital is

funded under the $I - X$ index and the remaining 40% is funded under the capital tracker.

Line (L)	Description	Scenario 1	Scenario 2
		$ Amount	$ Amount
	Forecast Stage:		
L1	Forecast CAPEX Additions	10	10
L2	Covered by $(I - X)$	5	6
L3	Capital Tracker (L1 – L2)	5	4
	True-Up Stage:		
L4	Actual CAPEX Additions	12	12
L5	Variance (L1 – L4)	2	2
L6	Variance Deemed to be Covered by $(I - X)$	1 or (50%)	1.2 or (60%)
L7	Variance Deemed to be Related to Approved Capital Tracker (L5 – L6)	1 or (50%)	0.8 or (40%)
L8	**Tracker True-Up**	**1**	**0.8**

Table 2. Capital Tracker True-Up Mechanics

99. First consider Scenario 1 in Table 2, where the company forecasts CAPEX additions of 10, but only 5 are covered under the $I - X$ price cap mechanism. This leaves a residual of 5 to be financed through the capital tracker. In the true-up stage, the company's actual CAPEX additions are assumed to be 12 rather than 10, which leaves a positive variance of 2 as shown in line L5 of Table 2. Given that 50% of the forecast CAPEX addition is not covered under the $I - X$ index, the company is only able to true-up 50% of the variance, or 0.5 × 2 = 1 as shown in lines L7 and L8, for the duration of the PBR regime.

100. Now consider Scenario 2, where 40% of the forecast CAPEX addition is not covered under the $I - X$ index. In this case, the company is only able to true-up 40% of the variance, or 0.4 × 2 = 0.8 as shown in lines L7 and L8, for the duration of the PBR regime. Hence, the risk the company faces (as measured by the responsibility it bears for the variance between forecast and actual CAPEX) is equal to the percentage of the CAPEX additions that are covered by the $I - X$ index.

101. Another way to conceive of the risk-bearing properties of this true-up mechanism is to partition the cost recovery for CAPEX variance into endogenous and exogenous

components. A proxy for the endogenous component (i.e., the component that is under the control of the company) is equal to the percentage of CAPEX addition governed by the $I - X$ index. A proxy for the exogenous component (i.e., the component that is outside the control of the company) is equal to the percentage of the CAPEX addition that is not covered by the $I - X$ index.

102. In explicitly differentiating between endogenous and exogenous components of the CAPEX variance, this approach is consistent with the principle that a sound PBR regime should "limit the firm's financial responsibility for factors beyond its control."[60] To wit, if the company operated under an $I - X$ index without capital trackers, it would typically have no opportunity to seek recourse for funding shortfalls from the regulator for the duration of the PBR regime, because all required outlays are effectively deemed to be endogenous to the firm. Conversely, in the case of purely exogenous events for which the $I - X$ index provides no funding, the firm would be fully compensated (just as it would be with Z factors) for all prudent CAPEX outlays. Hence, it may be reasonable to limit the true-up between actual outlays and expected outlays to that portion of the expected outlay funded through the capital tracker – the exogenous component.

103. In summary, this second-best approach to capital additions has the benefit of being "tried and true" in the sense that the Commission adopted an approach that has by all accounts worked reasonably well over the course of the first-generation PBR regime. EPCOR has identified opportunities to further strengthen the incentive properties of this approach by adopting a more high-powered true-up process that requires the company to bear greater risk. This modification is properly viewed as a refinement of the original approach that facilitates a closer alignment with the AUC's PBR principles and the relevant economics literature.

7. Summary and Conclusion

104. EDTI's PBR proposal seeks to fine tune the incentive properties of the first-generation PBR. Specifically, the proposal seeks to (1) identify elements of the current PBR regime

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[60] See David E. M. Sappington, "Designing Incentive Regulation," *Review of Industrial Organization*, Volume 9, 1994, p. 269.

that can be improved upon by providing more high-powered incentives for firm efficiency; and (2) identify opportunities to improve regulatory efficiency by reducing the degree of regulatory intervention required over the PBR term.

105. The Commission has identified three major issues to be addressed in this proceeding: (1) Rebasing and the Establishment of Going-In Rates; (2) Productivity Offset (X Factor) in the Next Generation of PBR; and (3) The Treatment of Capital Additions. The EDTI PBR proposal is fully responsive to the AUC's notice with respect to each of these three issues.

106. EDTI's proposal for rebasing and the establishment of going-in rates seeks to preserve to the greatest extent possible the desirable incentive properties of PBR while recognizing that some degree of "true-up" is warranted at the end of the first-generation PBR regime. The ECM will serve to partly ensure that the incentives for superior performance are not weakened unduly as the end of the first-generation PBR is approached.

107. EDTI also developed an innovative approach that conditions rebasing on an average of actual financials over the intermediate years of the PBR regime along with an ECM based on those years. This approach addresses the Commission's concerns regarding the need to preserve high-powered incentives for efficiency and reduce the regulatory burden associated with conducting comprehensive rate cases for each of the utilities.

108. EDTI's proposal for the productivity offset (X factor) reflects the principle that economic regulation should seek to emulate competitive market outcomes. With this objective in mind, EDTI proposes a forward-looking approach to developing the X factor. This approach recognizes that competitive markets require firms to pass along realized industry productivity gains to consumers in the form of lower prices. An additional benefit of the forward-looking X factor is that it may serve to reduce the company's capital funding shortfall.

109. EDTI's proposal for the treatment of capital additions in PBR regimes builds upon the strong foundation the Commission put in place with the current capital tracker approach. Therefore, the EDTI proposal seeks to (1) limit capital trackers over the course of the PBR regime to the type of extraordinary, idiosyncratic investments that were envisioned in the

2012 PBR proceeding (i.e., Category 1 and Category 3 trackers); and (2) modify the true-up process associated with Category 2 Capital Trackers by putting in place more high-powered incentives for efficiency.

110. In conclusion, EDTI's proposal for the second-generation PBR is fully aligned with the AUC's five PBR principles and the relevant economics literature. The proposal seeks to improve upon the first-generation PBR plan with respect to important dimensions of performance (including firm efficiency and regulatory efficiency) and therefore represents a best practices PBR regime for the 21st century.

Appendix 1. Curriculum Vitae

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1992 - Present	Weisman Associates, LLC: Founder and President
1989 - 1993	SBC Communications Inc. (now AT&T): Director - Strategic Marketing Director - Special Project with Florida Public Service Commission
1982 - 1989	Southwestern Bell Telephone Company – Demand Analysis: District Manager Staff Manager Staff Specialist Assistant Staff Manager

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2008 - Present	Board of Academic Advisors, The Free State Foundation.
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2007 - 2008	Program Committee Member, International Telecommunications Society.
2005 - 2006	Regulatory Framework Working Group, Digital Age Communications Act (DACA) Project, Progress and Freedom Foundation.
2004 - 2005	Chairperson, Site Council, Frank V. Bergman Elementary School.
2003 - 2006	Advisory Board, The Institute for Regulatory Law and Economics.
2002 - 2003	Guest Editor, Symposium on Incentive Regulation, *The Review of Network Economics*, Vol. 2(4), December 2003.
2000 - 2003	Dean's Advisory Council On Tenure and Promotion in Arts and Sciences.
1998 - 2005	Associated Faculty Member, Center For Research In Regulated Industries, Rutgers University.
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PUBLICATIONS:

"The Disparate Adoption of Price Cap Regulation in the U.S. Telecommunications and Electricity Sectors," *Journal of Regulatory Economics*, forthcoming (with D. Sappington).

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INVITED PRESENTATIONS:

"Race-Based Preferences in College Admissions: An Economist's Journey," Economics Club, Kansas State University, Manhattan, Kansas, January 2013.

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Appendix 2. Assessing the Treatment of Capital Expenditures in PBR Plans

ASSESSING THE TREATMENT OF CAPITAL EXPENDITURES IN PERFORMANCE-BASED REGULATION PLANS

by

David E. M. Sappington and Dennis L. Weisman[*]

September 1, 2015

EXECUTIVE SUMMARY

This paper was undertaken to identify and objectively evaluate the merits of potential alternative approaches to the treatment of capital expenditures (CAPEX) in performance-based regulation (PBR) regimes.

The paper analyzes both earnings-based and price-based PBR plans. A total of eleven difference approaches are evaluated (three earnings-based plans and eight price-based plans). The advantages and disadvantages of each plan are assessed, and references are provided to the relevant economics literature to facilitate further analysis. In addition, where appropriate, the PBR principles set forth by the Alberta Utilities Commission (AUC) in its 2012 PBR proceeding are linked to the various advantages and disadvantages of each approach.

Our preliminary recommendation regarding appropriate approaches reflects four main criteria. First, the AUC is unlikely to adopt any approach containing elements of traditional rate of return regulation. Second, the AUC places a large premium on simplicity, transparency and reducing the regulatory burden for all parties. Third, the preferred approaches should address the issue of capital sufficiency in a comprehensive and principled manner. Fourth, the preferred approaches must provide strong incentives for efficiency, comparable to incentives that arise in competitive markets.

Our preliminary recommendation is that the AUC adopt a pure price cap approach that incorporates an economically principled mechanism that can address all three of the capital tracker categories that EPCOR identified in the 2013 Capital Tracker proceeding. Three of the eleven approaches evaluated in the paper (those analyzed in Sections III.C, III.E, and III.F) appear to satisfy these requirements. We believe that each of these approaches satisfactorily addresses both company and Commission concerns while preserving to the extent possible the desirable efficiency incentives of competitive markets.

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I. INTRODUCTION.

A. Background and Purpose of this Paper.

In 2012, Application No. 1606029, Proceeding ID No. 566, the Alberta Utilities Commission ("AUC") launched its first industry-wide performance-based regulation ("PBR") initiative for the electric power and natural gas industries.[1] The initiative reflected in part the largely favorable experience with PBR in the telecommunications industry.[2,3] However, it became clear early on in the process that important differences between the energy and telecommunications sectors would require a form of PBR in the Alberta energy sector that differed from common forms of PBR in the telecommunications sector.[4] In particular, the relatively simple $I - X$ price cap plans often implemented in the telecommunications sector were deemed to be inappropriate for Alberta's utilities.[5]

Alberta's utilities believed it was important to have the opportunity to formally reassess their anticipated capital requirements and adjust allowed prices accordingly during the course of the PBR regime. Such a "re-opening" mechanism typically is not present in PBR plans in the telecommunications industry. This may be the case in part because the ongoing decline in the cost of computing enables telecommunications firms to count on increasing profit margins over the course of a PBR regime.[6] Corresponding systematic cost-reducing forces are not present to the same degree in the electric power and natural gas industries. Consequently, absent an

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[1] In AUC 2009-035, the Commission issued its order for the PBR plan for ENMAX. Notably, this PBR plan was initiated at the request of ENMAX rather than the AUC. The AUC's March 25, 2010 Rate Regulation Initiative Roundtable recognized that traditional rate of return regulation was no longer the appropriate regulatory regime for the Alberta utilities, and explored alternative regulatory regimes with superior incentive properties.

[2] See Abel (2000) and Lowry and Kaufman (2002), for example.

[3] Two key members of the AUC, Chairman Willie Grieve and Vice-Chair Mark Kolesar, joined the Commission after long careers in the Canadian telecommunications industry. Both served on the AUC panel for the PBR initiative.

[4] EPCOR (June 13, 2012, ¶¶ 121-127).

[5] The $I - X$ index limits annual price changes for the regulated firm to an economy-wide inflation measure (I), less an offset (X). To illustrate, if I is 3% and X is 2%, the regulated firm is permitted to increase its prices by 1% (= 3% $-$ 2%) annually, on average. X measures the extent to which productivity in the regulated industry is expected to increase more rapidly and industry input prices are expected to increase less rapidly than in the economy as a whole. See Bernstein and Sappington (1999).

[6] See Jorgenson (2001), for example.

opportunity to revisit the terms of a lengthy PBR regime, regulated firms may experience unduly low returns and face substantial earnings uncertainty.

These concerns may help to explain why, even though PBR was adopted relatively rapidly in the telecommunications sector (often at the initiative of the companies themselves), the implementation of PBR has experienced fits and starts in the electric power and natural gas industries.[7] The differential patterns of technological advance in the telecommunications and energy sectors likely has led the companies in the former sector to embrace the opportunities for enhanced earnings presented by price cap regulation and the companies in the latter sector to prefer the earnings stability afforded by traditional rate of return regulation.

By the end of the PBR hearings in the late spring of 2012, the AUC concluded that: (i) capital expenditures ("CAPEX") likely required some special treatment in the design of PBR plans; and (ii) it would be appropriate to consider the unique circumstances of each company when determining the treatment of its CAPEX under PBR.[8] In particular, the AUC recognized the need for a mechanism that would permit reconsideration of the terms of the PBR plan as the need for unforeseen capital expenditures arose. The Commission's focus then turned to designing a PBR plan that addressed the concerns of the companies regarding capital requirements over the course of the PBR regime while preserving to the greatest extent possible the incentives for efficiency that prevail in competitive markets.[9]

In its 2012 PBR decision, the AUC adopted a capital tracker approach (and associated *K* factor adjustment) as the mechanism through which the companies would be allowed to re-open the PBR plan in order to address unforeseen capital expenditures. The AUC specified three conditions that a capital project must satisfy in order to qualify as a capital tracker, and thereby receive explicit consideration by the Commission:[10]

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[7] This issue was discussed at length at the PBR hearings and summarized in EPCOR's Final Argument in that proceeding. See EPCOR (June 13, 2012, ¶¶ 121-127).

[8] Alberta Utilities Commission (AUC), Rate Regulation Initiative, Application No. 1606029, Proceeding ID No. 566, Proceedings, Volume 10, April 27, 2012, pp. 1962-3.

[9] Makholm et al. (2012) survey PBR plans in the U.S. and Canada and discuss how regulators might incorporate "trackers" into PBR plans to address cost items not traditionally covered by PBR plans. (Dr. Jeffrey Makholm was retained by the AUC to provide economic testimony in the AUC's 2012 PBR proceeding.)

[10] AUC Decision 2012-237, ¶ 592.

(1) The project must be outside of the normal course of the company‘s ongoing operations.[11]

(2) Ordinarily the project must be for replacement of existing capital assets, or undertaking the project must be required by an external party.

(3) The project must have a material effect on the company’s finances.

The total dollar amount of all capital projects approved by the Commission as capital trackers are included as a K factor in the price cap formula and operates in a manner similar to the exogenous factor or Z factor common to most price cap plans.[12] The Commission adopted the capital tracker approach and rejected other approaches with similar objectives. The Commission did so because it believed this approach would limit the extent to which the strong incentives of competitive markets would be diluted. Specifically, the Commission rejected other approaches suggested by the companies that the Commission believed would reintroduce elements of traditional rate of return regulation and its poor incentive properties.[13]

In the 2013 Capital Tracker proceeding, EPCOR identified three categories of capital trackers. These categories are reviewed here to provide context for the ensuing analysis. Category 1 capital trackers consist of life cycle replacement projects and/or projects that EPCOR is obligated to undertake at the request of a third party, where, in both cases, the $I-X$ component of the PBR formula does not provide any funding for CAPEX. Category 3 trackers are Category 1 type trackers that were completed and added to the rate base in 2012. Category 2 trackers consist of trackers that are intended to permit EPCOR to recover project-by-project capital funding shortfalls that it would otherwise incur when the $I-X$ component of the PBR formula includes funding for CAPEX. An outstanding issue of demonstrated interest to the Commission is whether there is an efficiency rationale for treating Category 1 and Category 3 trackers differently from Category 2 trackers.

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[11] In AUC Decision 2013-435, the Commission interpreted the phrase “outside of the normal course of the company’s ongoing operations” somewhat more broadly. Specifically, the Commission allowed for capital trackers in the case of extraordinary projects as well as project-specific expenditures incurred in the course of ongoing operations that were deemed to be funded inadequately under the $I-X$. See AUC Decision 2013-435, § 3.1.3.

[12] In particular, the regulated company is permitted to raise its prices annually at the rate of $I-X+K$, where I is the prevailing rate of inflation in the economy, X is a productivity factor, and K reflects costs associated with the types of unanticipated investment projects described above.

[13] AUC Decision 2012-237, § 7.3. These poor incentive properties are discussed in Section II.A below.

B. AUC PBR Principles.

The Commission determined that a well-designed PBR plan should reflect the following principles:

The AUC's PBR Principles

Principle 1. A PBR plan should, to the greatest extent possible, create the same efficiency incentives as those experienced in a competitive market while maintaining service quality.

Principle 2. A PBR plan must provide the company with a reasonable opportunity to recover its prudently incurred costs including a fair rate of return.

Principle 3. A PBR plan should be easy to understand, implement and administer and should reduce the regulatory burden over time.

Principle 4. A PBR plan should recognize the unique circumstances of each regulated company that are relevant to a PBR design.

Principle 5. Customers and the regulated companies should share the benefits of a PBR plan.

The present paper was undertaken to identify and objectively evaluate the merits of potential alternative approaches to the treatment of capital in PBR regimes.

C. The Purpose and the Forms of PBR.

The economics literature advises that economic regulation should seek to emulate competitive market outcomes. As Professor Alfred Kahn observes:

> the single most widely accepted rule for the governance of the regulated industries is regulate them in such a way as to produce the same results as would be produced by effective competition, if it were feasible. (Kahn, 1970, p. 17)

Similarly, Professor James Bonbright observes:

> Regulation, then, as I conceive it, is indeed a substitute for competition; and it is even a partly imitative substitute. (Bonbright, 1961, p. 107)

Once the central goal of economic regulation is identified, the best means to achieve this goal must be determined. In particular, it is important to identify the form of PBR plan that will best replicate the incentives that prevail in competitive markets. Competitive market forces constrain the prices firms can charge, limiting them to only a normal return on their investments. Consequently, a regulator might seek to emulate competitive market outcomes either by adopting an earnings-based regulating regime (which constrains a company's earnings) or by adopting a price-based regime (which constrains the prices the company can charge for the services it supplies to customers).

Traditional rate of return regulation is an example of an earnings-based regulatory regime that seeks to instill competitive discipline by limiting the regulated firm's financial returns. Pure price cap regulation is an example of a price-based regulatory regime that seeks to instill competitive discipline by capping the prices of the regulated firm. A central question in the literature on the economics of regulation is whether earnings-based regulatory regimes, price-based regulatory regimes, or some combination of the two types of regulation are the best means to replicate the discipline of competitive markets (Joskow, 2014).

Professors Armstrong and Sappington offer the following perspective on the tradeoffs between the two types of regulatory regimes.

> Now consider price cap regulation, which typically permits revenues to diverge from realized costs for a specified period of time (e.g., four years) but does not promise specific long-term returns on investment. Although such a policy can provide substantial incentive for short-term innovation and cost reduction, it may provide limited incentive for long-term infrastructure investment. Therefore, the choice between rate of return regulation and price cap regulation will depend in part on the type of investment that is most important to secure. In settings where the top priority is to induce the regulated firm to employ its existing infrastructure more efficiently, price cap regulation may be preferable. In contrast, in settings where it is important to reverse a history of chronic underinvestment in key infrastructure, rate of return regulation may be preferable (footnotes omitted).[14]

This observation highlights a central theme in the literature on the economics of regulation, namely that a one-size-fits-all approach to the design of PBR plans is not appropriate. To the contrary, a PBR plan that is implemented for a particular company should reflect both the type of behavior the regulator wishes to encourage the company to undertake (which can vary across companies) and the unique characteristics of the regulated industry and the regulated company. As Professor Guthrie concludes from his survey of the economic literature that examines the relationship between regulation and infrastructure investment:

> The two most important lessons to be drawn from the literature surveyed here are that there is no single combination of regulatory settings that is best in all situations and that the various components of a regulatory scheme are interrelated. The most

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[14] Armstrong and Sappington (2006, pp. 340-41).

> appropriate regulatory scheme for a given situation will depend on the characteristics of the firm and industry being regulated, as well as the institutional environment.[15]

D. The Outline of this Paper.

This paper will assess several possible approaches to the treatment of capital in PBR regimes by identifying the central advantages and disadvantages of each approach. Sections II and III of the paper consider earnings-based PBR plans and price-based PBR plans, respectively. Section IV provides a brief summary and a preliminary recommendation as to the preferred approach (or approaches) to the treatment of capital in PBR regimes.

II. EARNINGS-BASED PBR PLANS.

There are several different types of PBR plans that focus on limiting the earnings of the regulated company. We review here the two most common forms of such earnings-based PBR plans: banded rate of return regulation and earnings sharing regulation. First, though, we review the central features of rate of return regulation.

A. Rate of Return Regulation.

PBR plans often are viewed as alternatives to rate of return regulation ("RORR"). Therefore, to fully understand the rationale for PBR plans and their potential merits, it is helpful to review the purpose and the key features of RORR.

RORR is designed primarily to ensure that the regulated firm ("the company") can continually attract the capital it requires to deliver high quality, reliable service to customers. RORR typically pursues this goal through substantial regulatory oversight of the company's operations.

Under RORR, the company often is required to secure explicit regulatory approval for each major capital investment it undertakes. The regulator sets prices for the company's services to provide the company a reasonable opportunity to recover its prudently incurred operating expenses and earn a "fair return" on prudently incurred capital investment (AUC PBR Principle 2). The company typically is precluded from earning substantially more than the authorized return under RORR, no matter how exceptional the company's performance might be. Provided

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[15] Guthrie (2006, p. 966).

the company's investments are ultimately judged to have been prudent, RORR typically protects the company against financial returns that are substantially less than the authorized return.[16]

In addition to holding hearings to assess the prudency of particular investments, RORR typically schedules general rate hearings fairly frequently to re-set the company's prices to ensure that the company's actual earnings do not diverge substantially from its authorized earnings. The company's earnings usually are monitored on an ongoing basis, and the regulator can initiate additional hearings if preliminary evidence suggests that the company's earnings have diverged substantially from authorized levels.

RORR entails both advantages and disadvantages relative to other policies. The primary potential advantages of RORR include the following four. First, by providing a relatively predictable return on investment, RORR can help the company attract capital and reduce the company's cost of capital.[17] Second, even as it encourages prudent investment, RORR can limit excessive capital investment. It can do so by requiring *ex ante* regulatory approval for major investment projects and by undertaking *ex post* reviews of the prudency of these projects after observing the extent to which the investments have proved to be used and useful in delivering high quality service to customers.

Third, RORR can avoid complaints from customers that they are being required to finance "excessive" returns for the company. Fourth, by providing returns that are sufficient to attract needed capital, RORR can limit the likelihood that customers will experience extended service interruptions or inadequate service quality (AUC PBR Principles 1 and 2).[18]

RORR also entails at least five disadvantages relative to other regulatory plans. First, RORR typically provides the company with limited incentive to minimize operating costs or otherwise realize exceptional performance. This is the case because prices are set under RORR to provide the company with (only) a fair return on investment regardless of the extent to which the company has reduced its operating costs or has otherwise exhibited exemplary performance.

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[16] The prudence of an investment is appropriately judged according to what the company knew and what it could reasonably have known at the time the investment was undertaken (Kolbe and Tye, 1991).

[17] See Fazzari et al. (1988), for example.

[18] Indeed, to the extent that the regulator views the company's expenditures to enhance service quality as prudent, RORR can promote the delivery of high levels of service quality by ensuring that the firm is fully compensated for the associated expenditures.

Second, because the minimum rate of return required to attract investment capital can be difficult to determine precisely, RORR can provide excessive or insufficient incentive for capital investment. If the authorized return on investment exceeds the return required to attract adequate levels of investment capital, the company may have an incentive to undertake more than the cost-minimizing level of investment. In contrast, if investors do not find the authorized return to be commensurate with the returns they can secure on other investments of comparable risk, the company may be unable to attract the capital it requires to operate efficiently.

Third, RORR can provide the company with limited incentives to choose capital and non-capital inputs in cost-minimizing proportions (and so may be inconsistent with AUC PBR Principle 1). This is the case in part because the authorized compensation for capital investment may exceed or fall short of the level required to attract essential capital investment and in part because RORR offers little explicit financial reward for minimizing its overall operating costs.[19]

Fourth, the implementation of RORR typically requires considerable regulatory resources (and so may be inconsistent with AUC PBR Principle 2). The determination of a company's cost of capital and its capital investment needs can be a time consuming and resource intensive process. Detailed *ex ante* and *ex post* assessments of the prudency of individual capital investment projects also entails the expenditure of considerable regulatory resources, as does the ongoing monitoring of the company's realized earnings.

Fifth, confiscatory *ex post* prudence reviews can limit the company's incentive to pursue needed capital investment. Whether the confiscatory nature of a review is intentional (to secure lower prices for customers in the short run) or unintentional (e.g., caused by limited information about relevant industry considerations), the prospect of a review that prevents the company from securing a reasonable return on investments that appear prudent *ex ante* reduce the attraction of investment. The prospect of confiscatory prudence reviews also limits the firm's ability to attract capital, and so can limit the company's ability to deliver uninterrupted, high quality service to customers.[20]

B. Banded Rate of Return Regulation.

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[19] Despite substantial theoretical interest in this "Averch-Johnson bias" (Averch and Johnson, 1962), empirical support for the bias is not extensive. Cicala (2015) provides some recent evidence.

[20] See Kolbe and Tye (1991), for example.

Banded rate of return regulation ("BRORR") is much like RORR, with one important exception. BRORR allows the company's earnings to vary with its observed performance, but typically only to a limited extent. In particular, if the company's realized earnings exceed a specified target level of earnings (or target rate of return on investment) by a modest amount, the prices the company charges to its customers are not reduced to eliminate the "excess" earnings. Similarly, if the company's actual earnings fall below the target level of earnings, the company's prices are not increased to eliminate the earnings "deficit." Consequently, the company receives some reward for achieving earnings above a target level and incurs a penalty if its earnings fall below the target.

The essence of BRORR is illustrated in Figure 1. The figure depicts the relationship between the company's "unadjusted earnings" and its "authorized earnings." The former are the earnings the company would secure if the prices it charges to customers remain at the levels established at the outset of the BRORR regime. The latter are the earnings the company secures after any relevant price adjustments are implemented in response to an observed divergence between the firm's unadjusted earnings and its target level of earnings (E_T).

BRORR entails the specification of a critical level of earnings (E_L) below the target and another critical level of earnings (E_H) above the target. As long as the company's unadjusted earnings are between E_L and E_H, the company's prices are not revised. If the company's unadjusted earnings rise above E_H, prices are reduced to ensure the company secures earnings E_H. If the company's unadjusted earnings fall below E_L, prices are increased to ensure the company's earnings are E_L.

This relationship between the company's unadjusted earnings and its authorized earnings are reflected in the solid line in Figure 1. Regardless of the firm's unadjusted earnings, authorized earnings never fall below E_L or rise above E_H. When unadjusted earnings are between E_L and E_H, authorized earnings coincide with unadjusted earnings.

Relative to RORR, BRORR enhances the company's incentive to reduce its operating costs when its unadjusted earnings are between E_L and E_H. When unadjusted earnings are in this range under BRORR, the company effectively: (i) keeps each extra dollar of cost savings it achieves; and (ii) forfeits a dollar for each extra dollar of cost increase it experiences.[21] Therefore, at least

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[21] This is why the solid line in Figure 1 has a slope of 1 when the company's unadjusted earnings are between E_L and E_H.

within the specified range of unadjusted earnings, BRORR provides incentives for cost containment similar to those that arise in competitive markets (AUC PBR Principle 1).[22]

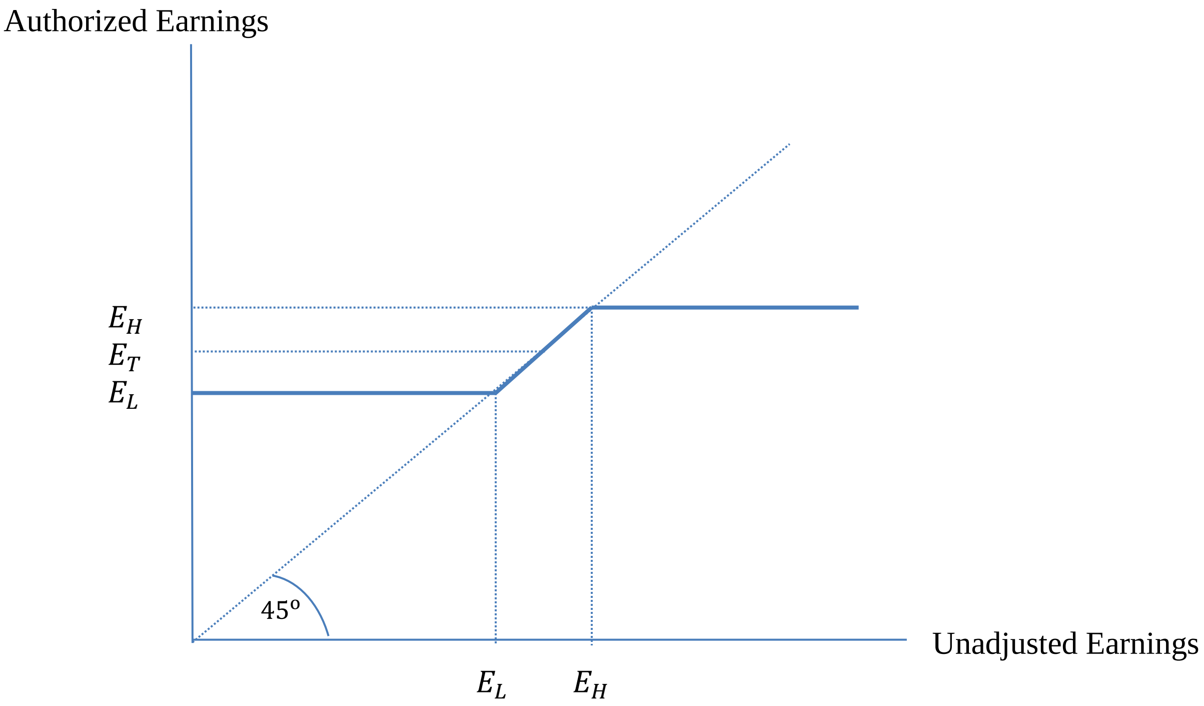

Figure 1. Banded Rate of Return Regulation

Typical values for E_L and E_H under a BRORR plan correspond to earnings that are 100 basis points below and above the target rate of return, respectively. For instance, if the target rate of return on investment is 10%, E_L would correspond to a 9% return on investment and E_H would correspond to an 11% return on investment. Consequently, whereas the company's prices might be revised whenever the company's unadjusted earnings diverged significantly from a 10% return on investment under RORR, price revisions would only occur under BRORR when the company experienced unadjusted earnings that constituted returns on investment below 9% or in excess of 11%.

The magnitude of the difference between the highest and the lowest authorized earnings (i.e., between E_H and E_L) under BRORR determines the extent to which BRORR differs from

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[22] In a competitive market, a firm keeps every dollar of profit it generates (not counting taxes). Therefore, the relationship between unadjusted earnings and authorized earnings for a firm that operates in a competitive market is given by the 45^o line in Figure 1.

RORR. The smaller is this magnitude, the more similar are the two regulatory policies.[23] The larger is $E_H - E_L$, the closer are the company's incentives to the incentives a firm faces in a competitive market. As $E_H - E_L$ increases, the company faces more potential earnings variation, and the range of earnings in which the firm bears the full consequences of increased or diminished unadjusted earnings expands.[24]

The increased potential variation in authorized earnings typically will enhance the company's incentive to operate efficiently because the firm: (i) has an increased opportunity to benefit financially from any cost reductions it achieves; and (ii) faces an expanded threat of financial penalties from any cost increases it experiences. The increased potential earnings variation also can increase the company's cost of capital because investors typically demand a higher level of expected compensation when they face increased downside risk. In addition, the increased potential earnings variation can conceivably invite criticism from customers that the company's earnings are too high or from the company and its shareholders that earnings are too low.

As the company's unadjusted earnings approach E_H from below, the company's incentive to undertake activities that might secure a substantial increase in unadjusted earnings becomes very limited. Most of any additional earnings the company might realize would accrue to consumers in this case because the firm's authorized earnings are capped at E_H. Similarly, as the company's unadjusted earnings approach E_L from above, the company's incentive to work diligently to avoid a decline in unadjusted earnings becomes limited. Most of any reduced earnings that might arise will effectively be borne by customers in this case because the company's authorized earnings are bounded from below at E_L. Consequently, as the company's unadjusted earnings rise toward E_H from below or decline toward E_L from above, the company's incentives can more closely resemble the incentives the company faces under RORR than the incentives it would face in a competitive market.

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[23] RORR can be viewed as an extreme form of BRORR in which E_L, E_T, and E_H all coincide. Consequently, the range of unadjusted earnings in which RORR provides incentives similar to those that arise in competitive markets is effectively degenerate.

[24] The AUC's PBR plan might be viewed as a form of BRORR because the terms of the plan can be revisited if a company experiences a variation in earnings of more than 300 basis in any two consecutive years or a variation of more than 500 basis points in any single year. See 2012 Commission Decision at ¶¶ 737-738.

To help ensure that the company delivers high levels of service quality under BRORR, authorized earnings can be explicitly linked to realized levels of service quality. For example, the BRORR plan might state that E_L and E_H will both be reduced by specific amounts if realized service quality falls below a designated level. Alternatively, or in addition, the plan might identify amounts by which E_L and E_H will be increased if realized service quality attains or exceeds a specified target.[25, 26]

C. Earnings Sharing Regulation.

Earnings sharing regulation ("ESR") is much like BRORR except that it admits greater flexibility in the manner in which earnings that diverge from a target level of earnings are shared between the company and its customers.[27] Relative to BRORR plans, ESR plans often institute sharing over a broader range of earnings and implement intermediate levels of sharing, so incremental earnings do not necessarily accrue entirely to the company or entirely to its customers (AUC PBR Principle 5).

A typical ESR plan is illustrated in Figure 2. This figure, like Figure 1, depicts the relationship between the company's unadjusted earnings (which are the company's earnings if prices remain at the levels established at the start of the ESR plan) and the company's authorized earnings (which are its earnings after any price adjustments that are undertaken to implement the specified sharing of earnings). Under the ESR plan depicted in Figure 2, the company's authorized earnings coincide with its unadjusted earnings when these earnings are between E_1 and E_2.[28] Therefore, as the company's unadjusted earnings increase between E_1 and E_2, the company is authorized to keep all of the incremental earnings (as under BRORR).

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[25] The company's authorized return under RORR might similarly be linked to the level of service quality the company delivers.

[26] AUC PBR Principle 1 calls for service quality to be maintained under PBR.

[27] Earnings sharing regulation is sometimes referred to as "sliding-scale regulation" (e.g., Braeutigam and Panzar, 1993; Lyon, 1996).

[28] Figure 2 reflects this coincidence of earnings with the solid line segment that has a slope of 1 for unadjusted earnings between E_1 and E_2.

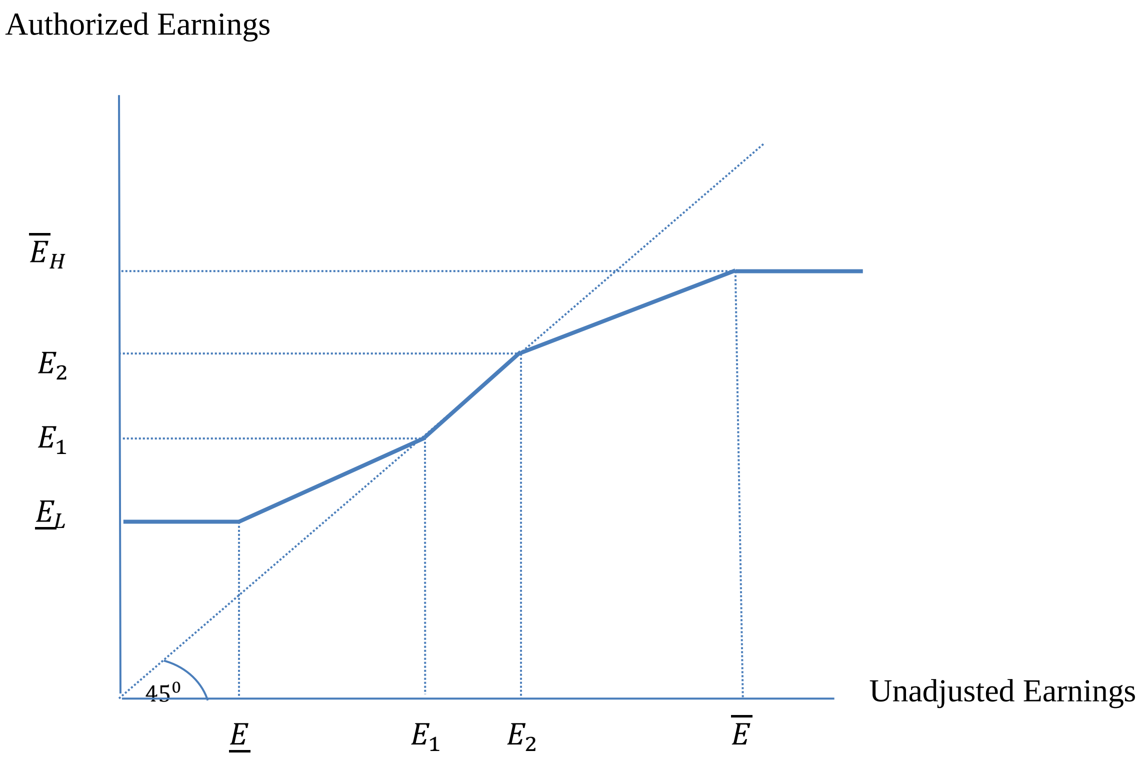

Figure 2. Earnings Sharing Regulation

As the company's unadjusted earnings increase above E_2 toward $\overline{E}$, the company is authorized to keep a fraction (e.g., one half) of the incremental earnings. The remainder of the incremental earnings is awarded to customers.[29] Thus, both the company and its customers benefit as the company's earnings increase between E_2 and $\overline{E}$ in Figure 2 (AUC PBR Principle 5).[30] Once the company's unadjusted earnings reach $\overline{E}$, though, all incremental earnings accrue to customers. Thus, the company's authorized earnings are capped at $\overline{E}_H$ in Figure 2.

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[29] The relevant portion of incremental earnings can be awarded to consumers in different ways. For instance, the prices charged to customers might be reduced. Alternatively, a bill credit might be awarded to all customers at the end of each year. The incremental earnings might also be employed to create or expand a program that provides rate relief for low income customers, for example.

[30] Observe that the solid line segment that appears above the unadjusted earnings between E_2 and $\overline{E}$ in Figure 2 has a slope between 0 and 1. This slope captures the explicit sharing of incremental earnings

The ESR plan depicted in Figure 2 also places a lower bound ($\underline{E_L}$) on the company's authorized earnings and implements a sharing of the incremental "loss" the company experiences as its unadjusted earnings decline below E_1 toward $\underline{E}$. As unadjusted earnings decline in this region, prices are increased to elevate the company's earnings above the level the company would experience in the absence of any price adjustment.[31] If unadjusted earnings decline below $\underline{E}$, prices are raised commensurately to ensure that the company's earnings never decline below $\underline{E_L}$. This lower bound on authorized earnings might represent, for example, the minimum level of earnings the company can tolerate without experiencing pronounced difficulty in attracting capital, serious risk of service interruptions, and/or a substantial decline in service quality.

To provide illustrative numbers, $\underline{E}$, $\underline{E_L}$, E_1, E_2, $\overline{E}_H$, and $\overline{E}$ might be 7%, 8%, 9%, 11%, 12%, and 13%, respectively. In this case, the firm's authorized earnings coincide with its unadjusted earnings whenever these earnings constitute a return on investment between 9% and 11%. As unadjusted earnings increase between 11% and 13%, the company and its customers each receive one half of the incremental earnings. The company is not permitted to earn more than a 12% return on investment. As unadjusted earnings decline below a 9% return on investment toward a 7% return on investment, prices are increased sufficiently to ensure the company and its customers share the incremental decline in earnings equally.[32] Prices are further elevated, as necessary, to ensure the company's earnings never fall below a 7% return on investment in this example.

The primary difference between ESR and BRORR is the less abrupt changes in the allocation of incremental earnings under ESR. In particular, the company receives some, but not all, of the incremental earnings it generates as its unadjusted earnings increase above E_2 under the ESR plan in Figure 2. Consequently, although the company's incentive to generate additional earnings are diminished once its unadjusted earnings rise to E_2, the incentive is not eliminated

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by the company and its customers. The larger is this slope, the larger is the fraction of incremental earnings that is awarded to the company.

[31] This lower level of earnings is represented in Figure 2 by the height of the 45^o line above unadjusted earnings between $\underline{E}$ and E_1.

[32] The fraction of incremental earnings awarded to the company can be explicitly linked to the level of service quality the company delivers. Such linkage can help to ensure that the company does not increase its earnings by reducing service quality unduly.

entirely.[33] Similarly, although the company's incentive to avoid additional reductions in unadjusted earnings is diminished once these earnings fall below E_1, the incentive is not eliminated. Consequently, depending on the details of its design, an ESR plan can provide more pronounced incentives for efficient operation than a BRORR plan.[34]

The potential flexibility of ESR plans raises the possibility that a regulator might find it advantageous to implement different ESR plans for different regulated companies (AUC PBR Principle 4). To illustrate, consider the following setting. Suppose a regulator oversees the operations of two regulated firms. Company 1 is known to operate efficiently, but requires extensive investment to replace aging infrastructure. Company 2 enjoys a modern infrastructure but is believed to operate the infrastructure inefficiently. In this setting, the regulator's primary tasks are to encourage investment in company 1's infrastructure and to motivate company 2 to operate more efficiently.

The regulator might design distinct ESR plans to pursue these two distinct tasks. The regulator might implement an ESR plan for company 1 that: (i) ensures the company's authorized earnings never fall below a relatively high level; and (ii) implements a corresponding relatively modest ceiling on the maximum earnings the company can attain. This ESR plan also might award to company 1 only a modest share of the incremental unadjusted earnings it generates between the specified lower and upper bounds on earnings.

The regulator might implement a very different ESR plan for company 2. The plan might entail a relatively pronounced range in which company 2's authorized earnings can vary. Furthermore, company 2 might be awarded a relatively generous share of the incremental unadjusted earnings it generates within the specified range.

The ESR plan implemented for company 1 can help to ensure that its shareholders receive a substantial, steady return on their investment in the company. The ESR plan implemented for company 2 can provide it with strong incentives to improve its operating efficiency in order to increase its unadjusted earnings (and thus its authorized earnings). More generally, the

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[33] The diminished incentive to generate additional earnings implies that the company has some incentive to engage in what Blackmon (1994) refers to as "regulatory abuse." This abuse entails expenditures on resources that the regulated firm would not undertake if it had to bear their full cost. Notice that a firm that is required to share 50 cents of each additional dollar of earnings effectively bears only 50 cents of each additional dollar of expense.

[34] Schmalensee (1989) and Lyon (1996), among others, discuss the potential merits of and drawbacks to ESR plans.

substantial flexibility that ESR plans admit can enable a regulator to serve customers well by tailoring the ESR plan to the prevailing regulatory goals and industry conditions.

Even when an ESR plan is reasonably well tailored to the prevailing environment, though, it can still introduce many of the drawbacks that arise under RORR and BRORR, and therefore be inconsistent with AUC PBR Principle 1. In particular, by restricting the company's earnings, ESR can limit the company's incentive to minimize operating costs and to otherwise realize exceptional performance.[35] Furthermore, because it entails ongoing monitoring of earnings, ESR can require substantial regulatory resources and therefore violate AUC PBR Principle 3. In addition, ESR plans can encourage regulators to disallow the company's expenditures on the grounds that they have been incurred imprudently. Such disallowances can increase the company's measured earnings and thereby obligate the company to deliver more "shared earnings" to customers.[36,37] The prospect of such disallowances can limit the company's incentive to pursue costly innovative activities even when the activities likely would serve customers well.[38]

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[35] ESR also can encourage strategic intertemporal cost shifting. To illustrate, a company that operates under ESR may delay costly maintenance to future years when earnings are otherwise expected to increase to levels that require the sharing of incremental earnings with customers.

[36] See Sappington and Weisman (2010), for example.

[37] An example of this phenomenon was presented during the AUC's 2012 PBR hearings. SBC (now AT&T), a telecommunications firm operating in the U.S., operated under an earnings sharing plan in 1993. Massive floods arose in SBC's operating territory during the summer of that year, causing pervasive service outages. The Missouri Public Service Commission questioned the manner in which SBC restored these outages and deemed that a substantial amount of costs had been incurred imprudently. The cost disallowances that followed increased the company's measured earnings into a range where the firm was required to share earnings with customers. These events prompted SBC to petition its regulators for a price cap regime without earnings sharing. See AUC (April 27, 2012, Proceedings, Volume 10, p. 1887).

[38] Earnings sharing can sometimes be implemented in less transparent ways. For example, the extent to which the regulated company's prices are adjusted to reflect significant, exogenous (Z factor) events might vary with the level of the company's prevailing earnings. Alternatively, or in addition, future X factors might be ratcheted upward to extract a portion of current earnings retroactively.

III. PRICE-BASED PBR PLANS.

Unlike earnings-based PBR plans that seek to instill competitive discipline by constraining earnings, price-based PBR plans seek to instill competitive discipline by constraining prices. The recent literature on incentive regulation suggests that price-based regulatory plans often provide stronger incentives for efficient operation than do earnings-based regulatory plans.[39] The superior incentive properties of price-based regimes arise when these regimes sever the link between the regulated company's costs and the prices it is permitted to charge for its services. The following passage is instructive.

> It is possible to conclude that under a properly articulated economic rationale, consumer protection against "excessive profits", as traditionally applied under profit regulation, could not be invoked to reestablish a necessary link between prices and profits. . . . In effect, therefore, the standard of constitutional protection for consumers under a price level regime would be modified. The focus would shift from protection against "excessive profits" *per se*, as defined under profit level regulation, to protection against prices viewed as "unconscionable" and "demonstrably irrelevant" to the purposes of the price level regime. (Hillman and Braeutigam, 1989, pp. 80-81)

Pure price cap regulation can present regulated companies with incentives similar to the incentives that prevail in competitive markets.[40] In particular, price cap regulation can present companies with strong incentives to: (1) adopt the least-cost production technology; (2) operate this technology efficiently; (3) diversify efficiently into new markets; (4) undertake efficient levels of cost-reducing innovation; (5) allocate costs appropriately; and (6) report costs truthfully. These strong incentives for efficient performance reflect the fact that pure price cap regulation operates much like a *fixed-price contract*, under which payment for a service rendered does not vary with the realized cost of performing the service. Consumers benefit from a *fixed-price contract* because the prices they pay do not vary directly with the company's realized operating costs. Consequently, consumers bear little or no risk of price variation during the price cap regime. Conversely, traditional rate of return regulation (and some forms of price cap regulation with earnings sharing) operate much like a *cost-plus contract*. In particular, the prices

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[39] See Braeutigam and Panzar (1989), Sappington (1994, 2002), and Armstrong and Sappington (2006), for example.

[40] The term "pure price cap regulation" refers to a price-based regulatory regime in which there is no earnings sharing with consumers, regardless of the level of the earnings secured by the regulated company.

consumers pay increase as the company's realized costs increase. Consequently, these prices can exhibit considerable volatility.

Although price cap regulation can provide strong incentives for efficient operation, it can admit very high or very low earnings. The prospect of extreme earnings can undermine regulator's commitment to the regulatory regime.[41]

> …Can the regulator credibly pre-commit to a system of price cap regulation? Stated differently, can today's regulatory commission bind its successor? A regulatory agency is likely to be subjected to considerable political pressure to change the price cap or price cap formula over time. If a firm regulated by price caps begins to earn large profits, consumers will no doubt petition the regulator to lower the price in the core market (Braeutigam and Panzar, 1989, p. 320).
>
> This issue of recontracting and the efficiency distortions resulting therefrom is arguably one of the more serious problems with PC [Price Cap] regulation in practice. A key premise underlying PC regulation is that increased profits for the firm will be viewed by regulators and their constituency as something other than failure of regulation itself. If this premise is false, then regulators will be under constant political pressure to recontract when the firm reports higher profits. In equilibrium, the firm learns that this is how the game is played and the efficiency gains from PC regulation in theory may fail to materialize in practice (Weisman, 993, pp. 364-65).

If not implemented appropriately, a severed link between prices and costs also could jeopardize service quality and reliability. When a company can secure higher earnings by reducing its operating costs, the company may be tempted to reduce its costs by allowing service quality and reliability to decline. This decline was identified as a potential problem in the early days of incentive regulation in the telecommunications industry. However, the empirical evidence generally does not support a strong causal link between incentive regulation and reduced service quality.[42] This may be the case in part because price-based PBR generally is accompanied by explicit restrictions on the level of service quality the regulated company must deliver.[43]

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[41] See Weisman (2002) for further discussion of regulatory commitment and regulatory opportunism under price cap regulation.

[42] See Banerjee (2003) and Sappington (2003, 2005), for example.

[43] Ter-Martiroysyan and Kwoka (2010) find that although service outages do not occur more frequently under incentive regulation, the outages that do arise tend to persist for longer durations. The authors note that reductions in service quality can be avoided with explicit financial penalties for sub-standard

We now consider the central advantages and disadvantages of eight distinct types of price-based PBR plans. The eight plans considered here are not the only price-based PBR plans that might conceivably be implemented in Alberta. Rather, the plans are intended to reflect a representative sample of plans that have been adopted elsewhere and/or might reasonably be afforded serious consideration for possible adoption in Alberta.

A. Partial Price Caps with Bifurcation of CAPEX and OPEX and a Mid-Term CAPEX Update.

The first plan we consider contains elements of both earnings-based regulation and price-based regulation. Under this plan, CAPEX is subject to traditional rate of return regulation, whereas OPEX is subject to price cap regulation. Specifically, the company is afforded the opportunity to earn a fair return on prudently incurred capital investment. Compensation for operating expenses is governed by a price cap mechanism which limits the direct link between authorized revenues and current operating expenses. At the outset of the PBR regime, the company's aggregate revenue requirement is partitioned into a component associated with CAPEX and a component associated with OPEX. The disaggregated revenue requirement forms the basis for the rate structure implemented by the Commission. Over the course of the PBR regime, the annual adjustment to aggregate rates under the $I - X$ index is limited to the OPEX component of the revenue requirement. The price cap mechanism takes the form of pure price cap regulation because it entails no earnings sharing.

A key feature of this PBR plan is the mid-term CAPEX update. Under this plan, the company provides a CAPEX forecast at the beginning of the regime and an updated CAPEX forecast at the mid-point of the regime. This update recognizes that: (i) the company may have somewhat less control over CAPEX than OPEX;[44] and (ii) the inherent uncertainty associated with CAPEX can make it very difficult for the company to forecast CAPEX over the entire duration of the PBR regime, particularly when the length of the regime is pronounced.

The rationale for treating CAPEX and OPEX differently under the PBR plan merits additional discussion. As a public utility with: (i) a carrier-of-last resort obligation; (ii) the obligation to maintain adequate service quality and reliability; and (iii) little or no discretion

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levels of service quality. See Sappington (2005) for further discussion of the complexities inherent in designing reward/penalty schemes for efficient provisioning of service quality.

[44] See Kwoka (2009), for example, for a discussion of why this is likely to be the case.

regarding the markets to be served and the timeframe over which to serve them, the company's capital requirements are driven in significant part by exogenous factors, including population growth and consumption trends. Furthermore, the long-lived, lumpy nature of capital for public utilities implies that realized costs may diverge significantly from expected revenues. In contrast, utilities typically can fine-tune the processes and procedures they employ to control operating costs, and these costs tend to be relatively predictable.

As is the case with all PBR plans, this plan with bifurcated treatment of CAPEX and OPEX entails both advantages and disadvantage, which are now considered in turn.

The potential advantages of this bifurcated PBR plan include the following four. First, a predictable return on investment can encourage investment, help the company attract capital, and perhaps reduce the company's cost of capital (AUC PBR Principle 2). The ability to attract capital on reasonable terms can be of particular value in the rapidly-growing Alberta economy, which requires considerable infrastructure investment. Second, required *ex ante* approval for capital investment, coupled with *ex post* prudence reviews, can limit incentives for excessive capital investment. Third, high-powered incentives are focused on activities over which the company has the most control.[45] Fourth, the mid-term review recognizes the complexities inherent in forecasting CAPEX over the entire PBR regime, while eliminating administratively burdensome annual rate cases (AUC PBR Principle 3). Furthermore, if a company were forced to forecast CAPEX over the course of the entire PBR regime, it might conceivably have an incentive to overstate capital requirements in order to reduce the likelihood of reductions in service quality.

Professor John Kwoka presents evidence of under-investment in CAPEX under PBR plans that treat CAPEX and OPEX symmetrically under a simple price cap plan similar to those employed extensively in the telecommunications sector. He further points out that a number of states in the U.S. have adopted a hybrid approach to PBR in which OPEX is subject to price cap regulation, but CAPEX is subject to some variant of rate of return regulation. These observations underlie his recommendation for treating CAPEX and OPEX differently under PBR plans.

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[45] The power of a regulatory regime refers to the fraction of realized cost savings the regulated company is permitted to retain. Pure price cap regulation is considered a high-powered regulatory regime because the regulated company is permitted to keep all of the cost savings it secures during the price cap regime. In contrast, rate of return regulation is considered a low-powered regulatory regime because the firm is typically is required to return to customers in the form of lower prices all of the cost savings that arise. See, for example, Laffont and Tirole (1993, p. 11).

> The under-investment problem under incentive regulation is likely to be most acute under plans that cap price at a level intended to cover both capital and operating costs, leaving to the utility decisions about expenditures on each. … This understanding has prompted regulators to modify incentive plans so as to treat operating and capital costs differently. The most common variant involves the use of straightforward incentive regulation for operating costs but more traditional regulation of the utility's investment. This reflects the … fact that incentive regulation seems well designed for conservation of operating costs, but less well suited to investment behavior and costs. This hybrid approach may in fact capture the comparative advantage of each mode of regulation (Kwoka, 2009, p. 15).
>
> The simplicity of incentive regulation has over time given way to recognition of the need for modifications to address quality and investment issues. Neither of these latter objectives is likely to be satisfied by a plan that simply sets price or the parameters of a pricing formula. … With respect to capital investment, there is a widespread view that some form of rate of return regulation may have a comparative advantage over incentive regulation. For this reason most alternative approaches combine incentive regulation for operating costs with some form of traditional cost-based regulation for investment decisions (Kwoka, 2009, p. 22).

Professor Kwoka's reference to the need to sacrifice some degree of simplicity in the design of PBR plans in order to address "quality and investment issues" figured prominently in the AUC's 2012 PBR proceeding. As discussed in Section I above, the Commission initially favored the simpler approach commonly employed in the telecommunications industry, whereas the companies had serious concerns that this approach could lead to capital deficiencies during the PBR regime.

The potential disadvantages of this PBR plan with a bifurcated treatment of CAPEX and OPEX include the following six. First, the company may have excessive incentive to undertake capital investment if the authorized return exceeds the company's cost of capital. Second, the company may have insufficient incentive to undertake capital investment if the authorized return falls short of the company's cost of capital. Third, the company may have limited incentive to choose capital and non-capital inputs in cost-minimizing proportions, in violation of AUC PBR Principle 1. The incentive to undertake excessive CAPEX in this framework may be even more pronounced than under traditional rate of return regulation. This is the case because the company is fully compensated for CAPEX that can serve to reduce OPEX. The reduced operating costs, in turn, can augment the company's profit under price-based regulation of OPEX if the lower costs increase the company's price-cost margins.[46] Consequently, the bifurcated treatment of CAPEX and OPEX could limit the extent to which consumers share the benefits generated by PBR (AUC PBR Principle 5).

Third, the determination of a company's cost of capital and its capital investment needs can be a time-consuming, resource-intensive, and imperfect process, thereby violating AUC PBR Principle 3. Fourth, confiscatory *ex post* prudence reviews can limit incentives for capital investment. Fifth, in practice, it can be more difficult to infer from available historic data the rate at which operating costs alone are likely to change over time than to infer the rate at which all costs are likely to change. As a result, an OPEX-specific *X* factor may be difficult to estimate accurately. The AUC appeared to arrive at this conclusion when it observed "the Commission is not satisfied that there is any acceptable way to create an X factor suitable for use for non-capital-related costs only."[47]

Sixth, the impact of changes in CAPEX on appropriate OPEX-specific *X* factors may be difficult to calculate accurately. For example, the company may be able to reduce OPEX at a rate that exceeds the *X* factor only because it is authorized to increase its capital investment. As a result, it may be difficult to differentiate between endogenous reductions in OPEX that reflect superior performance by the company and exogenous reductions in OPEX that are achieved through Commission-approved CAPEX additions.

It should also be noted that the AUC summarily rejected this approach in the 2012 PBR proceeding, in part because the approach was not viewed as a significant departure from traditional rate of return regulation.[48,49] In other words, it may be difficult to reconcile this

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[46] EPCOR testified in the 2012 PBR proceeding that increases in CAPEX would not generally lead to reductions in OPEX. EPCOR (August 16, 2013, ¶¶ 135-136). In specific cases (e.g., automatic meter reading), increases in CAPEX would be expected to lead to reductions in OPEX. In the telecommunications industry, the substitution of capital for labor has dramatically reduced the number of employees per access line.

[47] AUC Decision 2012-237, ¶ 58.

[48] *Id.*

[49] The Commission signaled at the outset of the PBR hearings in 2012 that it wished to implement a PBR regime that furthered the process of discovery and innovation that typically is not fostered by traditional rate of return regulation. To this end, the AUC distributed to all parties of record, as a potential aid to questioning by the Commission, the article by Weisman and Pfeifenberger (2003). This article explains why high-powered incentives can outperform regulatory mandates. See AUC (April 11, 2012).

approach with AUC PBR Principle 1. In addition, to the extent that this approach retains many of the administratively burdensome aspects of traditional rate of return regulation, this approach may be inconsistent with AUC PBR Principle 3.

B. Partial Price Caps with Bifurcation of CAPEX and OPEX and No Mid-Term CAPEX Update.

Now consider a closely related PBR plan that does not include a mid-term CAPEX update. Specifically, suppose CAPEX is subject to traditional rate of return regulation, whereas OPEX is subject to price cap regulation. In particular, the company is afforded the opportunity to earn a fair return on prudently incurred capital investment, while recovery of operating expenses is governed by a price cap index that limits the direct link between authorized revenues and current operating expenses. The plan entails no earnings sharing. The one notable difference between this approach and the one described in Section III.A is that the company provides a single CAPEX forecast at the beginning of the regime and does not update the forecast at any point during the PBR regime.

Three of the four primary advantages of this plan parallel the advantages identified in section III.A. First, a predictable return on investment can encourage investment, help the company attract capital, and perhaps reduce the company's cost of capital (AUC PBR Principle 2). Second, required *ex ante* approval for capital investment, coupled with *ex post* prudence reviews, can limit incentives for excessive capital investment. Third, high-powered incentives are focused on the (operating) activities over which the company has the most control. An additional advantage of the present plan is that the absence of a mid-term review of CAPEX reduces the frequency of administratively burdensome rate cases (AUC PBR Principle 3).

The potential disadvantages of this approach are also similar to those discussed in Section III.A, and include the following nine. First, the company may have excessive incentive to undertake capital investment if the authorized return exceeds the company's cost of capital. Second, the company may have insufficient incentive to undertake capital investment if the authorized return falls short of the company's cost of capital. Third, the company may have limited incentive to choose capital and non-capital inputs in cost-minimizing proportions (AUC PBR Principle 1). Fourth, the initial determination of a company's cost of capital and its capital investment needs can be a time-consuming, resource-intensive, and imperfect process (AUC

PBR Principle 3). Fifth, confiscatory *ex post* prudence reviews can limit incentives for capital investment.

Sixth, in practice, it may be more difficult to infer from available historic data the rate at which operating costs alone are likely to change than to infer the rate at which all costs are likely to change over time. As a result, an appropriate OPEX-specific X factor can be difficult to calculate accurately. In particular, the calculation of a single X factor that pertains to both CAPEX and OPEX simply requires the computation of an industry-wide total factor productivity growth rate. Conversely, the calculation of an OPEX-specific X factor requires the computation of a productivity factor for a subset of the inputs employed in the production process. There is no broad-based consensus on how to compute such a disaggregated productivity factor due to the inherent difficulty of identifying the unique contributions of individual factors of production.

Seventh, the impact of changes in CAPEX on appropriate OPEX-specific X factors can be difficult to calculate accurately. Specifically, if capital can be substituted for labor, then the OPEX-specific X factor should be adjusted to reflect Commission-approved CAPEX additions. Such adjustment is likely to be administratively burdensome and complex (AUC PBR Principle 3). Eighth, the absence of a mid-term review could result in actual CAPEX that departs significantly from forecast CAPEX.[50] Ninth, the absence of a mid-term review could motivate the regulator (company) to implement (propose) a regulatory regime of shorter duration, which would reduce incentives for efficiency, particularly if there is an earnings true-up prior to the start of the new PBR regime (AUC PBR Principle 1).[51]

The absence of a mid-term CAPEX forecast raises two important concerns. First, a key tenet of sound incentive regulation is to “limit the firm’s financial responsibility for factors beyond its control” (Sappington, 1994, p. 269). Hence, to the extent that the company’s limited ability to forecast CAPEX accurately over the entire PBR regime is largely beyond the company’s control, it is generally inappropriate to hold the company financially responsible for the associated risk.

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[50] It should be noted in this regard that in the last PBR proceeding, EPCOR’s position was that CAPEX forecasts beyond three years were subject to significant uncertainty and could not be deemed reliable in light of rapidly changing conditions in the Alberta economy. EPCOR (July 22, 2011, ¶ 34).

[51] An earnings true-up refers to changes in retail rates that are implemented to ensure the regulated company earns its target rate of return. A true-up process can undermine a regulated company’s incentives for cost minimization, particularly when true-ups occur frequently. In general, the more frequently an earnings true-up occurs under PBR, the more the plan resembles a *cost-plus contract* and the less it resembles a *fixed-price contract*.

Second, the company is confronted with a *Hobson's choice* of sorts. If it errs by exaggerating its CAPEX forecast at the outset of the PBR regime to hedge against uncertainty, it risks both future disallowances by the regulator on grounds of imprudence and increased regulatory scrutiny going forward. Such disallowances and increased scrutiny can impose significant costs on all parties. In contrast, if the company experiences a capital deficiency, it may be forced to choose between disappointing investors and permitting service quality to erode and incurring the associated potentially large service-quality penalties.[52] Hence, the benefits of eliminating administratively burdensome rate cases via the elimination of the mid-term review of CAPEX must be balanced carefully against the associated costs, which can be substantial.

C. Price Caps with Capital Trackers and Associated K Factors.

In its 2012 PBR decision, the AUC adopted a price cap plan with capital trackers and associated K factors. Under this plan, a single $I - X$ index governs the company's earnings, and there is no earnings sharing. The X factor reflects historic industry total factor productivity growth rates and company-specific stretch factors determined by the Commission. This index can be modified during the PBR regime by a K factor that reflects the financial consequences of specific capital investment projects as identified in the capital trackers. The projects in question, which must be outside of the normal course of the company's ongoing operations, include projects required by an external party.[53]

To be considered for a K factor adjustment, each individual capital tracker must exceed a materiality threshold.[54] There is no aggregate materiality threshold for all capital trackers combined. There is also no linkage between the magnitude of K factor adjustments and the company's prevailing earnings. The Commission adopted this PBR plan in large part to limit the

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[52] An increase in CAPEX without a corresponding increase in rates can be expected to lower the realized rate of return and disappoint investors.

[53] Examples include: (1) relocation of EDTI's distribution infrastructure at the request of the City of Edmonton; and (2) replacing EDTI's current Interval Meter Data Collection and Processing System ("MDCPS") with a new data collection engine that complies with Measurement Canada's requirements. See EPCOR (December 14, 2012, § 3.1.1).

[54] The materiality threshold is a minimum dollar amount that each proposed capital project must satisfy in order to be given consideration as a capital tracker.

dilution of the high-powered incentives that arise under pure price cap regulation and in competitive markets (AUC PBR Principle 1).[55]

The potential advantages of this PBR plan include the following five. First, the plan provides incentives for the company to limit overall production costs (both capital costs and operating costs) and to employ capital and non-capital inputs in cost-minimizing proportions (AUC PBR Principle 1). Second, by admitting K factor adjustments, the plan can afford the company a reasonable opportunity to earn a fair return on its investment even in the presence of significant changes in capital costs and capital investment needs (AUC PBR Principle 2). Third, the plan may limit a company's uncertainty about its ultimate recovery of capital costs, and thereby encourage capital investment. Fourth, the plan may help to limit rate shock by allowing for rate adjustments (reflecting K factor adjustments) during the course of the PBR regime (AUC PBR Principle 5). Fifth, the plan can help to conserve regulatory resources by only considering capital trackers that exceed a specified materiality threshold (AUC Principle 3).

The potential disadvantages of this plan include the following six. First, price changes based on an X factor that reflects historic industry productivity changes may not ensure adequate compensation for the regulated company when costs are unavoidably increasing over time (AUC Principle 2).[56] Indeed, this was the issue addressed by EPCOR's Category 2 capital trackers that were proposed to address capital funding shortfalls under the $I - X$ index.[57] Specific examples include tools, equipment, and vehicle replacement that would not typically be considered outside the normal course of company operations.

Second, in practice, it can be difficult to distinguish between projects that are outside of the normal course of the company's ongoing operations and those that are not. This issue generated significant discussion in the 2012 PBR proceeding regarding the purported existence of a line of demarcation between so-called baseline CAPEX and incremental CAPEX.[58]

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[55] AUC (2013, ¶ 586).

[56] An X factor that adjusts appropriately for historic industry-specific input price growth rates can provide adequate compensation for a company that operates in a steady-state environment, but potentially not in a setting where investment needs are increasing systematically over time. To the extent that the X factor only reflects historic trends, a stretch factor might be employed to account for expected changes in industry-specific productivity and input price growth rates.

[57] EPCOR (December 14, 2012, pp. 67-68).

[58] AUC (2012, Volume 10, pp. 1906-1920). EPCOR testified that it was difficult, if not impossible, to disentangle incremental CAPEX from baseline CAPEX. This is the case because when EPCOR

Third, the plan may provide the company with an incentive to identify (and possibly exaggerate) "positive" capital trackers, but overlook (or understate the impact of) "negative" capital trackers.[59] This problem may be particularly acute given the comingling of EPCOR's Category 1 and Category 3 trackers with its Category 2 trackers. Fourth, ongoing adjustments for unusual capital projects might limit incentives to minimize overall production costs (AUC PBR Principle 1).[60] Incentives can be diluted particularly severely by a full true-up of actual CAPEX associated with the capital tracker and forecast CAPEX.[61]

Fifth, despite the project-specific materiality threshold, substantial resources may be required to identify and quantify relevant capital trackers, unless the opportunity to do so is explicitly limited (AUC PBR Principle 3).[62] This is the case because it can be difficult to distinguish between projects that are outside of the normal course of the company's ongoing operations and projects that are within the normal course of the company's operations. In essence, the regulator is required to second-guess the company's operating practices, a task that is fraught with difficulty. Sixth, the company may not be able to secure adequate earnings if many unanticipated investment projects arise, each of which entails costs below the specified project-specific materiality threshold (AUC PBR Principle 2). In essence, the company may risk "death by a thousand cuts."

A full true-up of forecast CAPEX and actual CAPEX can undermine incentives for cost containment and work at cross purposes with the high-powered incentives the Commission had sought to preserve in adopting this approach (AUC PBR Principle 1). EPCOR highlighted this concern in its final argument in the capital tracker proceeding (EPCOR, 2013, § 2.2). EPCOR proposed a full true-up of forecast CAPEX and actual CAPEX for Category 1 trackers. In light of the fact that Category 1 trackers are essentially capital-specific Z (exogenous) factors, this approach is consistent with sound incentive regulation principles.

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undertakes an incremental CAPEX project, it is generally prudent and cost-effective to simultaneously implement other upgrades or replacements that normally would be considered baseline CAPEX.

[59] It may be possible to limit this incentive with true-ups and annual *ex ante* reviews of capital tracker projects.

[60] A requirement to demonstrate that the benefit of the proposed new capital investment could not have been achieved at lower cost through other means can help mitigate this potential problem.

[61] EPCOR (2013, ¶¶ 60-66).

[62] Adjustments for capital trackers might only be permitted at a limited number of times during the PBR regime.

EPCOR proposed two alternatives for strengthening the incentives for cost containment associated with its Category 2 trackers, which it referred to as Alternative 1A and Alternative 1B. Each of these alternatives and their incentives properties are discussed in turn.

Under Alternative 1A, EPCOR would be permitted to true-up its Category 2 Trackers on a prospective basis only, rather than the full, retrospective basis contemplated in the Commission's Decision. In other words, EPCOR would not be allowed to true-up its capital trackers to actual costs for the period of time between the approval of the Category 2 Tracker and the Commission's approval of the true-up. Instead, only a prospective true-up would be permitted, beginning at the time the true-up is approved. The prospective true-up would occur only after a stipulated period of time, ranging from the time remaining in the calendar year to the full remaining term of the PBR regime. When EPCOR effectively is held responsible for cost variances during the period of time between the approval of the Category 2 Capital Tracker and the true-up to actual costs, the company faces strong incentives to undertake only necessary, efficient capital projects.

Under Alternative 1B, EPCOR's ability to true-up its Category 2 Trackers during the PBR term would be limited to the share of the company's annual forecast capital cost for each Category 2 Tracker that is funded by the approved Capital Tracker K factor adjustment (i.e., to the portion of the company's annual forecast capital cost that is not funded by the $I-X$ mechanism). It is noteworthy that the AUC was sufficiently interested in a mechanism by which the incentives for cost containment could be strengthened that it provided the Commission's Aid to Panel Questioning (Exhibit 229) in the capital tracker proceeding.

A slightly modified form of Exhibit 229 permits a demonstration of how the true-up mechanism might work in practice. This demonstration is provided here with the aid of Table 1, which considers two distinct scenarios. Scenario 1 hypothesizes a CAPEX addition in which 50% of the required capital is funded under the $I-X$ index and 50% is funded under the capital tracker. Scenario 2 hypothesizes a CAPEX addition in which 60% of the required capital is funded under the $I-X$ index and the remaining 40% is funded under the capital tracker.

Line (L)		**Scenario 1**	**Scenario 2**
		$ Amount	**$ Amount**
	Forecast Stage:		
L1	Forecast CAPEX Additions	10	10
L2	Covered by $(I-X)$	5	6

L3	Capital Tracker (L1 – L2)	5	4
	True-Up Stage:		
L4	Actual CAPEX Additions	12	12
L5	Variance (L1 – L4)	2	2
L6	Variance Deemed to be Covered by $(I - X)$	1 or (50%)	1.2 or (60%)
L7	Variance Deemed to be Related to Approved Capital Tracker (L5 – L6)	1 or (50%)	0.8 or (40%)
L8	**Tracker True-Up**	**1**	**0.8**

Table 1. Capital Tracker True-Up Mechanics

First consider Scenario 1 in Table 1, where the company forecasts CAPEX Additions of 10, but only 5 are covered under the $I - X$ price cap mechanism. This leaves a residual of 5 to be financed through the capital tracker. In the true-up stage, the company's actual CAPEX Additions are assumed to be 12 rather than 10, which leaves a positive variance of 2 as shown in line L5 of Table 1. Given that 50% of the forecast CAPEX addition is not covered under the $I - X$ index, the company is only able to true-up 50% of the variance, or 0.5 × 2 = 1 as shown in lines L7 and L8.

Now consider Scenario 2, where 40% of the forecast CAPEX addition is not covered under the $I - X$ index. In this case, the company is only able to true-up 40% of the variance, or 0.4 × 2 = 0.8, as shown in lines L7 and L8. Hence, the risk the company faces, as measured by the responsibility it bears for the variance between forecast and actual CAPEX, is equal to the percentage of the CAPEX additions that are covered by the $I - X$ index.

Another way to envision the risk-bearing attributes of this true-up mechanism is to partition the cost recovery for CAPEX variance into endogenous and exogenous components. A proxy for the endogenous component (i.e., the component that is under the control of the company) is equal to the percentage of CAPEX addition governed by the $I - X$ index. A proxy for the exogenous component (i.e., the component that is beyond the control of the company) is equal to the percentage of the CAPEX addition that is not covered by the $I - X$ index. This approach, which explicitly differentiates between endogenous and exogenous components of the CAPEX variance, is consistent with the principle that a sound PBR regime should "limit the firm's financial responsibility for factors beyond its control" (Sappington, 1994, p. 269). In other words, if the company operated under an $I - X$ index with no capital trackers, it would have no opportunity to seek recourse for funding shortfalls from the regulator, because all required outlays are effectively deemed to be endogenous to the firm. In contrast, for purely exogenous events for which the $I - X$ index provides no funding, the firm would be fully compensated (just as it would be in presence of Z factors) for all prudent CAPEX outlays. Hence, it may be reasonable to limit the true-up between actual outlays and expected outlays to that portion of the expected outlay funded through the capital tracker – the exogenous component.

D. Price Caps with an Incremental Capital Module.

The price cap plan with an incremental capital module is essentially the approach the Ontario Energy Board (OEB) adopted for addressing the complexities presented by incremental CAPEX over the course of the PBR regime.[63] Under this plan, a single $I - X$ index governs the company's earnings and there is no earnings sharing. The X factor reflects historic industry total factor productivity growth rates and company-specific stretch factors determined by the Commission. This index can be modified via K factor adjustments during the course of the PBR regime to reflect specific capital investment projects. Hence, the "capital module" takes the form of an adjustment to the price cap formula to provide adequate funding for special (incremental) capital projects. These projects, which must be outside of the normal course of the company's ongoing operations, include projects required by an external party. To be considered for a K factor adjustment, the entire set of capital trackers in total must exceed a stipulated materiality threshold, but there is no materiality threshold for any individual capital tracker. Finally, the magnitude of K factor adjustments does not vary with the level of the company's prevailing earnings.

The potential advantages of this plan are similar in many respects to the advantages of the plan discussed in Section III.C above. These advantages include the following six. First, because prices are governed by a single $I - X$ index, this plan provides incentives for the company to limit overall production costs (both capital costs and operating costs) and to employ capital and

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[63] It is noteworthy that the OEB retained the incremental capital module (ICM) for its fourth PBR regime, but modified the applicable language to allow for a somewhat broader category of CAPEX applications. Specifically, the language was revised to remove words such as "unusual" and "unanticipated" as prerequisites for an application for incremental capital, although the requirement that the proposed expenditures be non-discretionary remains (OEB, 2012, p. 18). This change may reflect the fact that a more restrictive test for CAPEX applications could increase the risk of capital insufficiency at some point during the PBR regime.

non-capital inputs in cost-minimizing proportions (AUC PBR Principle 1). Second, because it includes K factor adjustments, the plan may afford the company a reasonable opportunity to earn a fair return on its investment even in the presence of significant changes in capital costs and (exogenous) capital investment needs (AUC PBR Principle 2). Third, the plan may limit a company's uncertainty about its ultimate recovery of capital costs, and thereby encourage capital investment. Fourth, the plan can help to limit rate shock by allowing for rate adjustments during the course of the PBR regime. Fifth, the plan conserves on regulatory resources to some extent by only considering capital trackers that, in total, exceed a specified materiality threshold (AUC PBR Principle 3). Six, the aggregate materiality threshold can enable the company to earn an adequate return even when the need arises for several "small" investment projects.

The potential disadvantages of this plan are also similar in many respects to the disadvantages of the plan discussed in Section III.C above. The disadvantages include the following five. First, price changes that reflect historic industry productivity changes may not ensure adequate compensation in the presence of costs that increase unavoidably over time (AUC PBR Principle 2). Notably, as discussed in greater detail below, this plan addresses only one of the two predominant sources of revenue inadequacy that a company may encounter over the course of the PBR regime (i.e., exogenous CAPEX additions). Second, in practice, it can be difficult to distinguish between projects that are outside of the normal course of the company's ongoing operations and those that are not. Third, the company may have an incentive to identify (and possibly exaggerate) "positive" capital trackers, but overlook (or understate the impact of) "negative" capital trackers. Fourth, ongoing adjustments for unusual capital projects can limit incentives to minimize overall production costs (AUC PBR Principle 1). Fifth, because there is no materiality threshold on individual projects, substantial resources may be devoted to analyzing proposed capital trackers.

A key difference between this plan and the AUC's current PBR plan concerns the specific categories of capital trackers that are permitted. Under the OEB's incremental capital module approach, EPCOR's Category 1 and Category 3 capital trackers (which reflect capital projects for which the $I - X$ component of the PBR formula provides no funding) would presumably be allowed, but EPCOR's Category 2 trackers (which reflect adjustments for specific projects that are not adequately funded by the $I - X$ component of the PBR formula) would not be allowed. In this sense, the incremental capital module approach is more restrictive than the AUC's current capital tracker approach. To see why, recall that under the AUC's guidelines, if a project is to qualify as a capital tracker, then "the project must be outside of the normal course of the company's ongoing operations."[64] In AUC Decision 2013-435, the Commission adopted a relatively broad interpretation of this condition. Specifically, the Commission allowed for capital trackers in the case of extraordinary projects as well as project-specific expenditures incurred in the course of ongoing operations that were deemed to be not adequately funded under the $I - X$ index.[65] The AUC apparently felt compelled to adopt a broader view of the various sources of exogenous revenue inadequacy than the view reflected in the incremental capital module approach.[66]

E. Price Caps with an *F* Factor ("*K*-Bar") Adjustment.

Under a price cap plan with an F factor adjustment, a single $I - X$ index governs the company's earnings and there is no earnings sharing. The X factor reflects historic industry total factor productivity growth rates and company-specific stretch factors determined by the Commission. The company identifies at the start of the PBR regime any additional "F (forward-looking) factor" adjustment that is required for (expected) revenue sufficiency. In essence, the F factor reflects the extent to which the standard $I - X$ index fails to provide the company with the opportunity to earn a fair return on its foreseeable, prudent capital investments over the course of the PBR regime (AUC PBR Principle 2).[67] During the PBR regime, the company can apply for capital trackers that are not known (and not knowable) at the start of the PBR regime. These capital trackers can reflect unique life cycle replacement projects or projects required by a third party for which the $I - X$ component of the PBR formula does not provide compensation.

The relationship between this approach and three categories of capital trackers that EPCOR identified in the capital tracker proceeding merits clarification. Under this approach, EPCOR's Category 1 and Category 3 trackers would be addressed via K factors, whereas EPCOR's Category 2 trackers would be addressed via the F factor. This bifurcation has the advantage of

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[64] AUC Decision 2012-237, ¶ 592.

[65] AUC Decision 2013-435, § 3.1.3.

[66] It should be noted that the incremental capital module approach was placed on the record in the 2012 PBR proceeding and was addressed in the rebuttal stage of the proceeding by various parties, including EPCOR and the City of Calgary.

[67] The F factor can change during the course of the PBR regime. However, the specific values of the F factor that will prevail in each year should be specified clearly at the outset of the regime to ensure that the F factor does not devolve into a "make-whole" safety net for the firm.

restricting *K* factors to those categories of capital trackers that the Commission initially envisioned in its 2012 PBR proceeding as the proper domain for *K* factor adjustments. It is further noteworthy that the AUC may have signaled some preliminary support for this approach in its 2013 Capital Tracker proceeding.[68] This approach differs from a price cap plan with an ICM by recognizing at the outset of the PBR regime that because an ICM limits capital trackers to EPCOR's category 1 and category 3 classifications, even an appropriately formulated ICM could leave the company with an exogenous revenue deficiency (i.e., a revenue deficiency through no fault of its own).

The potential advantages of a price cap plan with an *F* factor adjustment include the following seven. First, the plan allows the company a reasonable opportunity to earn a fair return even in the presence of significant changes in capital costs and capital investment needs (AUC PBR Principle 2). Second, the plan can encourage the company to undertake comprehensive operations planning. Third, the plan provides incentives for the company to limit overall production costs (both capital costs and operating costs) and to employ capital and non-capital inputs in cost-minimizing proportions (AUC PBR Principle 1).

Fourth, a plan of this type streamlines the regulatory process after the initial forward-looking assessment of prudent capital investment (AUC PBR Principle 3). Fifth, the plan leverages familiarity with telecom style price-cap regulation (and the experience of key AUC Commissioners) while explicitly accounting for the unique characteristics of the energy sector. Sixth, to the extent that foreseeable capital expenses are pre-approved, the plan can encourage investment by reducing the financial risk the company faces.

Seventh, this plan provides for a clear line of demarcation between issues of ongoing financial solvency (EPCOR's Category 2 trackers) and the AUC's initial conception of the qualifying criteria for a capital tracker (EPCOR's Category 1 and Category 3 trackers). By limiting capital trackers to purely exogenous CAPEX, this approach may give rise to more high-powered incentives relative to those reflected in the AUC's current capital tracker approach (discussed in Section III.C above).

The potential disadvantages of a price cap plan with an *F* factor adjustment include the following four. First, the forward-looking approach the plan entails could provide the company

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[68] Application No. 1606029, Proceeding ID No. 566, Proceedings, Transcripts, Volume 7, pp. 1335-1354, July 17, 2013.

with incentives to exaggerate actual capital investment needs.[69] Second, the initial forward-looking assessment of prudent capital investment requires substantial regulatory resources (AUC PBR Principle 3). Third, the line of demarcation between so-called baseline CAPEX, as reflected in the F factor, and incremental CAPEX, as reflected in the K factor, may be difficult to identify.[70] Fourth, the company may have an incentive to identify (and possibly exaggerate) "positive" capital trackers, but overlook (or understate the impact of) "negative" capital trackers.

F. Price Caps with Limited Factor Adjustments and a Midterm Review.

A price cap plan with a mid-term review but no capital trackers is similar to the price cap plan considered in Section III.E. The plan contemplates a single $I - X$ index that governs the company's earnings for a specified period of time (e.g., 6 years). There is no earnings sharing. The X factor reflects historic industry total factor productivity growth rates and company-specific stretch factors determined by the Commission. The company has the opportunity to identify at the start of the PBR regime any additional "F factor" adjustment that is relevant. As discussed in detail in Section III.E, the F factor reflects the extent to which the standard $I - X$ index fails to allow the company the opportunity to earn a fair return on its foreseeable prudent capital investments over the course of the PBR regime. The central difference between the plan discussed in Section III.E and the present plan is the inclusion of the option for a single, mid-term "bottom-up" review of capital requirements, with corrections for relevant capital trackers.[71] The present plan also does not permit additional capital trackers during the PBR regime.

Four key features of this review of capital requirements merit emphasis. First, the review is limited to a consideration of projects that were not known (and not knowable) at the start of the

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[69] These undesirable incentives can be mitigated to some extent via *ex post* prudence reviews and ongoing comparisons between projected and actual capital investments.

[70] During the 2012 PBR hearings, EPCOR argued that this approach was inherently unworkable due to the complex interrelationships between baseline capital and new capital and the lack of any systematic methodology for distinguishing between the two. See Alberta Utilities Commission (AUC), Rate Regulation Initiative, Application No. 1606029, Proceeding ID No. 566, Proceedings, Volume 10, April 27, 2012, p. 1900 and EPCOR (2012, ¶ 102).

[71] A "bottom-up" review of capital requirements evaluates a company's capital requirements on a project-by-project basis, and provides no guarantee that the sum of the capital requirements from all projects combined will permit the company to earn its target rate of return. In contrast, a "top-down" approach determines the aggregate capital requirement that is needed to ensure the company can achieve its target rate of return. In the 2013 Capital Tracker proceeding, the AUC employed the bottom-up review to determine whether the capital trackers proposed by the companies should be approved.

PBR regime and that are outside of the normal course of the company's ongoing operations, which include projects required by an external party.[72] Second, the mid-term review does not include a rate of return review, and is not a "top down" review of capital requirements. Third, no mid-term review is conducted if (and only if) both the Commission and the company prefer no review.[73] Fourth, other than at the mid-term review, *F* factor and *K* factor adjustments are not permitted during the PBR regime.[74]

The potential advantages of this type of plan are similar to those discussed in Section III.E, and include the following five. First, this plan provides incentives for the company to limit overall production costs (both capital costs and operating costs) (AUC PBR Principle 1). Second, the plan motivates the company to assess accurately its long-term investment needs. Third, the initial *F* factor adjustment can afford the company a reasonable opportunity to earn a fair return on its investments even in the presence of significant foreseeable changes in capital costs and capital investment needs (AUC PBR Principle 2). Fourth, plans of this type leverage familiarity with telecom style price-cap regulation (and the experience of key AUC Commissioners) while explicitly accounting for the unique characteristics of the energy sector. Fifth, this plan conserves on regulatory resources during the PBR regime, while allowing for mid-course adjustments that can be important in the energy sector (AUC PBR Principle 3).

Many of the potential disadvantages of this plan parallel those discussed in Section III.E, but some notable differences arise. The potential disadvantages of this plan include the following four. First, the potential for an *F* factor adjustment may provide the company with incentives to exaggerate actual capital investment needs. Second, by precluding capital trackers except at the mid-plan review, the plan may force the company to bear considerable risk and face the prospect of a higher cost of capital. Third, the company may have an incentive at the mid-term review to identify (and possibly exaggerate) "positive" capital trackers, but overlook (or understate the impact of) "negative" capital trackers. Fourth, the Commission may face substantial political

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[72] One issue that warrants consideration is whether the regulator can penalize the company at the mid-term review for capacity that exceeds stipulated bounds (or perhaps for failure to meet service quality standards).

[73] To avoid excessive strain on limited regulatory resources during mid-term review years, the timing of reviews for different companies can be staggered appropriately.

[74] One possible variation on this design is to allow for *K* factor adjustments throughout the course of the PBR regime, but allow for *F* factor updates only at the time of the mid-term review. This has the benefit of distinguishing clearly between EPCOR's Category 1 and 3 trackers (*K* factor adjustments) and its Category 2 trackers (*F* factor update).

pressure to employ the mid-term review as an earnings review, which can reduce the company's incentives to operate efficiently.[75]

Observe that the plan under consideration here allows for *K* factor adjustments at the time of the mid-term review, but does not permit annual *K* factor adjustments. In contrast, the plan discussed in Section III.E does not permit a mid-term *F* factor adjustment, but does allow for annual *K* factor adjustments. Absent further information about the environment in which the company operates, it is not possible to determine which of these plans exposes the company to greater risk. It is conceivable that an inability to seek annual *K* factor adjustments could motivate a company to seek a relatively pronounced mid-term *F* factor adjustment.

G. Partial Price Caps with Bifurcation of CAPEX and OPEX, with a Rolling Average CAPEX Update.

We now consider another PBR plan that employs price cap regulation to limit the prices a company can charge for its regulated services. The plan entails no sharing of earnings and proceeds for a relatively long period of time (e.g., seven to ten years) before the parameters of the plan are revisited. Despite this relatively long duration, the plan does not permit capital trackers. It does, however, admit corrections for *Z* factor events throughout the course of the PBR regime.[76] The company's capital expenditures during the PBR regime may be subject to *ex post* prudence reviews.

In determining the price cap (i.e., the *X* factor) that is imposed on the company, the plan treats operating expenses and capital expenses differently. The component of the *X* factor that is intended to allow the company to recover its OPEX when it operates efficiently is determined in standard fashion. In particular, this component reflects the regulator's assessment of the operating expenses the company will incur annually if it works diligently to control these

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[75] The Massachusetts Commission explicitly declined to review Verizon's earnings when it reviewed the price cap regulation plan, noting that an earnings review could diminish the performance of the regime (Vasington, 2003). The AUC's capital tracker decision may provide support for an approach along these lines by favoring the bottom-up over the top-down approach for capital trackers. Also, the Commission recognized that if it were to review earnings when evaluating the company's capital requirements, it would effectively be employing earnings regulation. See AUC (September 12, 2012, ¶ 212).

[76] A relevant *Z* factor event is one: (i) that does not involve capital investment; (ii) that is unknown (and unknowable) to the company at the start of the PBR regime; (iii) that has a substantial impact on the company's earnings; and (iv) for which both the event and the financial impact of the event on the company's earnings are largely beyond the company's control.

expenses. This component of the X factor typically does not change throughout the duration of the PBR regime.

The component of the X factor that is intended to permit the company to recover its CAPEX and earn a reasonable return on investment is determined differently. This component varies from year to year. In year t, the component reflects a N-year moving average of the company's capital expenditures, beginning L years before year t. To illustrate, suppose the PBR regime is scheduled to last for ten years, beginning in 2016. Further suppose $N = 5$ and $L = 4$. Then for each year $t =$ 2016, 2017, …, 2025, the relevant component of the X factor in year t reflects the average of the company's CAPEX in years $t - 8$, $t - 7$, $t - 6$, $t - 5$, and $t - 4$.

The choice of the parameter L in this PBR plan is particularly important. The larger is L, the more distant is the historic period that informs the estimate of the company's current capital investment requirements. Consequently, any increase in CAPEX in a given year will only increase the relevant portion of the X factor after a substantial delay.

This PBR plan entails five primary potential advantages. First, the bifurcated treatment of OPEX and CAPEX allows relatively high-powered incentives to be focused on those activities over which the company has the most control. Second, authorized price increases designed to cover the company's capital costs are updated annually throughout the PBR regime rather than being linked solely to an initial estimate of the company's likely CAPEX needs. The annual update can link allowed revenues more closely to actual capital needs to the extent that the company's investment needs change significantly over time and the moving average of the company's historic CAPEX accurately predicts current CAPEX needs.

Third, the PBR plan conserves on regulatory resources by eliminating the use of capital trackers during the course of the PBR regime (AUC PBR Principle 3). Fourth, by linking allowed revenues directly to historic capital expenditures, the plan can limit the company's uncertainty about the ultimate recovery of capital costs, which can encourage capital investment. Fifth, coupling required *ex ante* approval for major capital investments with *ex post* prudence reviews can limit incentives for excessive capital investment.[77] A relatively long lag in relevant CAPEX (i.e., a relatively large value for L) also can help to limit incentives for excessive capital investment.

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[77] *Ex post* prudence reviews may not be advisable if the time lag on the moving average computation is sufficiently long. A sufficiently long lag can eliminate strategic incentives to inflate CAPEX, and so an *ex post* prudence review might serve primarily to invite regulatory opportunism.

This PBR plan also entails at least five potential disadvantages, though. First, because the plan automatically increases authorized future revenue as current CAPEX increases, the plan can encourage some capital over-investment and may not provide strong incentives to reduce capital expenditures. Second, if a substantial lag (i.e., a relatively high value of L) is employed in the plan, authorized revenues will only increase to cover capital expenditures with a significant delay. Consequently, the plan could discourage the company from undertaking needed investment.[78] Third, the plan may consistently underestimate CAPEX needs if these needs are increasing systematically over time.

Fourth, identifying the best values for the N and L parameters can be difficult, in practice (AUC PBR Principle 3). For the reasons explained above, a lag that is too long can discourage investment unduly, whereas a lag that is too short could encourage over-investment (by quickly and automatically translating higher capital expenditures into higher revenues).[79] Fifth, by weakening the link between current capital expenditures and current authorized revenue, the plan could permit earnings well above or well below a normal rate of return in any given year. The risk associated with this earnings variation could increase the company's cost of capital.

H. Options in the Choice of Regulatory Regime.

The discussion to this point has focused on settings where the regulator designs a specific PBR for a company rather than providing the company with a choice among PBR plans. Sometimes, though, regulators can better serve customers by affording the company some choice among PBR plans.[80]

To illustrate this more general point, consider a setting where the regulator would like to implement a PBR plan that provides strong incentives for the company to operate efficiently. A price cap ("$I - X$") policy that severs the link between allowed prices and realized costs can provide such incentives. However, such a policy can permit the company to secure very high

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[78] Penalties for inadequate service quality can help to enhance the company's incentive to undertake the capital expenditures required to ensure the ongoing delivery of adequate levels of service quality.

[79] Ideally, the values of N and L also should be chosen so that the moving average of historic CAPEX that is calculated each year closely approximates the company's CAPEX needs in that year. Such approximation may be possible if there are systematic cycles in required capital expenditures.

[80] Sappington and Weisman (1996), Sappington (2004), and Joskow (2014), among others, explain the potential benefits of allowing regulated companies to choose one regulatory plan from a carefully designed set of regulatory plans.

earnings (if the selected X factor is unduly low) or restrict the firm to very low earnings (if the selected X factor is unduly high). If the regulator is committed to implement a price cap policy when (s)he faces substantial uncertainty about the most appropriate value of the X factor, (s)he may set a relatively low X factor to avoid subjecting the company to financial distress. Such a policy will induce the company to operate efficiently, but may produce relatively high prices for customers (due to the low X factor) and possibly excess returns for the company.

Alternatively, the regulator might afford the company a choice between, say, a price cap $(I - X)$ plan and rate of return regulation.[81] By doing so, the regulator can set a relatively high X factor (and thereby secure relatively low prices for customers under the price cap plan) without fear of subjecting the company to financial distress. When the company believes it would suffer financial distress under the challenging price cap plan, it will instead choose to operate under rate of return regulation. In contrast, when the company is confident that it can secure relatively high earnings even under the challenging price cap plan, it will choose to operate under this plan rather than under rate of return regulation. In this event, the regulator will have succeeded in implementing a plan that provides strong incentives for efficient operation and secures for customers lower prices than they would have faced had the regulator restricted herself to necessarily implementing a price cap plan (and consequently imposing a relatively modest X factor in order to avoid financial distress).

This example illustrates the more general conclusion that when the regulated company is well informed about its capabilities and its environment but the regulator's corresponding knowledge is limited, the regulator can sometimes best serve customers by affording the company a choice among regulatory plans. Such choice can enable the regulator to design (and often secure) PBR plans that are quite favorable to customers with little risk of imposing financial distress on the company. This is the primary potential advantage of affording a company a choice among regulatory plans.

Such choice can introduce at least three potential disadvantages, though. First, the company may ultimately not choose the plan preferred by the regulator. For instance, in the example described above, the company may ultimately choose to operate under rate of return regulation rather than price cap regulation. Thus, although customers may often gain when the company is

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[81] Sappington and Weisman (1996) describe different choices that regulators have afforded companies in the telecommunications sector. Joskow (2014) describes options that have been implemented in the energy sector.

afforded a choice among regulatory plans, customers do not always gain. Second, it can be challenging both to design an appropriate set of options to offer to the company and to convince customers that they are being well served when the company is afforded a choice among regulatory plans.

Third, and relatedly, the design, implementation, and administration of optional PBR plans can be challenging and require considerable regulatory resources. Consequently, optional PBR plans may be inconsistent with AUC PBR Principle 3. Fourth, a company may secure undue profit by choosing strategically among regulatory plans over time. To illustrate, the company might initially choose to operate under rate of return regulation and later choose to operate under price cap regulation. When operating under rate of return regulation, the company might attempt to over-invest in capital-intensive technologies that reduce future operating costs. The firm might later benefit significantly from the resulting cost reductions that arise when it operates under price cap regulation.[82]

The Ontario Energy Board afforded the companies under its jurisdiction a choice among three PBR plans in 2012. The plans allows the companies to choose among: (1) an annual incentive regulation index; (2) a fourth generation incentive regulation plan; and (3) custom incentive regulation.

The annual incentive regulation index is a price cap regulation plan that is intended for companies with "primarily sustainment investment needs." Therefore, the plan does not permit capital trackers. A company that chooses this plan must file a five-year investment plan. However, the required filing is less detailed than the filing required under the other plans. A company can choose this plan as long as it is not earning more than 300 basis points above its approved annual return on equity. There is no fixed term for the plan, so a company that operates under this plan can request an alternative plan at any time.

The fourth generation incentive regulation plan is a five-year price cap plan that is intended for most companies under the jurisdiction of the Ontario Energy Board. The X factor specified in the plan reflects historic industry average productivity growth rates, along with firm-specific stretch factors specified by the Commission. A company that selects this plan can apply for an adjustment to the X factor to reflect unusual anticipated capital investment needs.

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[82] Such strategic behavior can be limited by restricting the company's ability to choose freely among the prevailing options over time.

The custom incentive regulation plan is a price cap plan with a duration of at least five years that is intended "for distributors with significantly large multi-year or highly variable investment commitments that exceed historical levels."[83] The plan does not include capital trackers. However, the X factor and the associated prices established under the plan reflect the conclusions of a comprehensive operating plan that includes anticipated capital investments. The Commission monitors the capital expenditures of each company that chooses this plan, and can terminate the plan if actual and planned expenditures differ substantially.

Options like these have the potential to tailor the PBR plan to the prevailing environment. Such tailoring can be particularly valuable when different companies face very different operating conditions. However, the design and implementation of optional PBR plans like these can require considerable regulatory resources.[84] Furthermore, it can sometimes be difficult for regulators to explain to constituents why they are permitting a regulated company to choose its preferred PBR plan rather than dictating the plan under which the company must operate. Perhaps for these reasons, optional PBR plans are not common in practice.

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[83] Report of the Ontario Energy Board (2012, p. 19).

[84] As Sappington (1994, p. 260) observes, "Allowing for a choice among incentive plans can complicate the regulatory task, thereby sacrificing simplicity." Perhaps in part for this reason, the AUC did not appear to support the options approach in the recent PBR proceeding. See, in particular, AUC Decision 2012-237, ¶¶ 273-276.

IV. CONCLUSION.

A. SUMMARY.

This paper was commissioned by EPCOR to identify and evaluate the merits of potential alternative approaches to the treatment of capital in PBR regimes. The paper analyzed three earnings-based PBR plans and eight price-based PBR plans. The advantages and disadvantages of each were assessed, and references to the relevant economics literature were provided to facilitate further analysis. The paper also selectively identified the specific AUC PBR Principles that applied to the various advantages and disadvantages of each approach. This exercise was intended to assist EPCOR in evaluating the various approaches through the same lens that the AUC is likely to employ for the next PBR regime.

This paper reveals at least two outstanding issues that EPCOR may wish to address prior to the termination of the current PBR regime. First, it is not apparent why an X factor that incorporates both productivity growth and input price differentials appropriately will fail to provide adequate compensation for a regulated company operating in a *steady-state*.[85] Second, in the 2012 PBR proceeding, EPCOR proposed a linkage between service quality performance and the efficiency-carryover mechanism. While the AUC did not adopt EPCOR's proposal, the Commission appeared to have some interest in a mechanism that linked service quality performance to the parameters of the price cap plan. The specific manner in which service quality performance should be linked to the parameters of the price cap plan is a complex question that warrants careful thought and analysis.

B. PRELIMINARY RECOMMENDATION.

Our preliminary recommendation with respect to the preferred approaches is based on four main criteria. First, the AUC is unlikely to adopt any approach containing elements of traditional rate of return regulation. Second, the AUC places a large premium on simplicity, transparency and reducing the regulatory burden for all parties. Third, the preferred approaches should address the issue of capital sufficiency in a comprehensive and principled manner. Finally, it is critical that the preferred approaches provide strong incentives for efficiency comparable to those that arise in competitive markets.

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[85] Stated differently, it remains to specify precise conditions under which it is important to include Category 2 capital trackers in a PBR plan.

Based on the analysis set forth in the body of this paper, our preliminary recommendation is that the AUC adopt a pure price cap approach that incorporates an economically principled mechanism capable of addressing all three of the capital tracker categories that EPCOR identified in the course of the 2013 Capital Tracker proceeding. We believe this approach addresses both company and Commission concerns while preserving to the extent possible the desirable incentives that arise in competitive markets. This suggests that the following three approaches merit the most serious consideration:

(1) PRICE CAPS WITH AN F FACTOR ("K -BAR") ADJUSTMENT **(III.E)**

(2) PRICE CAPS WITH LIMITED FACTOR ADJUSTMENTS AND A MIDTERM REVIEW **(III.F)**

(3) PRICE CAPS WITH CAPITAL TRACKERS AND ASSOCIATED K FACTORS (**III.C**)

In addition, we believe that the OPTIONS IN THE CHOICE OF REGULATORY REGIME (**III.H**) approach, which allows the regulated firm a limited choice among PBR plans, has considerable appeal. Recall that the Ontario Energy Board adopted this approach in its last PBR proceeding. Despite its potential merits, this approach is not included among our preliminary recommendations for two primary reasons. First, the AUC appeared to dismiss this approach out of hand in the 2012 PBR proceeding. Second, this approach entails potentially complex design issues and has encountered some difficulties in practice.

Finally, it is important to note that our preliminary recommendation does not reflect an explicit, systematic ranking of the eleven approaches from the perspective of the AUC's five PBR Principles. In subsequent analysis, EPCOR may see merit in undertaking a more formal assessment of each of the approaches from the perspective of the AUC's PBR Principles. This exercise may allow for a more refined ranking of the various approaches and better position the company to support the approach that it ultimately adopts for the next-generation PBR regime.

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Determination of the Second-Generation X Factor for the AUC Price Cap Plan for Alberta Electric Distribution Companies

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March 21, 2016

Table of Contents

1. Introduction

1.1. Qualifications

1. My name is Mark E. Meitzen. I am a vice president at Christensen Associates, an economic consulting and research firm. My business address is 800 University Bay Drive, Suite 400, Madison, Wisconsin. I have been at Christensen Associates since 1990. Prior to that, I was a regulatory economist at Southwestern Bell Telephone Company in St. Louis, Missouri, and I was a member of the economics faculty at the University of Wisconsin–Milwaukee and Eastern Michigan University.
2. I have a B.S. in economics from the University of Wisconsin-Oshkosh and a M.S. from the University of Wisconsin-Madison. I received my Ph.D. in economics from the University of Wisconsin-Madison.
3. Among my various duties at Christensen Associates, I have consulted with firms in a number of network industries, including the telecommunications, electricity, postal, and railroad industries. I have consulted with these industries on a variety of issues including incentive regulation, productivity, costing, and pricing. I have also provided testimony on these issues in regulatory proceedings.
4. I have co-authored a number of productivity studies conducted by Christensen Associates, including numerous analyses performed for former Regional Bell Operating Companies, the United States Telephone Association, the National Cable Television Association, and the Stentor companies in Canada. I have analyzed incentive regulation issues for various network industries including the telecommunications, electric utility, and postal industries. I also directed the Christensen Associates team that analyzed incentive regulation options for Peru's newly-privatized telecommunications industry.
5. Among the articles and reports I have co-authored, I have published articles on total factor productivity, incentive regulation in network industries (electric, gas, and telecommunications), and cross-subsidization issues in electric utility industries. I

was also a principal author of a study of U.S. railroad competition issues commissioned by the U.S. Surface Transportation Board.

6. My curriculum vitae can be found in Appendix A.

1.2. Outline of Evidence

7. In Section 2, I present an overview of the AUC price cap plan for Alberta electric distribution companies. In Section 3, I discuss the establishment of the current X factor for the AUC plan that was based on NERA's TFP study of the U.S. electric distribution industry. Section 4 presents my update of the NERA TFP study. Finally, in Section 5, I present my recommended approach for the X factor in the second-generation of the AUC price cap plan for Alberta electric distribution companies. While it is my opinion that the NERA study is, for the most part, methodologically sound, I strongly disagree with NERA's recommendation in AUC Proceeding 566 that was adopted by the AUC that the entire historical period of the study, dating back to 1972, should be used to determine the forward-looking X factor. In my opinion, more recent history based on moving averages of 10 and 15 years provides a more reliable basis for establishing the X factor.

2. Overview of the AUC Price Cap Plan for Electric Distribution Companies

2.1. Review of Commission's PBR Principles

8. In AUC Decision 2012-237, the Commission spelled out five principles to guide the development of PBR in Alberta that were established in AUC Bulletin 2010-20: [1]

- **Principle 1.** A PBR plan should, to the greatest extent possible, create the same efficiency incentives as those experienced in a competitive market while maintaining service quality.

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[1] AUC Decision 2012-237, p. 7.

- **Principle 2.** A PBR plan must provide the company with a reasonable opportunity to recover its prudently incurred costs including a fair rate of return.
- **Principle 3.** A PBR plan should be easy to understand, implement and administer and should reduce the regulatory burden over time.
- **Principle 4.** A PBR plan should recognize the unique circumstances of each regulated company that are relevant to a PBR design.
- **Principle 5.** Customers and the regulated companies should share the benefits of a PBR plan.

9. Dr. Weisman provided an economic interpretation of these principles in his July 2011 submission in AUC Proceeding 566. Overall, Dr. Weisman opined that "The AUC's PBR principles are well grounded in the theory and practice of regulatory economics …"[2] I agree with this assessment and believe that the AUC's Principles provide a proper framework for establishing and updating its price cap plan for Alberta electric distribution companies.

2.2. AUC Price Cap Formula

10. The cornerstone of the AUC PBR plan is based on what is referred to as price cap regulation. A pure price cap formula has the general form of "I – X," where I is a measure of input inflation and X is a measure of productivity growth. Under price cap regulation, the rates that can be charged by the regulated company are governed by a formula that effectively limits changes in rates to some measure of inflation, adjusted for the company's ability to offset inflation with gains in productivity, i.e., the "I – X" formula sets a ceiling on price changes for services that are subject to the price cap. The price cap approach to regulation is based on the

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[2] Dennis L. Weisman, Ph.D., "The EDTI PBR Framework: Commission Principles and Economic Foundations," July 22, 2011, p. 3.

proposition that in competitive markets the prices charged for a product or service are determined by the prices of the inputs used to produce the product or service, adjusted for any productivity gains exhibited in combining those inputs to produce the product or service.

11. The price cap formula adopted in AUC Decision 2012-237 augments the "pure" (I – X) price cap formula and has the form:

$$\%\Delta P = (I - X) +/- Y +/- Z +/- K$$

Where

$\%\Delta P$ = allowed change in capped price

I = inflation factor

X = productivity factor

Y = recurring flow through items, collected through Y factor rate adjustments

Z = one-time exogenous adjustments

K = capital trackers collected through K factor rate adjustments.

12. The X factor in the AUC price cap plan is discussed at greater length below. Regarding the other adjustment factors in the plan, the I factor in the AUC price cap plan represents the changes in industry input prices over the term of the PBR plan, consisting of a weighted average of labor costs and other input costs.[3] Y and Z factors provide flexibility for the regulator and the regulated firm to address cost increases that are outside of management's control. K factors provide sources of revenue in addition to that generated by the I – X mechanism to accommodate special circumstances for capital spending.

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[3] Labor costs are represented by Alberta average weekly earnings (AWE) for the previous July through June period and other input costs are represented by the Alberta consumer price index (CPI) for the previous July through June period. Weights for the I factor are 55 percent for AWE and 45 percent for CPI. See AUC Decision 2012-237, p. 52.

13. A Y factor accounts for recurring costs, outside the control of management, that the regulated firm passes through to ratepayers. A Y factor acts as a cost pass-through, with changes in these costs leading to changes in the price cap on a dollar-for-dollar basis. Property tax changes, for example, could be treated as Y factors. According to the Commission:

> In a PBR plan, Y factor costs are those costs that do not qualify for capital tracker treatment or Z factor treatment and that the Commission considers should be directly recovered from customers or refunded to them. Y factor costs in turn, could either be costs the company is required to pay to a third party … or other Commission-approved costs incurred by the company for flow through to customers.[4]

14. A Z factor is an exogenous one-time cost[5] that is recovered through a special price increase charged to ratepayers. A Z factor is also an adjustment for changes in costs that are outside the control of the regulated firm's management, but it is designed for changes that only occur infrequently during the term of the price cap. Generally, the regulator reviews each petition for a Z factor, determining whether it meets the criteria that it set out for Z factors at the beginning of the price cap period. For a cost change to be eligible for Z factor treatment, the cost change must be outside the control of the regulated firm, not be implicit in the inflation factor, and be of "material" size. According to the Commission:

> A Z factor is ordinarily included in a PBR plan to provide for exogenous events. The Z factor allows for an adjustment to a company's rates to account for a significant financial impact (either positive or negative) of an event outside of the control of the company and for which the company has no other reasonable opportunity to recover the costs within the PBR formula.[6]

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[4] AUC Decision 2012-237, p. 131.

[5] Z factors could also be exogenous one-time revenues.

[6] AUC Decision 2012-237, p. 108.

15. A K factor or capital tracker is designed for circumstances when necessary capital expenditures cannot be reasonably expected to be recovered through rates established by the pure I – X price cap formula. According to the Commission:

> A capital tracker mechanism in a PBR plan is warranted in circumstances where the company can demonstrate that a necessary capital replacement project or capital project required by an external party cannot reasonably be expected to be recovered through the I – X mechanism. The Commission concludes that a structured criteria-based approach provides the most objective method for assessing whether projects qualify as capital trackers.[7]

2.3. Basis of the X Factor in the AUC Price Cap Formula

16. As discussed below, the Commission's approach to setting the X factor spelled out in Decision 2012-237 is based on industry expected annual productivity growth. The productivity concept used in the AUC price cap formula is total factor productivity (TFP), which is defined as the ratio of total output to total input:

$$\text{TFP} = \frac{\text{Total Output}}{\text{Total Input}}$$

17. Thus, industry productivity gains are measured as the percentage change in TFP, which is computed as the percentage change in total output less the percentage change in total input:[8]

$$\%\Delta TFP = \%\Delta Total\ Output - \%\Delta Total\ Input$$

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[7] AUC Decision 2012-237, p. 124.

[8] Given that the I factor in the AUC price cap plan measures input inflation as opposed to output inflation, the X factor is based on industry TFP growth. If, on the other hand, the I factor would have been based on a measure of output inflation (as is common in most U.S. telecommunications price cap plans), the X factor would have to make adjustments for differences in productivity and input price growth between the industry and the overall economy. See AUC Decision 2012-237, pp. 87-89. As summarized on p. 89 of the Decision:

> [S]ince both components of the approved I factors can be considered input-based price indexes, there is no need in this case for the Commission to consider an adjustment to TFP for an input price differential or productivity differential in the calculation of the X factor.

18. Total output consists of all the services produced by the relevant unit of production (e.g., a firm or an industry). Total input includes all resources used by the unit of production in providing those services. Typically, TFP studies have three components of total input: capital, labor, and materials. TFP is widely recognized as a comprehensive measure of productive efficiency because, unlike measures of partial productivity, such as labor productivity, TFP provides a measure of the contribution of all inputs used in the production of total output.

19. Given that the X factor in the AUC PBR plan appropriately calls for <u>industry</u> <u>expected</u> productivity growth (per the Commission),[9] it must be determined what productivity growth metric best represents forward-looking productivity growth. In this case, this involves determining the appropriate time frame of the historical measurement of TFP that translates into forward-looking productivity and the appropriate industry grouping that best represents the Alberta electric distribution industry. As discussed below, both of these dimensions were debated during the Commission's previous proceeding, AUC Proceeding 566.[10]

3. Determination of the Current X Factor in the AUC PBR Plan

20. The X factor in the AUC PBR plan consists of expected industry productivity growth and a stretch factor. The current X factor in the AUC PBR plan for the Alberta electric distribution utilities is 1.16 percent, consisting of TFP growth of 0.96 percent and a stretch factor of 0.20 percent. In this section, I review the Commission's Decision 2012-237 that established this X factor.

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[9] AUC Decision 2012-237, pp. 52-53.

[10] The use of expected productivity in setting the X factor provides incentives for productivity gains by the regulated firm. In contrast, if the X factor were to be based on actual changes in the regulated firm's productivity, price cap regulation would function similar to cost of service regulation. See Jeffrey I. Bernstein and David E.M. Sappington, "Setting the X Factor in Price-Cap Regulation Plans," *Journal of Regulatory Economics,* Vol. 16, 1999, p. 9.

3.1. Commission's Productivity Criteria Outlined in AUC Decision 2012-237

21. Regarding productivity, the Commission stated a clear preference for expected industry productivity growth as the basis of the X factor. This is consistent with standard, accepted practice. For example:

> [T]he objective of the PBR plan sought by the Commission is to emulate the incentives experienced by companies in competitive markets where prices move according to the productivity of the industry in question rather than with the particular costs of a company.[11]
>
> In general terms, the X factor can be viewed as the expected annual productivity growth during the PBR term.[12]

22. The Commission also expressed that productivity studies used to establish X (including the NERA study it commissioned) should be based on publicly available data and use a transparent methodology:

> In its September 8, 2010 letter to the parties, the Commission included the use of publicly available data and a transparent methodology as part of the requirements for NERA to meet in respect of its TFP study contributing to a PBR plan.[13]
>
> … [T]he significance of the objectivity, consistency, and transparency of the TFP analysis to be employed in calculating the X factor cannot be understated.[14]

I agree that it is important that the process of determining the X factor should be based on consistent and transparent methods so that the results of the analysis are amenable to replication.

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[11] AUC Decision 2012-237, p. 60.
[12] AUC Decision 2012-237, pp. 52-53.
[13] AUC Decision 2012-237, p. 72.
[14] AUC Decision 2012-237, p. 73.

3.2. The NERA Productivity Study

23. The AUC retained NERA to conduct a productivity study for purposes of setting the X factor. NERA originally submitted its study in 2010[15] and submitted a slightly revised study in 2012 for the first-generation PBR plan.[16] The NERA study estimates total factor productivity growth for the electric distribution function of 72 U.S. utilities over the period between 1972 and 2009. Generation, transmission, and overhead functions are not considered in the analysis. Most of the data used come from the FERC Form 1.

24. Output in the NERA study is measured as a Tornqvist index of residential, commercial, industrial, and public sales, using revenue-based weights. Capital is computed using a perpetual inventory "one-hoss shay" method, with the capital prices and quantities computed on a consistent basis (i.e., the capital rental price is dual to the one-hoss shay capital quantity). The perpetual inventory method uses the 1964 book value of distribution plant in service, the Handy-Whitman index for distribution plant, annual additions to plant, and retirements from plant. The benchmark capital stock quantity is calculated by applying a trailing weighted-average of Handy-Whitman prices to the 1964 book value of plant. Additions to plant are deflated by the current year's Handy-Whitman index value, while retirements are deflated by the Handy-Whitman index lagged by the assumed average lifetime of distribution plant.

25. The quantity of labor is based on an estimate of full-time equivalent employees. Through 2001, this is based on the number of full-time employees, plus one-half of the number of part-time employees. Because the FERC Form I no longer contained employee data after 2001, for the years 2002 to 2009, growth in the U.S. Bureau of Labor Statistics series of wages and salaries in the utilities sector is used to construct

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[15] NERA, "Total Factor Productivity Study for Use in AUC Proceeding 566 – Rate Regulation Initiative," December 30, 2010.

[16] NERA, "Update, Reply and PBR Plan Review for AUC Proceeding 566 – Rate Regulation Initiative," February 22, 2012.

a constant dollar estimate of labor input. The cost of materials is residually obtained by subtracting distribution labor costs from distribution operations and maintenance cost. The quantity of materials is obtained by deflating the cost of materials by the Gross Domestic Product Price Index.

26. As I discuss below, it is my opinion that the methodology employed in the NERA study is generally sound and provides an appropriate basis for determining the updated X factor. However, there is one critical adjustment required for updated NERA results to form an appropriate basis of the forward-looking X factor for Alberta electric distribution utilities. Namely, the time frame to use from the historical time period estimated by NERA.[17] I strongly disagree with NERA's original assessment that the entire historical period of the study, dating back to 1972, should be used in establishing the forward-looking X factor.

3.3. Interpretation and Application of the NERA Study in AUC Decision 2012-237

27. In the Commission's opinion, the NERA study met the criteria it established for determining the X factor. The Commission adopted the full study for the 72 companies over the 1972 to 2009 period:

> [T]he Commission opted for an approach to set the X factor based on the average rate of productivity growth in the industry … For this purpose, the Commission engaged NERA to conduct a TFP study applicable to Alberta gas and electric companies. … The study was based on a population of 72 U.S. electric and combination electric/gas companies from 1972 to 2009. NERA measured the TFP of the distribution component of the electric companies. Costs related to power generation and transmission, as well as general overhead costs, were not included in the study.[18]

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[17] As discussed below, it was also debated in AUC Proceeding 566 whether the entire sample of companies or some subset of companies included in the NERA study best represented the Alberta electric distribution industry. At this time, I rely on the entire sample of companies.

[18] AUC Decision 2012-237, p. 59.

28. Two areas of controversy in adopting the full NERA study were the appropriate time frame to use and the firms to include for establishing expected industry productivity growth for the purpose of setting the X factor for Alberta electric distribution companies.

29. Regarding the appropriate time frame, there was disagreement between NERA and other experts in the proceeding whether the entire sample period should be used for establishing X:

> NERA recommended the use of its full set of data from 1972 to 2009 … The majority of other parties recommended a substantially shorter period.[19]
>
> The companies' experts contended that NERA's sample period, especially the early part of it, was not relevant for estimating the industry's current TFP trends or the trends that might be expected to prevail during the PBR term.[20]

30. The Commission agreed with NERA that there was no structural break in the series and adopted the full period of the NERA study:

> The Commission agrees with NERA's view that a deviation from reliance on the longest period of available data requires support that a structural break in the industry has occurred. The Commission also agrees that the determination of whether a structural break has occurred demands the scrutiny of academic experts, peer review and testing by parties independent of the current proceeding.[21]
>
> With respect to the electric industry restructuring, the Commission observes that NERA used data only on the distribution portion of the sampled companies' businesses. In the Commission's view, this approach sufficiently mitigates

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[19] AUC Decision 2012-237, p. 61.
[20] AUC Decision 2012-237, p. 62.
[21] AUC Decision 2012-237, p. 65.

> the concerns about the impact of industry restructuring on the TFP estimate.[22]
>
> In the Commission's view, NERA's approach of using the longest time period available allows a smoothing out of the effects of variations in economic conditions on the estimate of TFP growth, without engaging in a subjective exercise of picking the start and end points of a business cycle.[23]

As discussed below, NERA's criteria for use of anything other than the full 1972-2009 time period for establishing the X factor for the electric distribution industry are specious and create a non-credible, almost impossible standard for determining the appropriate forward-looking X factor from the historical record.

31. While there was general agreement that NERA's use of U.S. data was appropriate (particularly given that comparable Canadian data are not available), there were a number of parties that opined that a subsample of U.S. companies that better represented conditions faced by companies in Alberta was better-suited for establishing the X factor than was the entire sample of 72 U.S. companies. However, the Commission disagreed with this position and chose to use the entire sample of U.S. companies in the NERA database:

> [T]he Commission notes that the need to use U.S. data in establishing productivity targets for Alberta regulated companies arose because of the lack of uniform and standardized data for Canadian electric and gas distribution utilities. … [T]he Commission agrees … that given the generally perceived similarity of both the utility regulatory systems in Canada and the United States, as well as the organization of the utility industries in the two countries, the U.S. power distribution industry TFP growth trend is a reasonable starting point in establishing a productivity estimate for the Alberta companies.[24]

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[22] AUC Decision 2012-237, p. 65
[23] AUC Decision 2012-237, p. 66.
[24] AUC Decision 2012-237, p. 71.

> Under the approach adopted by the Commission, the focus of the TFP study is on the industry productivity growth rate, not levels. As NERA explained, in this case the manifest differences between the companies in terms of their geographic areas and climatic conditions, operational characteristics, regulatory regime, size or any other consideration do not matter as much to the study as it only deals with the average of year to year changes in productivity growth. As such, the unique cost features of any particular company cancel out in the process.[25]
>
> The Commission agrees with NERA's characterization that the TFP estimate that informs the X factor is supposed to reflect industry growth trends, not the trends in Alberta alone or among a group of companies with similar operations and cost levels to those in Alberta.[26]

In my opinion, the entire sample of companies contained in the sample used by NERA was and continues to be an appropriate approach for the AUC price cap plan.

3.4. Stretch Factor

32. A stretch factor is often added to the X factor of first-generation PBR plans to account for the expected increase in productivity growth as an industry transitions from traditional cost of service regulation to PBR. Since the X factor is often based on studies of historic productivity growth whose data represent a period before the industry moves to PBR, the stretch factor is seen as a forward-looking adjustment to the historically-measured productivity growth to account for the changes in incentives:

> The purpose of a stretch factor is to share between the companies and customers the immediate expected increase in productivity growth as companies transition from cost of service regulation to a PBR regime.[27] … The Commission agrees with Dr. Weisman that the transition from cost of service regulation to PBR provides an opportunity to realize

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[25] AUC Decision 2012-237, p. 70.
[26] AUC Decision 2012-237, p. 70.
[27] AUC Decision 2012-237, p. 100.

> more easily-achieved efficiency gains (the "low hanging fruit") due to increased incentives.[28]

Moreover, as the Commission has appropriately noted, the stretch factor is typically based on the regulator's judgement and is not quantitatively based:

> [T]he determination of the size of a stretch factor is, to a large degree, based on a regulator's judgement and regulatory precedent and does not have a "definitive analytical source" like the TFP study represents. … Taking into account the fact that the companies are moving from a cost of service regulatory framework to PBR, and being cognizant of the uncertainties associated with the change in regulatory framework, the Commission is taking a conservative approach to setting a stretch factor. … The Commission has considered the recommended stretch factors and finds a 0.2 per cent stretch amount to be reasonable.[29]

As Dr. Weisman notes in his evidence, beyond first-generation PBR plans, the case for including a stretch factor becomes weaker in subsequent generations of a plan.[30]

3.5. Summary

33. Ultimately, the AUC established an X factor of 1.16 percent, based on TFP growth of 0.96 percent from the full NERA sample of companies over the 1972-2009 period, and a stretch factor of 0.2 percent.

> [T]he Commission finds that no adjustments to the industry TFP growth rate are required when establishing the X factors for the companies. Accordingly, the Commission finds that the X factor to be used in the PBR plans of the electric and gas distribution companies prior to consideration of a stretch factor is 0.96 per cent. … [T]he Commission determined that a stretch factor of 0.2 per cent will apply to the companies' PBR plans for the duration of the PBR term. Accordingly, the

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[28] AUC Decision 2012-237, pp. 100-101.

[29] AUC Decision 2012-237, p. 104.

[30] Dennis L. Weisman, "Designing the Second-Generation PBR Framework: Commission Principles and Economic Foundations," March 21, 2016, Section 5.2.

> Commission finds that the total X factor for the electric and gas distribution companies, inclusive of a stretch factor, will be 1.16 per cent.[31]

4. Update of the NERA Study

34. As I noted above, it is my opinion that the methodology employed in the NERA study is generally sound and provides an appropriate basis for determining the updated X factor. Below, I report updated results through 2014 for TFP growth estimated using the NERA methodology. In the next section I assess the updated results to determine the appropriate forward-looking X factor in the second-generation price cap plan for the Alberta electric distribution industry.

4.1. Updating Procedure and Methodological Adjustments

35. Data are now available to extend the NERA study through 2014. Most of the data used to update the NERA study come from the FERC Form 1 reports submitted by the regulated utilities. The FERC Form 1 reports provide a comprehensive look at the financial and operating performance of each reporting utility. The U.S. Federal Energy Regulatory Commission posts the company data on their web site and provides software that can be used to download and view these data. We used this software to download the needed FERC Form 1 data and add those data to the NERA database.

36. The FERC database shows that some utilities in the NERA database did not submit FERC Form 1 reports for all years. In these cases, utilities stopped reporting data because they were merged with other operating companies. The following is the list of utilities that did not submit reports in all years and the last year when they did report: Central Illinois Light Company (2010), Columbus Southern Power Company (2010), Illinois Power Company (2010), and Central Vermont Public Service Corporation (2012).

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[31] AUC Decision 2012-237, p. 107.

37. In the original NERA study, the Gross Domestic Product Price Index was used in the construction of the quantity of materials. Specifically, the quantity of materials was derived by dividing the cost of materials by the Gross Domestic Product Price Index. I updated the Gross Domestic Product Price Index using data published on the U.S. Bureau of Economic Analysis web site. I also obtained updated values of the Handy-Whitman indexes used to convert book values of additions and retirements to constant dollar values in the construction of capital input.

38. NERA constructed the price of capital input using data on annual yields that it obtained from a variety of sources. The annual yields are used to impute expected future rates of return on investment. I was unable to access the data sources used by NERA to update its values of the annual yields, so I used the 2009 values for the subsequent years. I note that the price of capital is only used to weight the quantity of capital relative to other inputs, so that this alternative approach to measuring the price of capital does not significantly affect the results of the TFP analysis and the results of my update are reliable.

39. In updating the NERA results I discovered an error in its measurement of labor input. Up until 2001, companies reported their number of full-time and part-time employees across all utility operations (total employees). NERA constructed a quantity of labor input for distribution by converting the total number of employees to a full-time equivalent number and then multiplying this by the ratio of distribution salaries to total salaries. Beginning in 2002, companies no longer reported the total number of full-time and part-time employees, so NERA extended these series by a constant dollar measure of distribution salaries. Since NERA was extending the total number of full-time and part-time employees, and not the count of distribution full-time and part-time employees, it would have been correct to extend the series using constant dollar total salaries, not constant dollar distribution salaries. I made this correction for all years after 2001 in my update. Once I extend the number of full-time equivalent employees using this alternative method, I

multiply this by the ratio of distribution salaries to total salaries to get distribution labor input.

4.2. Results

40. Table 1 summarizes the results of my update of the NERA TFP study through 2014. The top portion of Table 1 shows annual average growth over the time frame of the initial NERA study for the entire 1972-2009 period, and the bottom portion of Table 1 shows updated results through 2014. The results through 2009 are slightly different than those of the initial NERA study because of the correction to the labor input measure and revisions to the Bureau of Economic Analysis Gross Domestic Product Price Index. As noted above, a number of experts disagreed with NERA's assessment that the entire time period should be used for determining the X factor.[32] As representative of that disagreement, I also include the 1999-2009 and 1999-2014 periods in Table 1. Results for individual years are found in Appendix B Table B.1.

Table 1
Electric Distribution Industry Output, Input, and TFP Growth
1972-2014

	Output	Input	TFP
1972-2009	2.10%	1.12%	0.98%
1999-2009	0.69%	1.29%	-0.60%
2009-2014	0.16%	1.44%	-1.28%
1972-2014	1.87%	1.16%	0.71%
1999-2014	0.51%	1.34%	-0.83%

41. Table 1 shows that the negative trend in electric distribution industry TFP growth previously documented for the 1999-2009 period has continued and has

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[32] For example, EPCOR witness Cicchetti recommended the 1999-2009 period, Fortis witness Frayer and AltaGas witness Schoech recommended the 2000-2009 period, and CCA witness Lowry recommended the 1988-2007 period. See AUC Decision 2012-237, pp. 62-63.

accelerated. The decline in TFP growth has been largely driven by a decline in output growth and that trend has continued, and has even accelerated, into the 2009-2014[33] period as output growth substantially diminished from its 0.69 percent annual average over the 1999-2009 period to an annual average growth of 0.16 percent over the 2009-2014 period. In contrast, input growth has remained relatively constant and actually increased somewhat in the 2009-2014 period.

42. Independent research published in the *Electricity Journal* finds that this reduction in output growth can be explained by a change in the long-term relationship between growth in economic activity and electricity use. Since the 1970s, electricity use and GDP had grown at comparable rates. However, the ratio of electricity consumption to GDP has been on a downward trend since the mid-1990s and, since 2007, the economy has generated GDP growth with almost no net growth in electricity demand:

> [T]he correlation between electricity consumption and GDP expansion diverged after about 1996, when the GDP growth rate greatly exceeded the electricity consumption rate. … Electricity consumption growth and GDP growth occurred at a similar pace from 1973 to 1996; however, after 1996, the correlation deviated significantly. … [E]lectriciy consumption has remained flat from 2007 to 2014, even as real GDP grew 8 percent.[34]

The TFP data presented here reflects the findings of this research as it shows lower TFP growth resulting from the noted reduction in electricity consumption growth and, consequently, lower output growth. As shown in Table 2, over the period 1996 to 2014, output grew at an annual rate of 0.75 percent, input grew at an annual rate of 1.39 percent, and TFP grew at an annual rate of -0.64 percent. This is in contrast to much higher average TFP growth in the 1972-1996 period, which was largely

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[33] The updated results have growth rates beginning in 2010 with the base year of 2009 for the 2010 growth rate. Thus, standard practice is to refer to this period as 2009-2014.

[34] Richard F. Hirsh and Jonathan G. Koomey, "Electricity Consumption and Economic Growth: A New Relationship with Significant Consequences?" *The Electricity Journal,* November 2015, Vol. 28, Issue 9, p. 75.

driven by significantly greater output growth. During the 1972-1996 period, output growth averaged 2.70 percent, input growth averaged 0.98 percent, and TFP growth averaged 1.72 percent. Finally, coincident with the flat electricity consumption noted over the 2007-2014 period, output growth dropped sharply to an annual average rate of -0.72 percent, input grew at an annual rate of 1.35 percent, and TFP grew at an annual rate of -2.07 percent.

Table 2

Electric Distribution Industry Output, Input, and TFP Growth: Periods Marked by Changes in Energy Consumption-Economic Growth Relationship

	Output	Input	TFP
1972-1996	2.70%	0.98%	1.72%
1996-2014	0.75%	1.39%	-0.64%
2007-2014	-0.72%	1.35%	-2.07%

43. Figure 1A shows electric distribution industry output, input, and TFP depicted graphically for the 1972-2014 period and Figure 1B focuses on TFP.[35] Consistent with the independent research cited, it is clear from Figure 1A that the primary driver of the reduction in TFP growth to its current negative state has been negative output growth. Figure 2 presents the annual growth rates in electric distribution industry TFP from 1972 to 2014.

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[35] Both of these figures show index levels based at 1972 = 1.0.

Figure 1A
Electric Distribution Industry Output, Input, and TFP
1972-2014

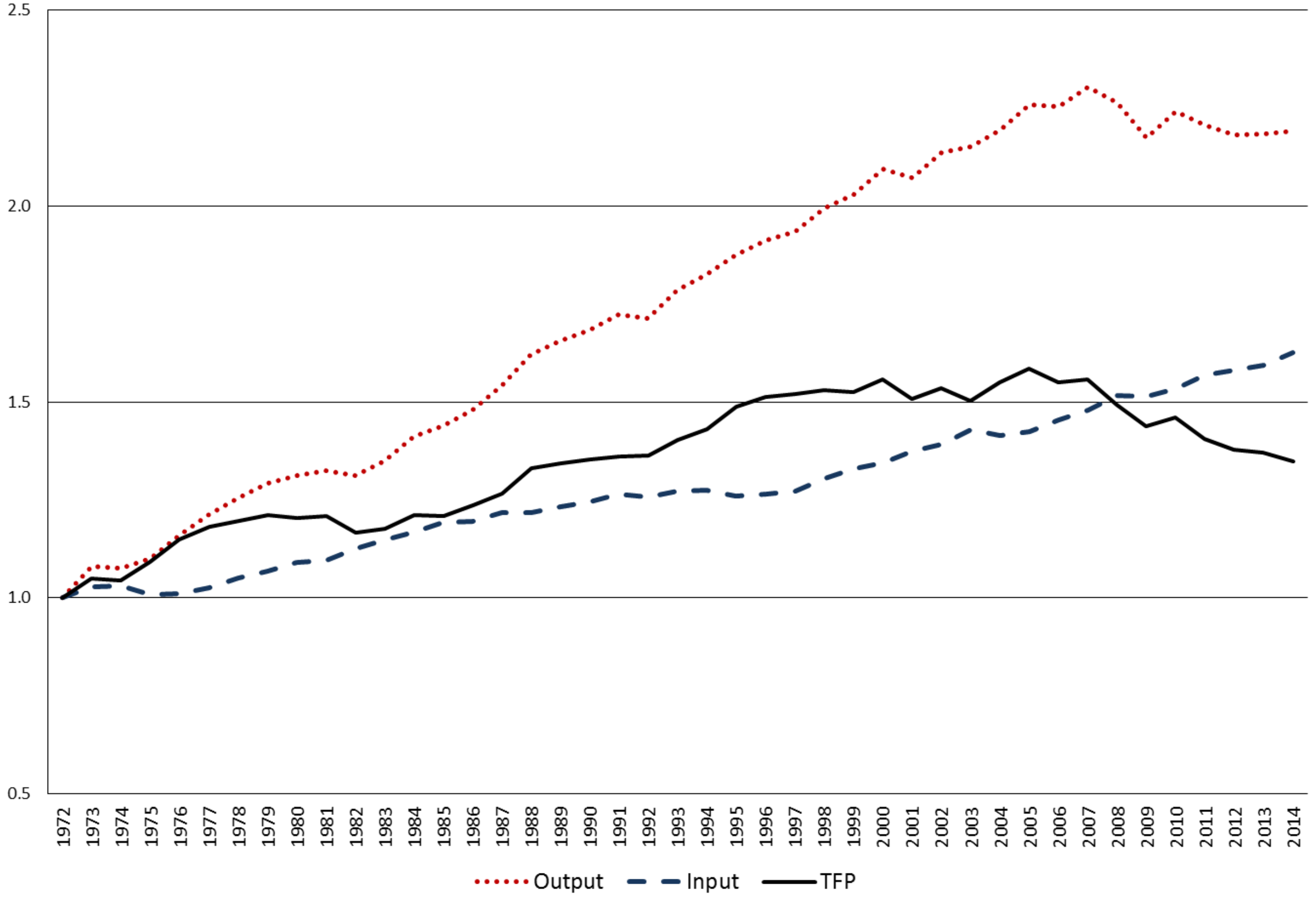


Figure 1B
Electric Distribution Industry TFP
1972-2014

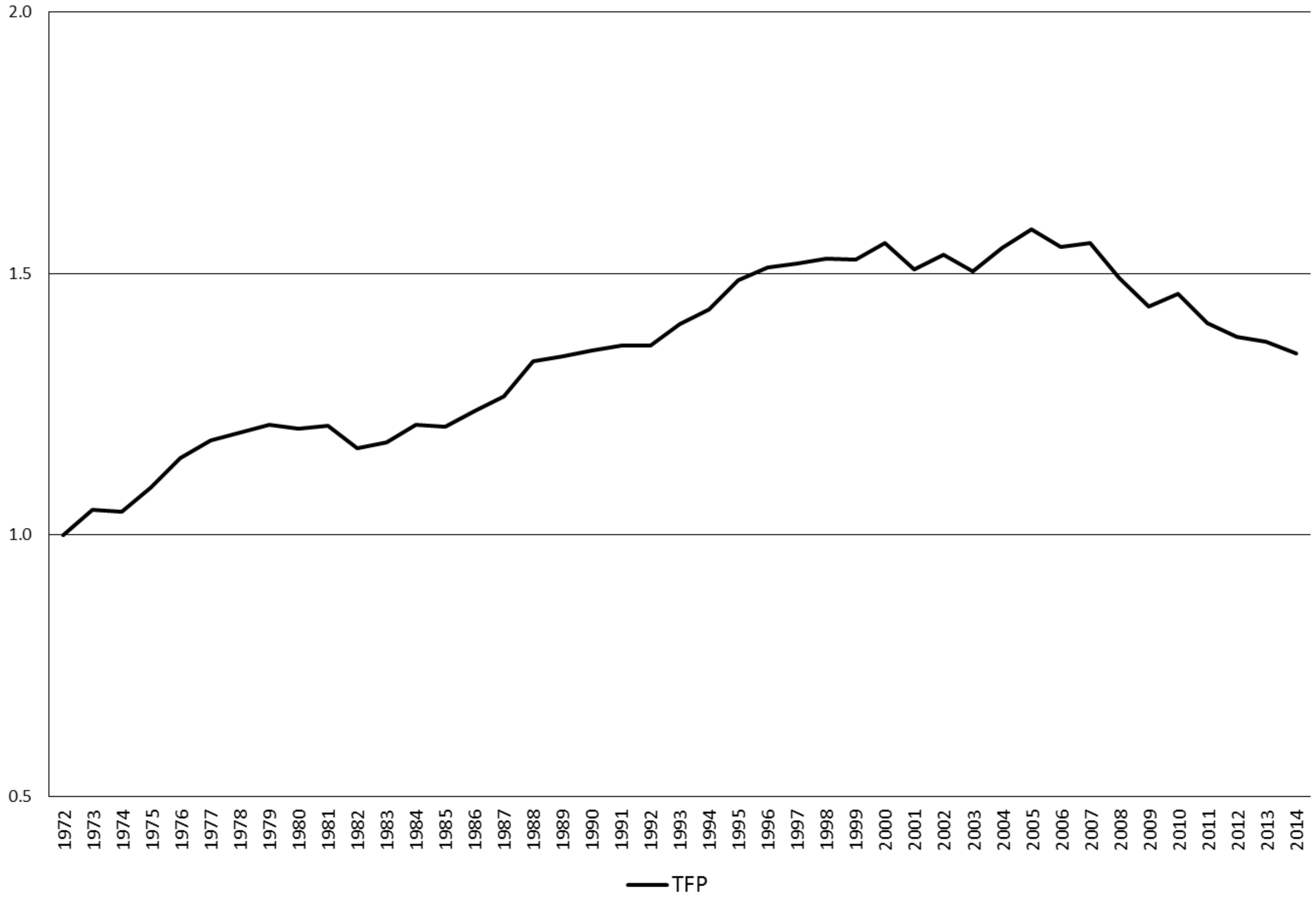
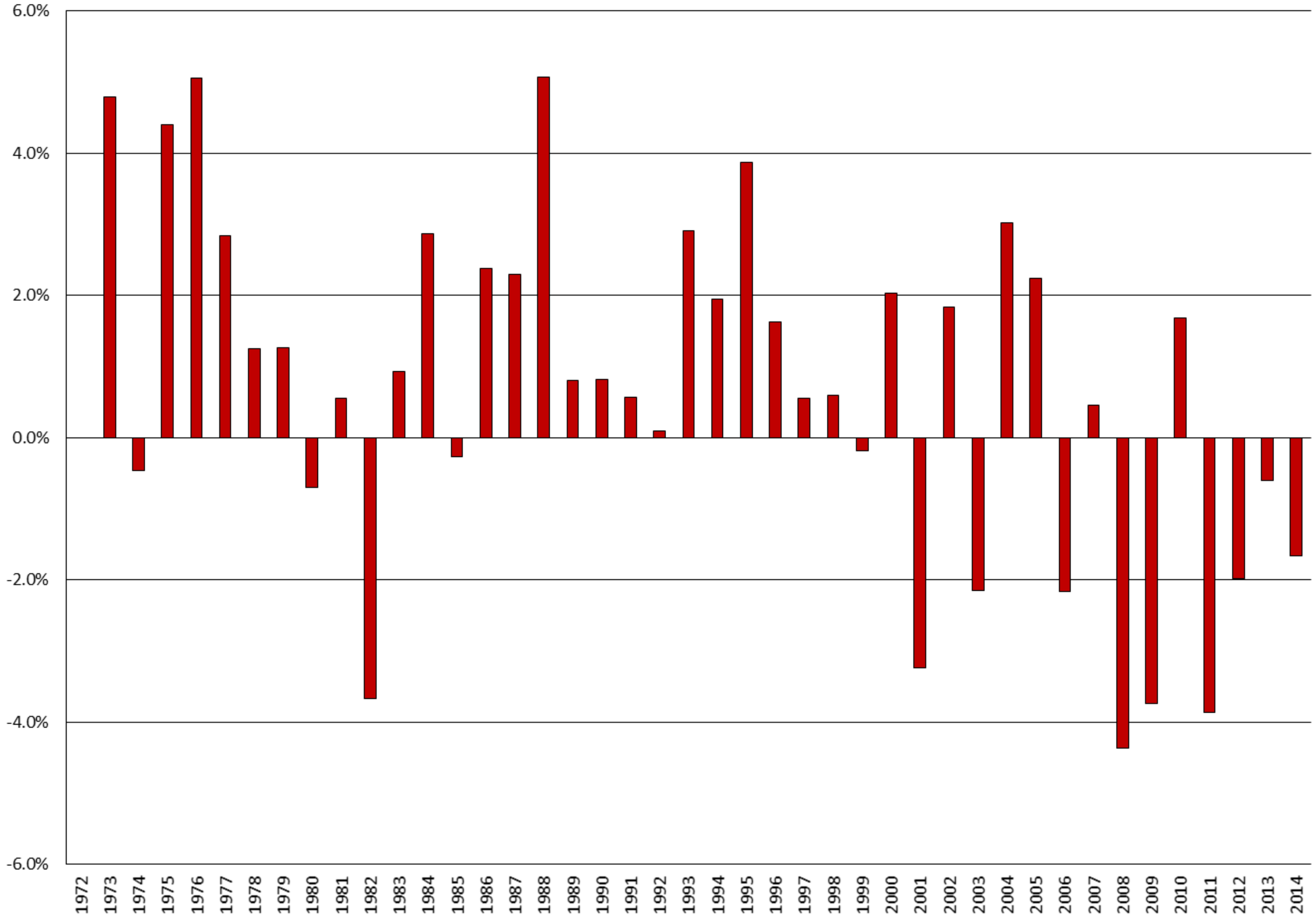


Figure 2
Electric Distribution Industry Annual TFP Growth
1972-2014



5. Determination of the X Factor for AUC's Second-Generation PBR Plan

44. While it is my opinion that the NERA study is, for the most part, methodologically sound, I strongly disagree with NERA's original assessment that the entire historical period of the study, dating back to 1972, should be used in establishing the forward-looking X factor. In this section, I first respond to NERA's justification for using the entire 1972-2009 time period for establishing the X factor in the AUC price cap plan. Next, I assess NERA's recommendation in the context of predicting the forward-looking X factor. I then provide my opinion of the appropriate application of the updated NERA study for determining the second-generation X factor.

5.1. NERA's Justification for Using the Entire 1972-2009 Time Period for Establishing the X Factor is Misguided

45. NERA's position that the entire 1972-2009 time period should be used to determine the X factor is untenable. In fact, NERA's own academic research and its 2010 submission in AUC Proceeding 566 clearly show that the series has changed over time, rendering its position that the entire time period be used not credible:

> TFP growth … fluctuates considerably year to year and … in more recent years exhibits sharp declines. The fastest TFP growth occurred in 1976 at 4.96 percent while the slowest TFP growth occurred in 2008 at -5.26 percent.[36]

46. NERA's reasoning that use of any other period for determining the X factor must be based on disinterested or scholarly sources is a red herring; it imposes an impractical, unnecessary standard on the determination of the X factor.

> [T]here is no evidence of which we are aware, from disinterested or scholarly sources outside this proceeding, of

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[36] Jeff D. Makholm, Agustin J. Ros, and Meredith A. Case, "Total Factor Productivity and Performance-Based Ratemaking for Electricity and Gas Distribution," presented at the 31st Annual Eastern Conference of the Center for Research in Regulated Industries, May 2012, p. 14. Also see NERA, "Total Factor Productivity Study for Use in AUC Proceeding 566 – Rate Regulation Initiative," December 30, 2010, p. 17.

> an event or a circumstance that so changed the nature of the utility businesses tracked by the FERC Form 1 as to invalidate the relevance of the longest period represented by those data. … We know of no *ex ante* basis to be selective regarding the time period used to compute average TFP growth for the industry. In the absence of such external or scholarly reasons for truncating the time period, we continue to support the use of the largest time period available for empirical study as the most objective basis for the TFP component of a well-structured PBR plan.[37]

While there is no doubt that witnesses in this proceeding are providing testimony on behalf of interested parties, in my opinion it serves no useful purpose to impose such an unreasonable condition on a rational, valid investigation of the appropriate value for the forward-looking X factor for the Alberta electric distribution industry.

47. NERA's position is logically flawed and demonstrably false. To illustrate, at one point, NERA blindly asserts that, "The conventional assumption that the industry productivity and input prices are characterized by a stable trend is valid."[38] NERA provides no support for its claim that the alleged stable trend represents "the conventional assumption," and it employs strained logic to avoid testing the unconfirmed assertion of a stable trend:

> We have not attempted a structural break test, as we have seen no evidence from outside this proceeding to lead us to believe that the nature of the utility distribution business has changed in a way that would require such a break to be imposed on the available Form 1 data.[39]

This statement by NERA is nothing more than a smokescreen to cover its flawed approach. NERA's reasoning is fallacious as a matter of scientific inquiry as it is fully

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[37] NERA, "Update, Reply and PBR Plan Review for AUC Proceeding 566 – Rate Regulation Initiative," February 22, 2012, p. 5.

[38] NERA, "Update, Reply and PBR Plan Review for AUC Proceeding 566 – Rate Regulation Initiative," February 22, 2012, p. 16.

[39] NERA, "Update, Reply and PBR Plan Review for AUC Proceeding 566 – Rate Regulation Initiative," February 22, 2012, p. 16.

contradicted by the types of "structural break" tests suggested by NERA itself.[40] These tests do not require *a priori* or independent evidence of the existence of such a break as a pre-condition for testing. By design, the tests are purely statistical and "let the data do the talking;" the procedures are entirely dependent on the data and do not depend on, or require, any other information outside of the data.

48. NERA's unsupported, faulty assertions only serve to divert attention from the determination of an informed, reasoned approach to the appropriate determination of the X factor. Bolstered by its erroneous and curious reasoning, NERA largely ignored the arguments and evidence set forth by various parties in AUC Proceeding 566. In contrast to NERA's reticence to admit there may have been relevant changes in the industry or that distant history was not relevant for the purposes of establishing the AUC X factor, a number of witnesses in AUC Proceeding 566 documented a variety of factors that would cause the trend rate of growth in the TFP data series to change over time. For example, the following were among the reasons provided for why the entire 1972-2009 period was inappropriate for establishing the forward-looking X factor:

- Changes in investment trends
- Technology deployments
- Changes in operating practices
- Changes in customer consumption patterns
- Regulatory incentives
- Industry restructuring
- Business cycles[41]

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[40] NERA, "Update, Reply and PBR Plan Review for AUC Proceeding 566 – Rate Regulation Initiative," February 22, 2012, pp. 15-16. It should be noted that NERA's discussion is not comprehensive as it does not include all possible approaches for these types of tests.

[41] See AUC Decision 2012-237, pp. 61-63.

49. While there may have been disagreement over the precise events and dates provided by the various witnesses, changes in the industry did have a significant impact on industry TFP growth, and the trend relied upon by NERA did change over time (as evidenced by Tables 1 and 2). At the very least, these factors provide ample evidence that using the TFP series dating back to 1972 was not an appropriate basis for establishing the forward-looking X factor. In addition, as I have cited above, disinterested, scholarly research has documented that the relationship between economic activity and electricity consumption has significantly changed in more recent years,[42] further invalidating NERA's false and untested assertion of the existence of a stable trend in industry TFP.

5.2. NERA's Recommendation as a Predictor of the Forward Looking X Factor Fails

50. As noted above, the Commission has appropriately interpreted the X factor as representing the expected annual productivity growth over the term of the price cap plan and, thus, forward looking:

> In general terms, the X factor can be viewed as the expected annual productivity growth during the PBR term.[43]

Therefore, per the Commission, the role of a TFP study in determining the X factor is as a predictor of expected annual productivity growth over the course of the subsequent price cap term.

51. When viewed as a reasonable predictor of forward-looking productivity growth and the X factor, NERA's recommendation of average TFP growth of 0.96 percent over the 1972-2009 period (to which a 0.20 percent stretch factor was added for an X factor of 1.16 percent) is not supported by the available evidence and, thus, fails as a

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[42] Richard F. Hirsh and Jonathan G. Koomey, "Electricity Consumption and Economic Growth: A New Relationship with Significant Consequences?" *The Electricity Journal,* November 2015, Vol. 28, Issue 9, pp. 72-84.

[43] AUC Decision 2012-237, pp. 52-53.

valid approach for determining the X factor.[44] As documented above, industry TFP growth over the 2009-2014 period averaged -1.28 percent per year, meaning that NERA's recommendation over-predicted TFP growth by 2.24 percentage points per year. In essence, the original X factor based on NERA's recommendation contained a stretch factor that was more than 11 times the stated stretch factor of 0.20 percent. The significant magnitude of this over-prediction can be illustrated by noting that, based on EPCOR's 2012 revenue requirement, this would amount to a revenue reduction of $3.2, or approximately 7.5 percent of EDTI's net income.[45]

52. To further put this sizeable over-prediction in context, Figure 3 shows the cumulative difference in price cap indexes between the X factor based on NERA's recommendation and the actual path of TFP growth over the 2009-2014 period.[46] As shown in Figure 3, by the end of the five-year price cap period, rates would have been 11.6 percent higher under the average actual industry TFP growth over this period (plus a 0.20 percent stretch factor) than they were under the implemented price cap with the 1.16 percent X factor based on NERA's recommendation. Clearly, the over-prediction of the X factor by NERA's method and the resulting constraint it put on rates contributed to the overall capital funding shortfall experienced by EPCOR with cumulative K factor amounts that were higher than would be the case had the X factor been set at a reasonable value.

53. When viewed in the context of the Commission's PBR Principles, it is clear that the X factor based on NERA's proposal did not meet the objectives embodied in these

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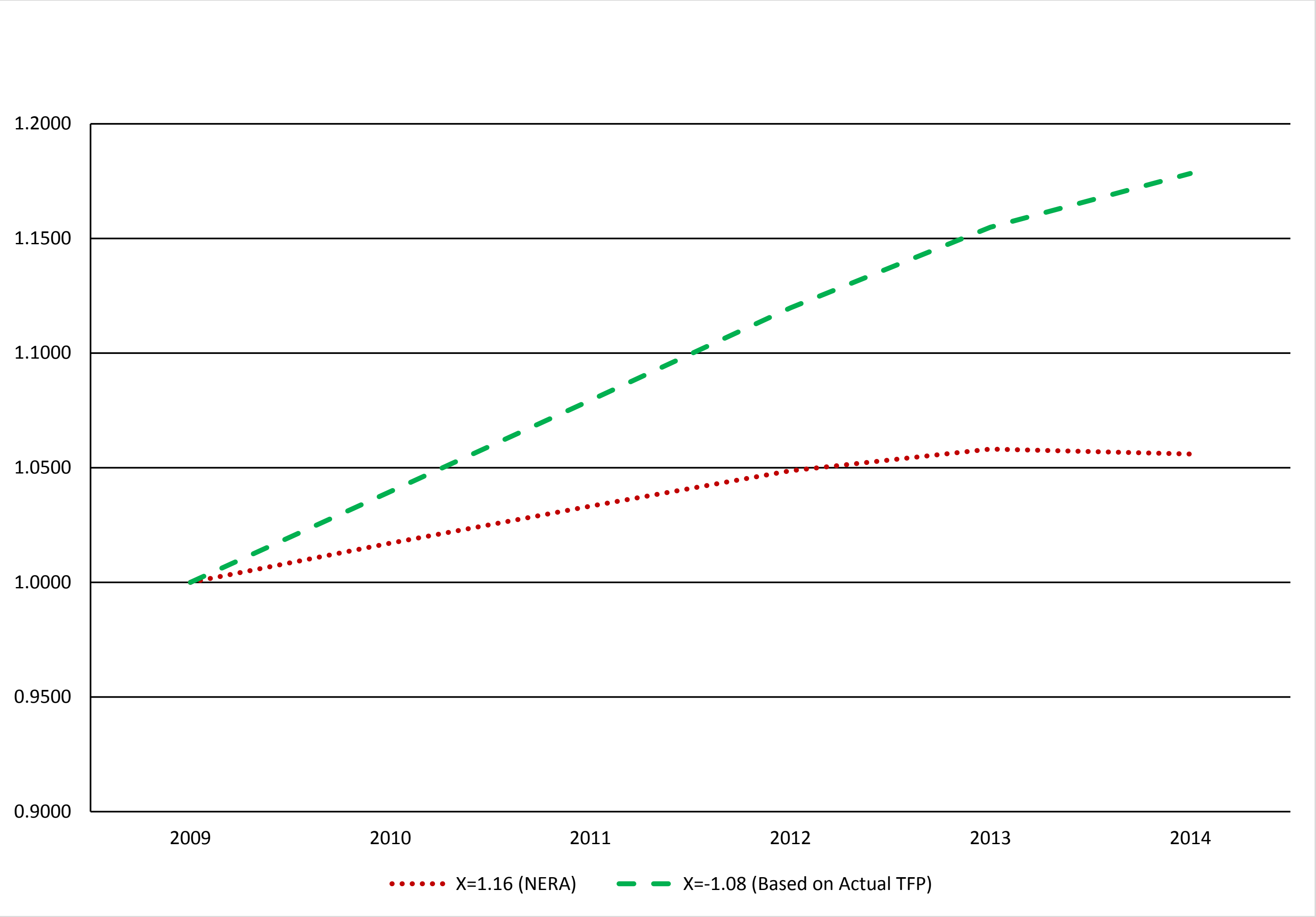
[44] CCA witness Lowry recommended using the 1988-2007 time frame of the NERA study. This would have produced an X factor of 0.83 percent (excluding the stretch factor) with the updated NERA data. The 1999-2009 period recommended by EPCOR witness Cicchetti would have produced an X factor of -0.60 percent (excluding the stretch factor), and the 2000-2009 period recommended by Fortis witness Frayer and AltaGas witness Schoech would have produced an X factor of -0.90 percent (excluding the stretch factor) with the updated NERA data.

[45] Approved 2012 Revenue Requirement = $143.6 million, EDTI 2012 Rule 005 Filing, Schedule 1, line 17; Approved 2012 Return = $42.7 million, EDTI 2012 Rule 005 Filing, Schedule 2, 2012 Decision, line 4; revenue reduction = 2.24% × $143.6 million = $3.2 million; portion of net income = $3.2 million ÷ $42.7 million = 7.5%.

[46] Given that Figure 3 illustrates alternative paths of the price cap index over time, a 0.20 percent stretch factor is added to both the NERA recommended TFP growth and the actual average 2009-2014 TFP growth.

Principles. A more appropriately calibrated X factor would have allowed the Commission to better achieve the goals stated in its PBR Principles of creating the same efficiency incentives as those found in competitive markets, providing the company with a reasonable opportunity to recover its prudently incurred costs, and having both customers and regulated companies share in the benefits of PBR.

Figure 3
Comparison of Price Cap Indexes with X Factors Based on NERA and Actual TFP Growth
2009-2014



5.3. The Second-Generation X Factor for the 2018-2022 Period

54. Just as the entire 1972-2009 time period was not appropriate for determining the X factor for the initial AUC price cap plan, the entire updated period, 1972-2014, is not appropriate for determining the second-generation X factor for the Alberta electric distribution industry. NERA's proclamation of a "stable trend" over the entire period is simply not true for either the original sample or for the updated sample. Moreover, use of this "trend" as a predictor of the forward-looking X factor was and continues to be fundamentally deficient.[47]

55. What is relevant in this case is not a discourse on what the long-term trend in industry TFP is or ought to be, but what is a good-faith, reliable estimate of the forward-looking X factor over the next five years of the plan, 2018-2022, at which time another review will take place. In this respect, the goal is to use the historical TFP series to produce a reasonable basis for the second-generation X factor. In achieving this goal, it is important to satisfy the Commission's desire for a transparent methodology that does not "cherry pick" results. By the same token, it is counterproductive to strive for an "optimal" methodology that is totally objective and devoid of judgement. This is simply not possible as any reasonable methodology will involve a degree of judgement. In this case, given the performance of electric distribution industry TFP, reasonable methodologies will likely produce a TFP basis for the second-generation AUC X factor less than zero.[48]

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[47] I have examined a variety of structural break tests following NERA's recommendation that such tests should be used to assess whether there are any changes in the trend of TFP growth that could inform the determination of the X factor. The choice of tests, their application and results are a matter of judgement as unanimity does not exist regarding the appropriate testing procedure. I conclude that, in this application, these types of tests do not provide a clear consensus on break points and, thus, do not provide an unambiguous, objective approach for determining the forward-looking X factor as implied by NERA.

[48] In addition to my recommended approach outlined below, average TFP growth over other periods that could be considered as a basis for the forward-looking X factor also produce negative results. For example, average annual TFP growth over the last five years of available data (2010-2014) was -1.28 percent, over the last 10 years of available data (2005-2014) was -1.40 percent, and over the last 15 years of available data (2000-2014) was -0.83 percent.

56. As cited above, the parties in AUC Proceeding 566 had recommended various time periods in the NERA series to establish the best estimate of TFP growth for the forward-looking X factor. Abstracting from the particular years recommended or the events that were the basis of the recommendation, these recommendations generally spanned a 10- to 15-year period. Taking a neutral position on the factors underlying these recommendations, this span of years provides a sufficiently long period that overcomes transient, short-run shocks that could influence TFP growth (such as with a 5-year average) and also avoids anchoring the forward-looking estimate with values from the distant past that no longer provide a reasonable basis for establishing a forward-looking X factor.

57. While judgement cannot be completely eliminated in the process of determining an appropriate X factor, by basing it on a moving average approach using the latest 10 or 15 years of available TFP data, independent of particular events and varying interpretations of these events, the Commission's concern with cherry-picking dates or time periods would be addressed. In my opinion, this approach is superior to the NERA approach for "smoothing out of the effects of variations in economic conditions on the estimate of TFP growth, without engaging in a subjective exercise of picking the start and end points of a business cycle." [49] Absent clear, unambiguous evidence of factors calling for specific time periods, this moving average approach best balances the desire for objectivity and transparency with the need to determine a reasonable and appropriate X factor.

58. For these reasons, I recommend basing the X factor for the second-generation AUC price cap plan on an average of the most recent 10- and 15-year intervals of industry TFP growth (the "10/15 moving average"). This approach effectively weights the most recent 10 years more heavily than the earliest five years of the 15-year

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[49] AUC Decision 2012-237, p. 66.

interval.[50] Thus, more recent experience counts more as a basis for the X factor, but this is tempered by the longer term represented by the earliest five years of the longer interval.[51] Given the volatility of the electric distribution TFP series, this approach provides a balance between using more recent data that are likely to more heavily influence the short-term future (which is the relevant time frame for determining the forward-looking X factor) with the stability provided by longer-term averages. I further recommend that these averages would be rolled forward to the end point of the latest available at the time the next price cap review takes place. Averaging over these intervals that are specified without regard to particular events eliminates a significant degree of subjectivity in determining the appropriate interval for forecasting the forward-looking X factor.

59. To illustrate the appropriate use of historical TFP growth as a basis for a forward-looking X factor, Figures 4a and 4b compare the 10/15 moving average and the NERA approach of using all available data to that point predict future TFP growth over the next five years. The figures run between 1987 and 2009, as 1987 is the first year in the series for which a 15-year average can be computed, and 2009 is the last year in series for which a forward-looking five-year average can be computed. Figure 4a shows the actual values of the 10/15 moving average, the NERA average, and next five-year average at that point in time, and Figure 4b shows the percentage point difference between the respective 10/15 and NERA averages and the next five-year average at that point in time. So, for example, in Figure 4a the plots for 1987 show the following:

- the “10/15” line shows the 10/15 year moving average in 1987;

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[50] Specifically, for the 15 years in the average, each of the most recent 10 years has a weight that is 2.5 times the weight of each of the earliest five years. The weight for each of the most recent 10 years is 8.33 percent and the weight for each of the earliest five years is 3.33 percent.

[51] I have not included a stretch factor in my recommendation. As I noted above, in principle, stretch factors are implemented in first-generation PBR plans and, *ceteris paribus*, represent a transition to expected greater TFP growth due to a switch from cost of service regulation to PBR.

- the "NERA" line shows the average over the 1972-1987 period (all available data to that point); and
- the "Next 5 Yrs" line shows actual average growth over the 1988-1992 period.

The last data point in Figure 4 occurs in 2009 since the last five-year average TFP growth occurs after 2009 (i.e., 2010-2014). In this case, the plots for 2009 show the following:

- the "10/15" line shows the 10/15 moving average in 2009;
- the "NERA" line shows the average over the 1972-2009 period (all available data to that point); and
- the "Next 5 Yrs" line shows actual average growth over the 2010-2014 period.

60. Figures 4a and 4b demonstrate that the 10/15 moving average has been a progressively better predictor of the next five-year average TFP growth than the NERA approach every year since 1998. The gap between the two approaches has grown wider over time as old, irrelevant data has become increasingly problematic for the NERA approach. In 1998, the gap between the two approaches was only 0.07 percentage points, but by 2009 the gap had widened to 1.27 percentage points.

61. The results are qualitatively the same if either the 10-year or 15-year moving average is used in place of the 10/15 moving average. Use of a five-year moving average also provides generally similar results but is much more volatile.[52] Considering the results of these sensitivity analyses leads me to conclude that my

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[52] See "Figure 4 Sensitivity" in backup. Appendix C contains charts comparing the alternative projections. As I stated above, reasonable methodologies will likely produce a TFP basis for the second-generation X factor less than zero. In this regard, given the similarity of results, a 10- or 15-year moving average would be acceptable as a basis for the X factor. As a benchmark that further reinforces the notion of a negative X factor, the post-1996 period (1996-2014) demarcated by the change in the relationship between economic activity and energy consumption noted above, experienced an average TFP growth of -0.64 percent. Furthermore, as I discussed above, the authors of the NERA study have recognized "sharp declines" in TFP growth in more recent years.

recommended approach produces a reasonable and conservative basis for the forward-looking X factor; it weights recent experience more heavily—which is important for relatively short-term forecasts in which the near-term future is likely to be more heavily influenced by more recent experience—but it is not unduly influenced by short-term volatility.

Figure 4a

Comparison of 10/15 Moving Average, NERA Average and Next Five-Year Average TFP Growth

1987-2009

Figure 4b
10/15 Moving Average and NERA Approach Differences Relative to Next Five-Year Average TFP Growth
1987-2009

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62. For example, as Table 3 shows, the 10/15 moving average for intervals ending in 2014 produces an X factor of -1.11 percent.[53] In my opinion, this approach is a reasonable and appropriate basis for the second-generation X factor in the AUC price cap plan.

Table 3
Average Annual Growth Rates for 10- and 15-Year Intervals Ending in 2014

	Output	Input	TFP
10 Years, 2005-2014	-0.01%	1.39%	-1.40%
15 Years, 2000-2014	0.51%	1.34%	-0.83%
Average	0.25%	1.36%	-1.11%

Had this approach been used with data through 2009 at the time of AUC Proceeding 566, the TFP basis for the first-generation X factor would have been -0.29 percent, consisting of a 10-year interval (2000-2009) average of -0.60 percent and a 15-year interval (1995-2009) average of 0.03 percent. If a stretch factor of 0.20 would be added recognizing that this was a first-generation X factor, the result would have been an X factor of -0.09 percent.[54] Figure 5 replicates the comparison of price cap indexes based on the adopted NERA proposal and actual average TFP growth over the 2009-2014 period from Figure 3, and adds the price cap index based on 10- and 15-year averages through 2009. It can be seen that the proposed X factor based on the 10/15 moving average would have performed much better than the NERA-based X factor. Cumulatively, at the end of this period, the price cap with the 10/15 X factor would have been 6.2 percent higher than the price cap with the NERA-based X factor. Furthermore, as noted above, a more reasonable X factor would have lessened the severity of the capital funding shortfall experienced by EPCOR and

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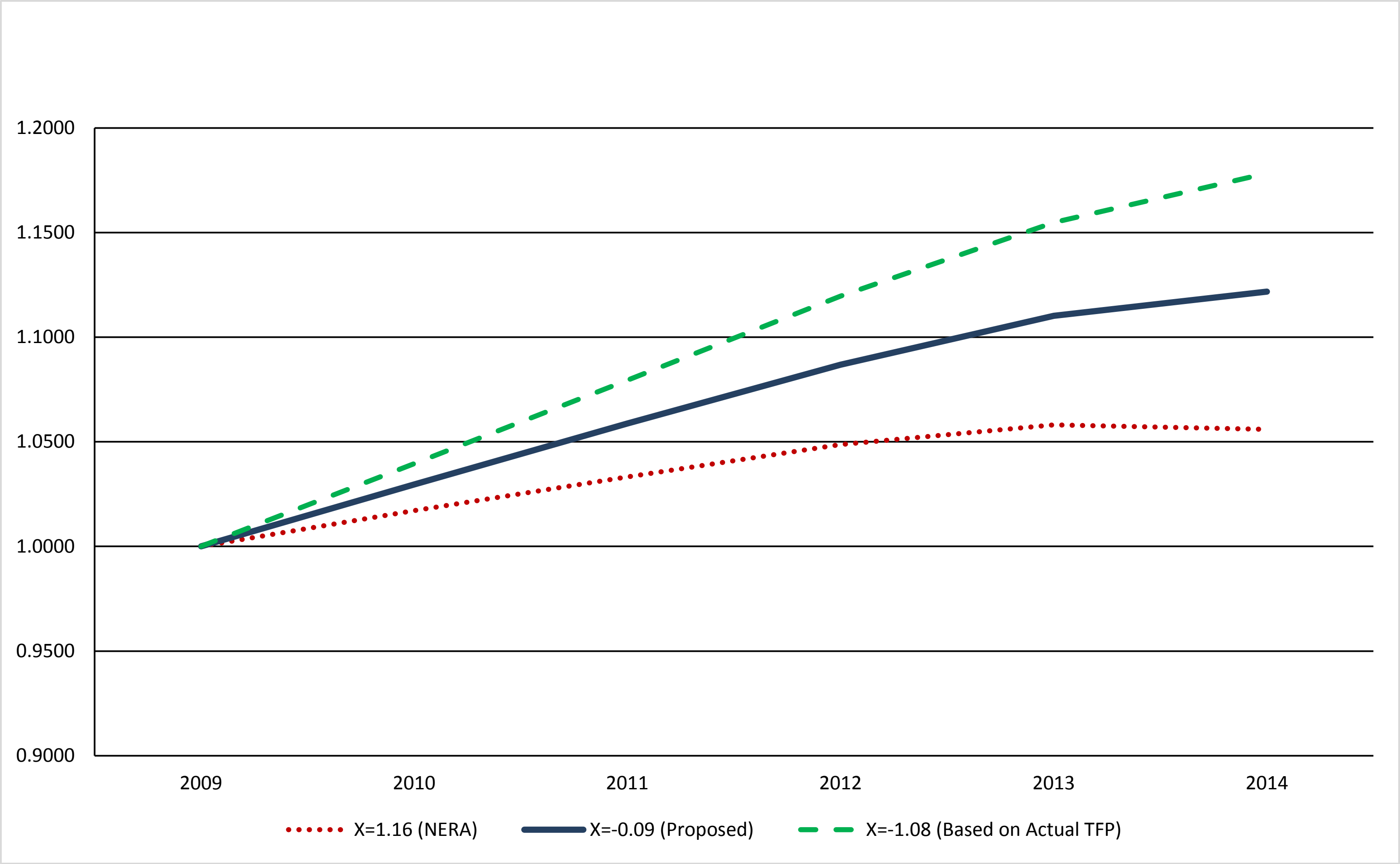
[53] As noted above, I have not included a stretch factor in my recommendation.

[54] If the stretch factor were viewed as being set roughly proportionate to the TFP estimate (e.g., 20 percent relative to NERA's TFP estimate), it could be argued that the stretch factor would have also been lower had the 10/15 moving average been used as a basis of the first-generation X factor. For example, 20 percent of the absolute value of the -0.29 TFP basis would have produced a stretch factor of 0.06 and the resulting X factor would have been -0.23 (= -0.29 + 0.06).

would have resulted in lower amounts to be recovered outside of the “I – X” index under K factors.

Figure 5
Comparison of Price Cap Indexes with X Factors Based on NERA, 10/15 Moving Average and Actual TFP Growth
2009-2014



6. Conclusion

63. It is my opinion that during the next five years of the AUC PBR plan until the next review, the 10/15 X factor would: (1) best balance the objectives of determining a reasonable X factor with the desire to minimize result-oriented analyses; (2) best address the needs of the industry to fund future investments and have the opportunity to recover its prudently incurred costs; (3) adequately protect Alberta consumers; and (4) enable the Commission to fulfill the goals of its PBR Principles that seek to design PBR so as to create the same incentive structure as a competitive market, stress regulatory efficiency and the balancing of the interests of regulated firms and their customers.

Appendix A

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RESUME

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Professional Experience:

I have experience as an expert witness in civil litigation cases on a range of issues, including antitrust, intellectual property, breach of contract, and employment issues. I have computed economic damages in a number of employment-related areas including wrongful termination, pay and promotion discrimination, and personal injury. In the antitrust area, I have experience with price fixing, predatory pricing, market definition, and market power issues. In the intellectual property area, my experience includes patent infringement, copyright infringement, and trade secret cases. I also have expertise in the economic analysis of network industries including telecommunications, railroad, electricity and postal. I was the Principal Investigator for NCFRP 24, *Preserving and Protecting Freight Infrastructure and Routes* and was a primary author of the study of the U.S. freight railroad industry commissioned by the U.S. Surface Transportation Board.

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"Unbundled Network Elements and Economic Cost Standards," Wisconsin Institute of Certified Public Accountants, Madison, WI, October 1997.

"The Uses and Abuses of Stand-Alone Costs," Second Prize winner in the Research Awards Competition of the Eleventh Annual Southeastern Public Utilities Conference, Atlanta, GA, September 23, 1991.

"Diversification of Telephone Company Service Offerings and Cash Cow Economics: Who Gets Milked?" First Prize winner in the Research Awards Competition of the Tenth Annual Southeastern Public Utilities Conference, Atlanta, GA, August 1990. Also presented at the Third Annual Western Conference of the Rutgers University Advanced Workshop in Regulation and Public Utility Economics, San Diego, CA, July 1990.

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Appendix B

Table B.1
Electric Distribution Industry Output, Input and TFP Growth
1972-2014

	ΔOutput, %	ΔInput, %	ΔTFP, %
1972			
1973	7.636%	2.839%	4.797%
1974	-0.341%	0.121%	-0.462%
1975	2.319%	-2.090%	4.409%
1976	5.190%	0.129%	5.060%
1977	4.444%	1.609%	2.835%
1978	3.552%	2.304%	1.249%
1979	2.924%	1.658%	1.266%
1980	1.386%	2.091%	-0.705%
1981	1.076%	0.515%	0.561%
1982	-1.090%	2.575%	-3.666%
1983	2.860%	1.924%	0.936%
1984	4.615%	1.744%	2.872%
1985	1.875%	2.138%	-0.263%
1986	2.704%	0.320%	2.385%
1987	4.051%	1.758%	2.293%
1988	5.030%	-0.042%	5.072%
1989	2.191%	1.378%	0.813%
1990	1.688%	0.861%	0.827%
1991	2.290%	1.715%	0.575%
1992	-0.620%	-0.715%	0.096%
1993	4.130%	1.216%	2.915%
1994	2.249%	0.301%	1.949%
1995	2.691%	-1.176%	3.867%
1996	1.988%	0.354%	1.634%
1997	1.126%	0.564%	0.563%
1998	3.135%	2.543%	0.592%
1999	1.674%	1.855%	-0.181%
2000	3.105%	1.070%	2.035%
2001	-0.973%	2.266%	-3.239%
2002	3.023%	1.182%	1.841%
2003	0.647%	2.788%	-2.141%
2004	1.967%	-1.057%	3.024%
2005	2.934%	0.694%	2.240%
2006	-0.236%	1.930%	-2.166%
2007	2.245%	1.781%	0.464%
2008	-1.835%	2.526%	-4.361%
2009	-4.003%	-0.260%	-3.743%
2010	3.019%	1.336%	1.683%
2011	-1.555%	2.305%	-3.860%
2012	-1.138%	0.841%	-1.979%
2013	0.111%	0.711%	-0.599%
2014	0.338%	1.999%	-1.660%

Appendix C

Table C.1
Comparison of Alternative Projections with Next Five-Year TFP Growth
1987-2009

	5 Avg	10 Avg	15 Avg	10/15 Avg	NERA	Next 5 Yrs
1987	**1.645%**	**0.693%**	**1.571%**	**1.132%**	**1.571%**	**1.477%**
1988	**2.472%**	**1.075%**	**1.589%**	**1.332%**	**1.790%**	**1.045%**
1989	**2.060%**	**1.030%**	**1.674%**	**1.352%**	**1.733%**	**1.272%**
1990	**2.278%**	**1.183%**	**1.436%**	**1.309%**	**1.682%**	**1.880%**
1991	**1.916%**	**1.184%**	**1.137%**	**1.161%**	**1.624%**	**2.092%**
1992	**1.477%**	**1.561%**	**0.954%**	**1.257%**	**1.548%**	**2.185%**
1993	**1.045%**	**1.758%**	**1.065%**	**1.412%**	**1.613%**	**1.721%**
1994	**1.272%**	**1.666%**	**1.111%**	**1.388%**	**1.628%**	**1.295%**
1995	**1.880%**	**2.079%**	**1.415%**	**1.747%**	**1.725%**	**0.929%**
1996	**2.092%**	**2.004%**	**1.487%**	**1.745%**	**1.721%**	**-0.046%**
1997	**2.185%**	**1.831%**	**1.769%**	**1.800%**	**1.675%**	**0.209%**
1998	**1.721%**	**1.383%**	**1.746%**	**1.564%**	**1.633%**	**-0.337%**
1999	**1.295%**	**1.284%**	**1.542%**	**1.413%**	**1.566%**	**0.304%**
2000	**0.929%**	**1.404%**	**1.696%**	**1.550%**	**1.583%**	**0.345%**
2001	**-0.046%**	**1.023%**	**1.321%**	**1.172%**	**1.417%**	**0.559%**
2002	**0.209%**	**1.197%**	**1.290%**	**1.244%**	**1.431%**	**0.284%**
2003	**-0.337%**	**0.692%**	**0.810%**	**0.751%**	**1.316%**	**-0.160%**
2004	**0.304%**	**0.799%**	**0.957%**	**0.878%**	**1.369%**	**-1.513%**
2005	**0.345%**	**0.637%**	**1.051%**	**0.844%**	**1.395%**	**-1.625%**
2006	**0.559%**	**0.257%**	**0.868%**	**0.562%**	**1.291%**	**-1.963%**
2007	**0.284%**	**0.247%**	**0.893%**	**0.570%**	**1.267%**	**-2.452%**
2008	**-0.160%**	**-0.249%**	**0.408%**	**0.080%**	**1.111%**	**-1.700%**
2009	**-1.513%**	**-0.605%**	**0.028%**	**-0.288%**	**0.979%**	**-1.283%**

Figure C.1
Comparison of Alternative Projections with Next Five-Year TFP Growth – 1
1987-2009

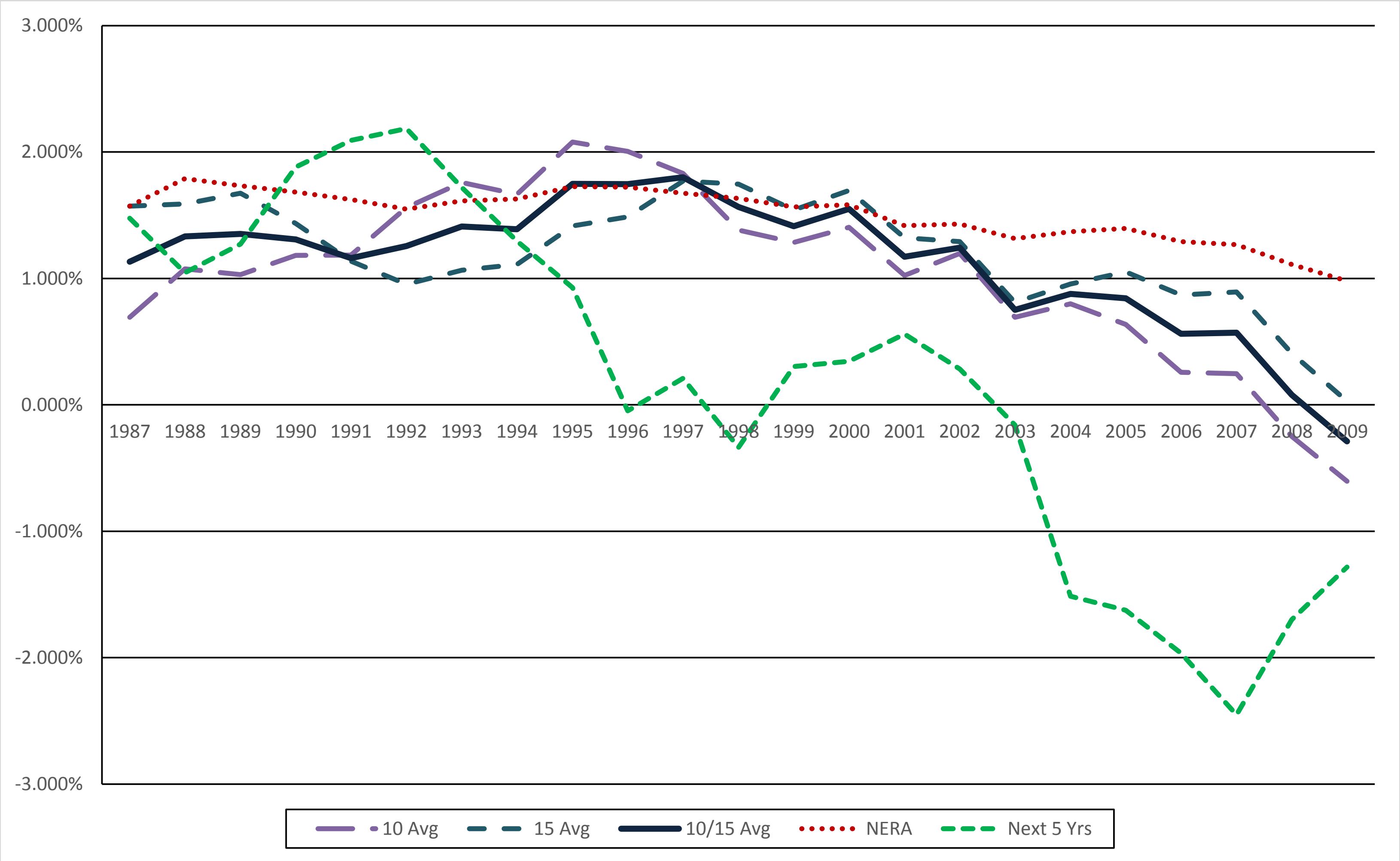


Figure C.2

Comparison of Alternative Projections with Next Five-Year TFP Growth – 2
1987-2009

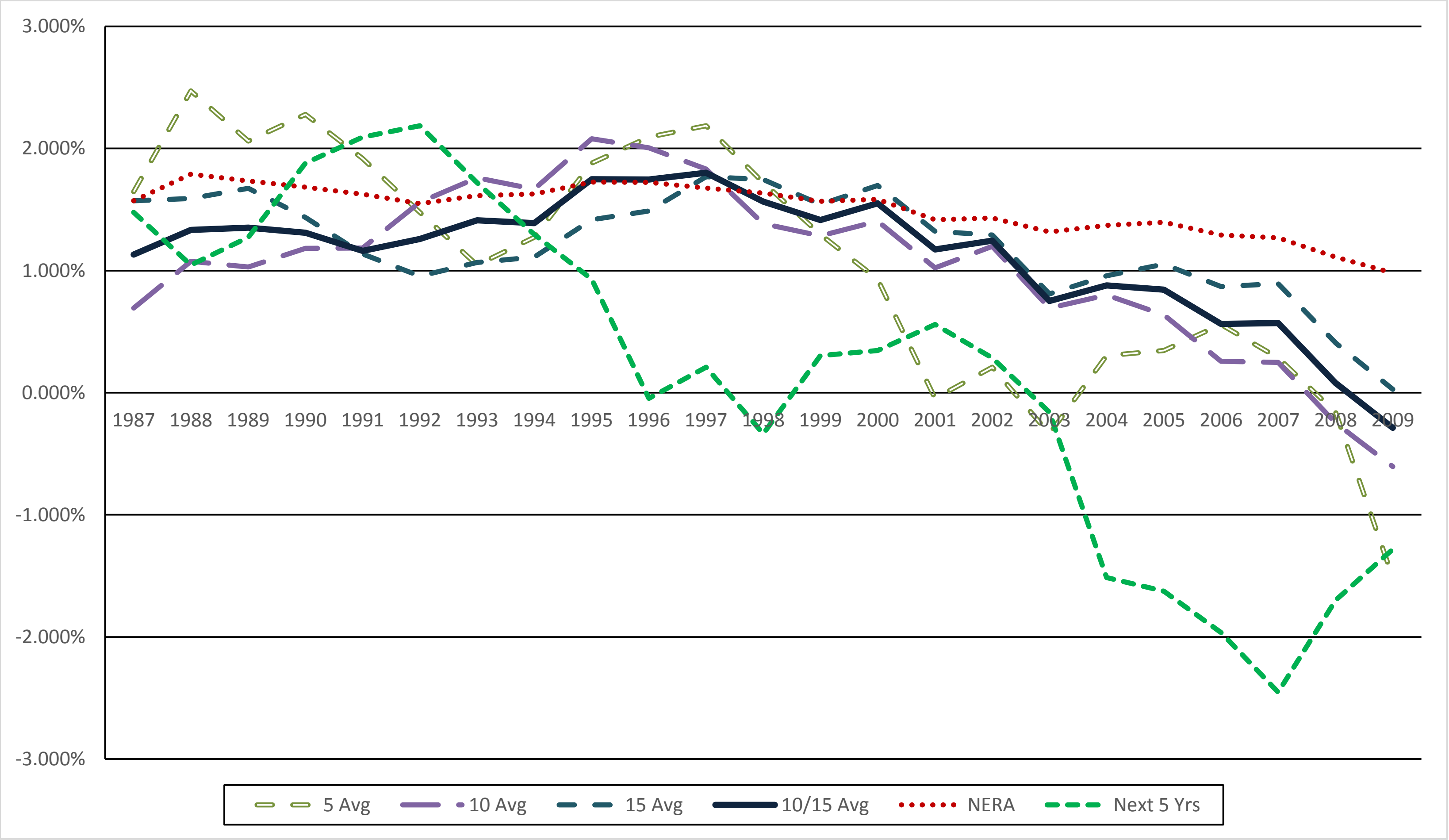


Table C.2
Comparison of Differences Between Alternative Projections and Next Five-Year TFP Growth
1987-2009

	5 Avg	10 Avg	15 Avg	10/15 Avg	NERA
1987	0.168	(0.784)	0.094	(0.345)	0.094
1988	1.427	0.030	0.544	0.287	0.745
1989	0.788	(0.242)	0.402	0.080	0.460
1990	0.398	(0.697)	(0.444)	(0.571)	(0.198)
1991	(0.176)	(0.907)	(0.955)	(0.931)	(0.468)
1992	(0.709)	(0.625)	(1.231)	(0.928)	(0.638)
1993	(0.676)	0.038	(0.656)	(0.309)	(0.108)
1994	(0.023)	0.371	(0.184)	0.093	0.333
1995	0.952	1.150	0.487	0.819	0.797
1996	2.138	2.050	1.533	1.792	1.768
1997	1.976	1.622	1.559	1.590	1.466
1998	2.058	1.720	2.083	1.902	1.971
1999	0.991	0.980	1.239	1.109	1.262
2000	0.584	1.060	1.351	1.205	1.238
2001	(0.605)	0.464	0.761	0.612	0.857
2002	(0.074)	0.913	1.007	0.960	1.147
2003	(0.177)	0.852	0.970	0.911	1.476
2004	1.817	2.313	2.470	2.391	2.882
2005	1.969	2.261	2.676	2.469	3.020
2006	2.523	2.220	2.832	2.526	3.254
2007	2.736	2.699	3.345	3.022	3.719
2008	1.540	1.451	2.107	1.779	2.810
2009	(0.230)	0.678	1.312	0.995	2.263

Figure C.3
Comparison of Differences Between Alternative Projections and Next Five-Year TFP Growth – 1
1987-2009

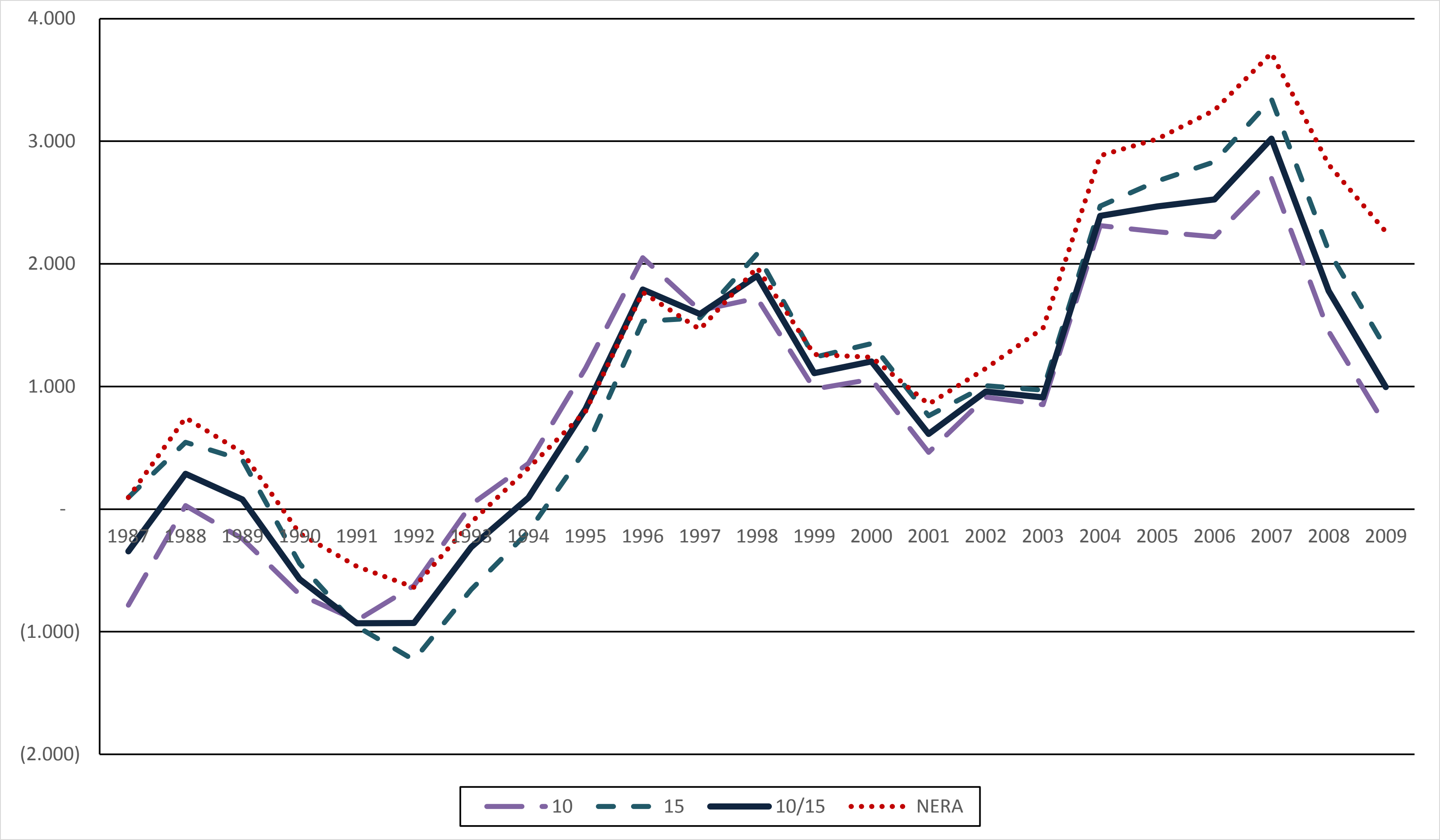
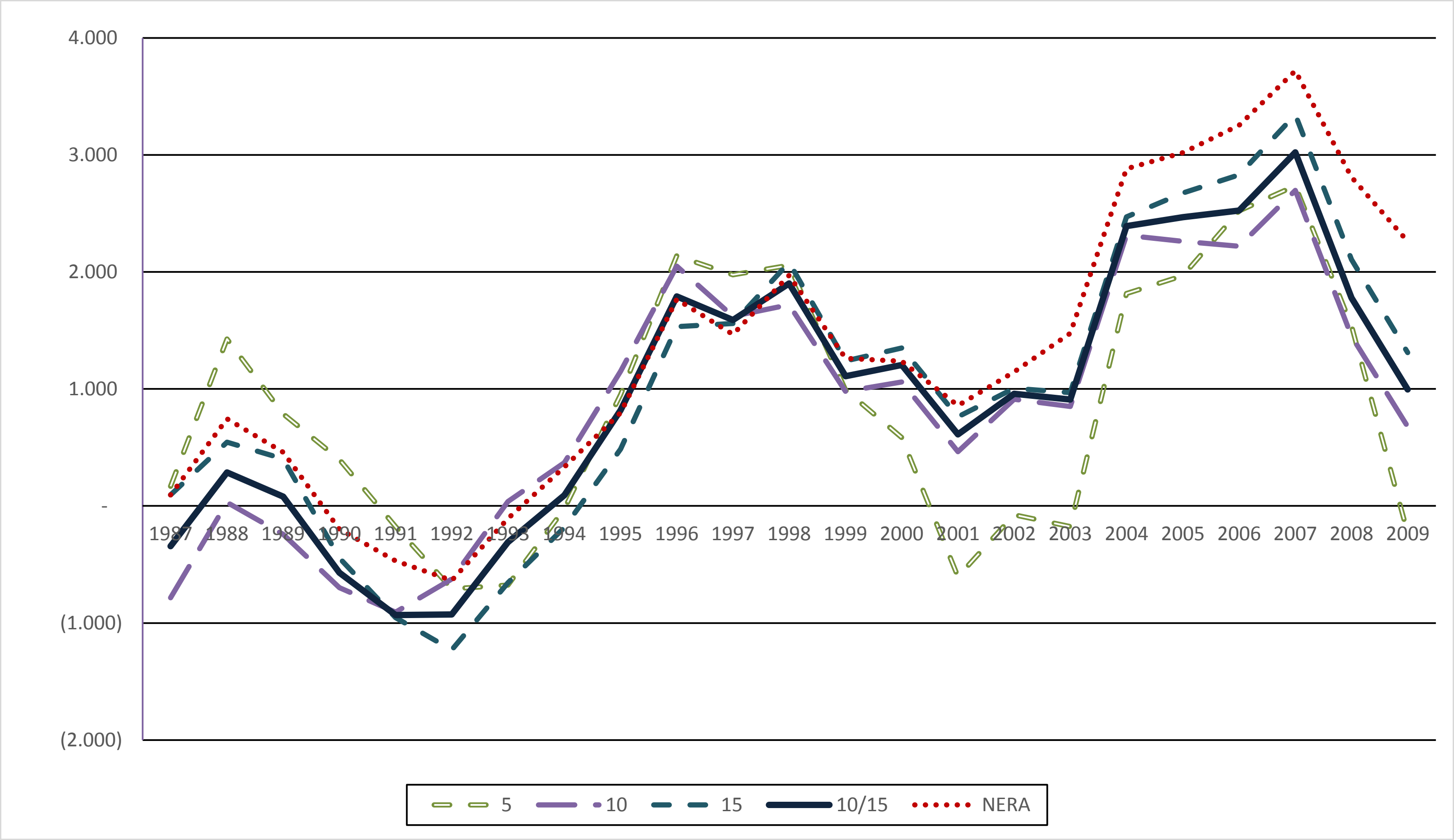


Figure C.4
Comparison of Differences Between Alternative Projections and Next Five-Year TFP Growth – 2
1987-2009



EPCOR Distribution & Transmission Inc.
2018 Rebasing - Option 1
1.0 - Summary
($ millions)

		A	B	C	D	E	F
	Description	**Ref./Calc.**	**2013**	**2014**	**2015**	**2016**	**2017 Notional**
	Distribution						
1	Revenues	2013-2016: tab 2.0 row 17, 2017: row 8 + row 9	152.30	158.67	170.97	186.06	189.46
2	Capital Costs						
3	Depreciation	tab 2.0 row 26	30.09	32.07	35.92	40.64	46.64
4	Cost of Debt	tab 2.0: row 33	22.89	24.29	28.18	29.84	34.68
5	**Total Capital Costs**	**row 3 + row 4**	**52.98**	**56.36**	**64.10**	**70.48**	**81.32**
6	Operating Costs	tab 2.0 row 18	65.84	66.98	70.50	71.67	71.94
7	Flow Through Items (Y)	2013-2016: tab 2.0 row 34, 2017 Y Factor Not Included in Notional Rebase	9.63	8.48	7.43	9.23	Note 1
8	**Total Costs**	**Sum: row 5 to row 7**	**128.46**	**131.82**	**142.03**	**151.38**	**153.26**
9	Return	2013-2016: row 1 - row 8, 2017: tab 2.0 (row 32 x row 6 x row 8)	23.85	26.85	28.95	34.68	36.20
10	Return on Equity %	row 9 / (tab 2.0 row 32 x tab 2.0 row 6)	8.84%	9.10%	8.89%	9.24%	8.30%
11	Inflation Factor (I)	tab 2.0 row 1	2.87%	2.75%	2.65%	2.06%	0.95%
12	Productivity Factor (X)	tab 2.0 row 5	1.16%	1.16%	1.16%	1.16%	1.16%
13	I - X	row 11 - row 12	1.71%	1.59%	1.49%	0.90%	-0.21%
14	Q Factor Growth	tab 2.0 row 12	1.46%	1.96%	0.85%	3.20%	2.15%

Note 1: Y Factor costs are not included in the calculation of the Notional Base Rates.

EPCOR Distribution & Transmission Inc.
2018 Rebasing - Option 1
2.0 Inputs and Assumptions
($ millions)

		A	B	C	D	E	F	G
	Description	**Unit**	**Ref./Calc.**	**2013 A**	**2014 A**	**PBR 1 2015 F**	**2016 F**	**2017 F**
1	Distribution I Factor	%	Input	2.87%	2.75%	2.65%	2.06%	0.95%
2	**X Factor**							
3	Productivity	%	Input	0.96%	0.96%	0.96%	0.96%	0.96%
4	Stretch	%	Input	0.20%	0.20%	0.20%	0.20%	0.20%
5	**Distribution X Factor**	%	row 3 + row 4	1.16%	1.16%	1.16%	1.16%	1.16%
6	Equity %	%	Input	40.00%	40.00%	40.00%	40.00%	40.00%
7	Debt %	%	100% - row 6	60.00%	60.00%	60.00%	60.00%	60.00%
8	Return on Equity (2013-2015 approved; 2016-2017 hypothetical)	%	Input	8.30%	8.30%	8.30%	8.30%	8.30%
9	Cost of Debt	%	Input	5.70%	5.30%	5.77%	5.30%	5.30%
10	**WACC**	%	row 6 x row 8 + row 7 x row 9	**6.74%**	**6.50%**	**6.78%**	**6.50%**	**6.50%**
11	Composite Depreciation Rate	%	row 26 / row 24	3.23%	3.17%	3.21%	3.23%	3.25%
12	**Q Factor Growth**	%	2013-2017 Input	1.46%	1.96%	0.85%	3.20%	2.15%
13	**Revenues**							
14	Revenues	$	2013-2016 Input, 2017 tab 1.0 row 1	138.38	143.34	146.71	152.82	189.46
15	K Factor Revenues	$	2013-2016 Input	4.29	6.85	16.83	24.01	
16	Y Factor Revenues	$	2013-2016 Input	9.63	8.48	7.43	9.23	
17	**Total Revenues**	$	Sum rows 14 to 16	**152.30**	**158.67**	**170.97**	**186.06**	**189.46**
18	**Operating Costs** [1]	$	13-16 Input, 2017 - tab 2.1 row 7	**65.84**	**66.98**	**70.50**	**71.67**	**71.94**
19	**Capital Costs**							
20	Gross Assets Opening	$	2013 to 2017: row 23 col (-1)	898.07	965.72	1,055.42	1,179.23	1,334.83
21	Capital Additions	$	Schedule 5 tab 1 row 108	78.62	100.87	135.87	177.96	213.27
22	Retirements	$	Input	(10.96)	(11.17)	(12.06)	(22.35)	(10.02)
23	Gross Assets Closing	$	Sum rows 20 to 22	965.72	1,055.42	1,179.23	1,334.83	1,538.09
24	Mid Year Gross Property	$	(row 20 + row 23) / 2	931.89	1,010.57	1,117.32	1,257.03	1,436.46
25	Opening Accumulated Depreciation	$	2013 Input, 2014 to 2017: col (-1), row	253.51	272.63	293.54	317.40	335.68
26	Depreciation Expense	$	Input	30.09	32.07	35.92	40.64	46.64
27	Retirements	$	row 22	(10.96)	(11.17)	(12.06)	(22.35)	(10.02)
28	Closing Accumulated Depreciation	$	Sum rows 25 to 27	272.63	293.54	317.40	335.68	372.31
29	Mid Year Depreciation	$	(row 25 + row 28) / 2	263.07	283.08	305.47	326.54	354.00
30	Mid Year Net Assets	$	row 24 - row 29	668.82	727.48	811.86	930.49	1,082.46
31	Working Capital	$	Input	5.62	10.35	2.11	8.01	8.01
32	**Mid Year Net Rate Base**	$	row 30 + row 31	**674.44**	**737.84**	**813.97**	**938.50**	**1,090.47**
33	**Cost of Debt**	$	2013-2014 Input, 2015-18 row 7 x row 9 x row 32	22.89	24.29	28.18	29.84	34.68
34	Flow Through Items (Y)	$	2013-16: row 16, 2017 = Prior Year x (1+row 1)	9.63	8.48	7.43	9.23	9.32

Note

[1] The Operating costs in row 18 do not include Y Factor costs. The 2013 and 2014 Operating costs are based on Rule 005 reported values adjusted for the removal of Y Factor costs. The Operating costs for all other years are based on forecasts net of Y Factor costs.

EPCOR Distribution & Transmission Inc.
Rebasing Option 1
2.1 Operating Cost Weighted Average Calculation
($ millions)

		A	B	C	D	E	F
	Operating Indexing & Weighted Average Calculation	**2013**	**2014**	**2015**	**2016**	**2017**	
1	**Operating Costs (Not Including Y Expenses)**	65.84	66.98	70.50	71.67	**71.94**	2013-2016 tab 2.0 row 18 2017 = row 7
2	**I Rate + 100%**	102.87%	102.75%	102.65%	102.06%	100.95%	
3	**Operating Costs Normalized for 2016 $**	70.87	70.17	71.95	71.67		

	2018 Operating Revenue:	**2013**	**2014**	**2015**	**2016**	**2017**	**Totals**
			2014 to 2016 weighted average				
4	**Weighting by Year**		1	1	1		**3**
5	Weighting x Normalized Costs - 2016 $s		70.17	71.95	71.67		**213.79**
6	2016 Average (Total Weighted $'s Row 5 / # of Weights Row 4) in 2016 $s				71.26		
7	**2017 Op Costs (Indexed to 2017 %'s)**				row 6 col D x row 2 col E	**71.94**	

Table 4.2-1
Capital Additions Funding Shortfall Over the PBR Term
2018-2022
($ millions)

		A	B	C	D	E
		2018	**2019**	**2020**	**2021**	**2022**
	Revenues					
1	Revenues Before Y Factor Revenue	207.10	218.13	229.50	241.71	254.03
2	Y Factor Revenue	9.53	9.73	9.93	10.12	10.30
3	**Total Revenues**	**216.63**	**227.86**	**239.42**	**251.83**	**264.33**
	Expenses					
4	Operating Expenses	73.10	75.92	78.70	81.72	85.04
5	Depreciation (Based on Capital Additions in row 14)	51.91	56.38	60.64	64.78	69.09
6	Cost of Debt (Based on Capital Additions in row 14)	38.83	41.76	44.56	47.22	49.75
7	Y Factor Expenses	9.53	9.73	9.93	10.12	10.30
8	**Total Expenses**	**173.37**	**183.79**	**193.83**	**203.84**	**214.17**
	Return					
9	Return (row 3- row 8)	43.26	44.07	45.60	47.99	50.16
10	Mid Year Net Rate Base	1,221.03	1,313.28	1,401.17	1,484.86	1,564.33
11	**ROE % (row 9/(row 10 x 40%))**	**8.86%**	**8.39%**	**8.14%**	**8.08%**	**8.02%**
12	**5 Year Average ROE (Average row 11)**					**8.30%**
13	Approved ROE					8.30%
	Capital Additions					
14	Level of Capital Additions Allowed to Maintain an average ROE of 8.30% over the term	146.40	146.40	146.40	146.40	146.40
15	Forecast Level of Capital Additions Added to Rate Based on 2015-2017 Capital Additions (using a 3 year escalated for inflation average)	183.12	187.02	190.78	194.37	197.96
16	Capital Additions Shortfall in order to maintain an ROE of 8.30% (row 14 - 15)	(36.72)	(40.62)	(44.38)	(47.97)	(51.56)
17	5 Year Average Capital Additions Shortfall in order to maintain an ROE of 8.30% (Average row 16)					(44.25)

Capital Additions Forecast
2018-2022
Tab 1.0 Capital Adds
($ millions)

	Year	A **Forecast Capital Additions**	B **I Factor Rate**	C **Note**	D **Calculation/Reference**	E **Normalized & Forecast Capital Adds**
1	2015	135.87	2.65%		col A x (1+row1 col.B) x (1+row2 col.B)	142.34
2	2016	177.96	2.06%		col A x (1+row2 col.B)	181.63
3	2017	213.27			2012 Decision	213.27
4	**3 Year Avg**	**175.70**			**Average of rows 1 to 3**	**179.08**
5	2018		2.26%		row $_{T-1}$ col. E x (1+col.B)	183.12
6	2019		2.13%			187.02
7	2020		2.01%			190.78
8	2021		1.88%			194.37
9	2022		1.85%			197.96

EPCOR Distribution
2018-2022 PBR Model
2.0 Inputs and Calculations
($ millions)

			8.30%	2018-2022 5 year average ROE			
	Description	A **Ref./Calc.**	B **2018**	C **2019**	D **2020**	E **2021**	F **2022**
	Revenues						
1	Revenues Before Y	2018 COS based on Option 2, 2019+ x row 30	207.10	218.13	229.50	241.71	254.03
2	Flow Through Items (Y) Revenue	row 31	9.53	9.73	9.93	10.12	10.30
2A	K Factor						
3	**Total Revenues**	**rows 1 to 2A**	**216.63**	**227.86**	**239.42**	**251.83**	**264.33**
4	Operating Costs	2012 Decision, 2013-14 : Actuals 2015 A/F, 2016-2023 LTP	73.10	75.92	78.70	81.72	85.04
	Capital Costs						
5	Gross Assets Opening	2018 Input, 2019 to 2022: row 8 $_{T-1}$	1,538.09	1,674.52	1,808.97	1,935.65	2,068.37
6	Capital Additions	Calculated to arrive at ROE Avg of 8.3%	146.40	146.40	146.40	146.40	146.40
7	Retirements	Input	(9.97)	(11.95)	(19.72)	(13.67)	(14.84)
8	Gross Assets Closing	Sum rows 5 to 7	1,674.52	1,808.97	1,935.65	2,068.37	2,199.94
9	**Mid Year Gross Property**	**(row 5 + row 8) / 2**	**1,606.30**	**1,741.74**	**1,872.31**	**2,002.01**	**2,134.16**
10	Opening Accumulated Depreciation	2018 Input, 2019 to 2022: row 13 $_{T-1}$	372.31	414.25	458.68	499.60	550.71
11	Depreciation Expense	row 9 x row 37	51.91	56.38	60.64	64.78	69.09
12	Retirements	row 7	(9.97)	(11.95)	(19.72)	(13.67)	(14.84)
13	Closing Accumulated Depreciation	Sum rows 10 to 12	414.25	458.68	499.60	550.71	604.95
14	Mid Year Depreciation	(row 10 + row 13) / 2	393.28	436.47	479.14	525.15	577.83
15	**Mid Year Net Assets**	**row 9 - row 14**	**1,213.02**	**1,305.27**	**1,393.17**	**1,476.86**	**1,556.33**
16	Working Capital	Same as 2016/2017 Forecast	8.01	8.01	8.01	8.01	8.01
17	**Mid Year Net Rate Base (Incl Work Cap)**	**row 15 + row 16**	**1,221.03**	**1,313.28**	**1,401.17**	**1,484.86**	**1,564.33**
18	Cost of Debt	row 17 x row 33 x row 35	38.83	41.76	44.56	47.22	49.75
19	**Total Capital Costs**	**row 11 + row 18**	**90.74**	**98.15**	**105.19**	**112.00**	**118.83**
20	**Flow Through Items (Y) Costs**	**row 31**	**9.53**	**9.73**	**9.93**	**10.12**	**10.30**
21	**Total Costs**	**row 4 + row 19 + row 20**	**173.37**	**183.79**	**193.83**	**203.84**	**214.17**
22	**Return**	**row 3 - row 21**	**43.26**	**44.07**	**45.60**	**47.99**	**50.16**
23	**ROE**	**row 22 / (row 17 x row 32)**	**8.86%**	**8.39%**	**8.14%**	**8.08%**	**8.02%**
	Factors/Rates						
24	**I Factor**	**Forecast on a 5 year rolling avg**	**2.26%**	**2.13%**	**2.01%**	**1.88%**	**1.85%**
25	Productivity	As Proposed	(1.11%)	(1.11%)	(1.11%)	(1.11%)	(1.11%)
26	Stretch	As Proposed	0.00%	0.00%	0.00%	0.00%	0.00%
27	**X Factor**	**row 25 + row 26**	**(1.11%)**	**(1.11%)**	**(1.11%)**	**(1.11%)**	**(1.11%)**
28	**I - X**	**row 24 - row 27**	**3.37%**	**3.24%**	**3.12%**	**2.99%**	**2.96%**
29	**Growth Factor (Q)**	**Forecast on a 5 year rolling avg**	**1.92%**	**2.02%**	**2.03%**	**2.26%**	**2.08%**
30	**I-X x Q**	**row 28 x row 29**	**5.35%**	**5.33%**	**5.21%**	**5.32%**	**5.09%**
31	**Y Factor Costs**	**2018 Input, 2019-2022 $_{T-1}$ x row 24**	**9.53**	**9.73**	**9.93**	**10.12**	**10.30**
	Cost of Debt/Equity						
32	Equity %	Approved	40.00%	40.00%	40.00%	40.00%	40.00%
33	Debt %	100% - row 32	60.00%	60.00%	60.00%	60.00%	60.00%
34	Approved Return on Equity	Approved	8.30%	8.30%	8.30%	8.30%	8.30%
35	Cost of Debt	Same as 2016/17 Forecast	5.30%	5.30%	5.30%	5.30%	5.30%
36	WACC	row 32 x row 34 + row 33 x row 35	6.50%	6.50%	6.50%	6.50%	6.50%
37	Depreciation Rate	Forecast on a 3 year rolling average	3.23%	3.24%	3.24%	3.24%	3.24%

Table 4.2-2
Estimated ROEs Calculated Based on 3 Year Historical Average Capital Additions
2018-2022
($ millions)

		A	B	C	D	E
		2018	**2019**	**2020**	**2021**	**2022**
	Revenues					
1	Revenues Before Y Factor Revenue	206.15	217.13	228.44	240.60	252.86
2	Y Factor Revenue	9.53	9.73	9.93	10.12	10.30
3	**Total Revenues**	**215.68**	**226.86**	**238.37**	**250.72**	**263.16**
	Expenses					
4	Operating Expenses	73.10	75.92	78.70	81.72	85.04
5	Depreciation	52.50	58.23	63.86	69.49	75.41
6	Cost of Debt	39.40	43.53	47.59	51.60	55.53
7	Y Factor Expenses	9.53	9.73	9.93	10.12	10.30
8	**Total Expenses**	**174.54**	**187.41**	**200.08**	**212.93**	**226.29**
	Return					
9	Return	41.14	39.46	38.29	37.79	36.88
10	**ROE with 3-Yr Average Capital Spend**	**8.30%**	**7.21%**	**6.40%**	**5.82%**	**5.28%**
11	5 Year Average ROE					6.60%
12	Approved ROE	8.30%	8.30%	8.30%	8.30%	8.30%
13	**Variance (Actual ROE less Approved ROE**	**0.00%**	**(1.09%)**	**(1.90%)**	**(2.48%)**	**(3.02%)**
14	Average Variance					(1.70%)
15	ROE Shortfall	0.00	(5.99)	(11.40)	(16.08)	(21.10)
16	5 Year Total ROE Shortfall					(54.57)
17	5 Year Average ROE Shortfall					(10.91)
	Capital Additions					
18	Capital Additions	183.12	187.02	190.78	194.37	197.96

Actual Capital Additions and Normalized Average
2015-2017
($ millions)

		A	B	C	D
		2015	**2016**	**2017**	**3 Year Average**
1	Capital Additions	135.87	177.96	213.27	175.70
2	Inflation Factor	2.65%	2.06%	-	NA
3	**Normalized Additions**	**142.34**	**181.63**	**213.27**	**179.08**

Table 4.2-4
EDTI Historical Capital Additions and Rate Base Growth
2013-2017
($ millions)

		A	B	C	D	E
		2013 A	**2014 A**	**2015 F**	**2016 F**	**2017 F**
1	All Assets, Opening	898.07	965.72	1,055.42	1,179.23	1,334.83
2	Additions	78.62	100.87	135.87	177.96	213.27
3	Retirements/Sold	(10.96)	(11.17)	(12.06)	(22.35)	(10.02)
4	Adjustments	-	-	-	-	-
5	All Assets Closing	965.72	1,055.42	1,179.23	1,334.83	1,538.09
6	All Assets A/D, Opening	253.51	272.63	293.54	317.40	335.68
7	Depreciation	30.09	32.07	35.92	40.64	46.64
8	Retirements	(10.96)	(11.17)	(12.06)	(22.35)	(10.02)
9	Adjustments	-	-	-	-	-
10	All Assets, Closing A/D	272.63	293.54	317.40	335.68	372.31
11	Mid Year Property	931.89	1,010.57	1,117.32	1,257.03	1,436.46
12	Mid Year Accumulated Depreciation	263.07	283.08	305.47	326.54	354.00
13	Mid Year Net Property	668.82	727.48	811.86	930.49	1,082.46
14	Add: Working Capital	5.62	10.35	2.11	8.01	8.01
15	**Mid Year Rate Base**	**674.44**	**737.84**	**813.97**	**938.50**	**1,090.47**
16	% Increase in Mid Year Rate Base (row 15)		9.4%	10.3%	15.3%	16.2%
17	4 Year Average Increase in Mid Year Rate Base					12.8%
18	% Increase in Capital Additions (row 2)		28.3%	34.7%	31.0%	19.8%
19	4 Year Average Increase in Capital Additions					28.5%
20	% Increase in Depreciation (row 7)		6.6%	12.0%	13.1%	14.8%
21	4 Year Average Increase in Depreciation					11.6%

Capital Additions Forecast
Tab 1.0 Capital Adds
2018-22
($ millions)

		A	B	C	D	E
	Year	**Capital Additions**	**I Factor Rate**	**Note**	**Calculation/Reference**	**Normalized & Forecast Capital Adds**
1	2015	135.87	2.65%		col A x (1+row1 col.B) x (1+row2 col.B)	142.34
2	2016	177.96	2.06%		col A x (1+row2 col.B)	181.63
3	2017	213.27			Per 2017 Forecast	213.27
4	**3 Year Avg**	**175.70**			**Average of rows 1 to 3**	**179.08**
5	2018		2.26%		row $_{T-1}$ col. E x (1+col.B)	183.12
6	2019		2.13%			187.02
7	2020		2.01%			190.78
8	2021		1.88%			194.37
9	2022		1.85%			197.96

2013-2022 PBR Model
Tab 2.0 Inputs and Calculations
($ millions)

		A	B	C
	Description	**Ref./Calc.**	**2013**	**2014**
	Revenues			
1	Revenues Before Y	2013-17 Input, 2018 Input (based on Approved ROE), 2019+ $_{T-1}$ x row 28 x row 29	138.38	143.34
2	Flow Through Items (Y) Revenue	row 31	9.63	8.48
2A	K Factor	Input	4.29	6.85
3	**Total Revenues**	**rows 1 to 2A**	**152.30**	**158.67**
4	**Operating Costs**	Input	65.84	66.98
	Capital Costs			
5	Gross Assets Opening	2013 Input, 2014 to 2022: row 8 $_{T-1}$	898.07	965.72
6	Capital Additions	2013-2017 Input per Schedule 5 tab 1, row 108, 2018-2022 Based on 3 year historical avg per Tab 1.0	78.62	100.87
7	Retirements		(10.96)	(11.17)
8	Gross Assets Closing	Sum rows 5 to 7	965.72	1,055.42
9	**Mid Year Gross Property**	**(row 5 + row 8) / 2**	**931.89**	**1,010.57**
10	Opening Accumulated Depreciation	2013 Input, 2014 to 2022: row 13 $_{T-1}$	253.51	272.63
11	Depreciation Expense	2018-2022: row 9 x row 39	30.09	32.07
12	Retirements	row 7	(10.96)	(11.17)
13	Closing Accumulated Depreciation	Sum rows 10 to 12	272.63	293.54
14	Mid Year Depreciation	(row 10 + row 13) / 2	263.07	283.08
15	**Mid Year Net Assets**	**row 9 - row 14**	**668.82**	**727.48**
16	Working Capital	Input	5.62	10.35
17	**Mid Year Net Rate Base (Incl Work Cap)**	**row 15 + row 16**	**674.44**	**737.84**
18	Cost of Debt	2013-2014 Rule 5, 2015+ row 17 x row 33 x row 35	22.89	24.29
19	**Total Capital Costs**	**row 11 + row 18**	**52.98**	**56.36**
20	**Flow Through Items (Y) Costs**	**row 31**	**9.63**	**8.48**
21	**Total Costs**	**row 4 + row 19 + row 20**	**128.46**	**131.82**
22	**Return**	**row 3 - row 21**	**23.85**	**26.85**
23	**ROE**	**row 22 / (row 17 x row 32)**	**8.84%**	**9.10%**
	Factors/Rates			
24	**I Factor**	**2013-2017 Input, 18+ 5 year rolling avg**	**2.87%**	**2.75%**
25	Productivity	13-17 PBR Decision, 18+ Forecast	0.96%	0.96%
26	Stretch	13-17 PBR Decision, 18+ Forecast	0.20%	0.20%
27	**X Factor**	**row 25 + row 26**	**1.16%**	**1.16%**
28	**I - X**	**row 24 - row 27**	**1.71%**	**1.59%**
29	**Growth Factor (Q)**	**2013-2017 Input, 18+ 5 year rolling avg**	**1.46%**	**1.96%**
30	**I-X x Q**	**row 28 x row 29**	**3.19%**	**3.58%**
31	**Y Factor Costs**	**2013-2016 Input, 2017-22 T-1 x row 24**	**9.63**	**8.48**
	Cost of Debt/Equity			
32	Equity %	Input	40.00%	40.00%
33	Debt %	100% - row 34	60.00%	60.00%
34	Approved Return on Equity	Input	8.30%	8.30%
35	Cost of Debt	Input	5.70%	5.30%
36	WACC	row 32 x row 34 + row 33 x row 35	6.74%	6.50%

2013-2022 PBR Model
Tab 2.0 Inputs and Calculations
($ millions)

		A	B	C
	Description	**Ref./Calc.**	**2013**	**2014**
37	Depreciation Rate	2013-2017: row 11/row 9, 2018+ 3 year rolling average	3.23%	3.17%
38	Return at 8.3% ROE	row 17 x row 32 x row 34	22.39	24.50

6.60%	**2018-22 5 year average ROE**

D	E	F	G	H	I	J	K
2015	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
146.71	152.82	154.60	206.15	217.13	228.44	240.60	252.86
7.43	9.23	9.32	9.53	9.73	9.93	10.12	10.30
16.83	24.01	36.21					
170.97	**186.06**	**200.13**	**215.68**	**226.86**	**238.37**	**250.72**	**263.16**
70.50	71.67	71.01	73.10	75.92	78.70	81.72	85.04
1,055.42	1,179.23	1,334.83	1,538.09	1,711.24	1,886.31	2,057.37	2,238.07
135.87	177.96	213.27	183.12	187.02	190.78	194.37	197.96
(12.06)	(22.35)	(10.02)	(9.97)	(11.95)	(19.72)	(13.67)	(14.84)
1,179.23	1,334.83	1,538.09	1,711.24	1,886.31	2,057.37	2,238.07	2,421.20
1,117.32	**1,257.03**	**1,436.46**	**1,624.66**	**1,798.77**	**1,971.84**	**2,147.72**	**2,329.64**
293.54	317.40	335.68	372.31	414.84	461.12	505.26	561.08
35.92	40.64	46.64	52.50	58.23	63.86	69.49	75.41
(12.06)	(22.35)	(10.02)	(9.97)	(11.95)	(19.72)	(13.67)	(14.84)
317.40	335.68	372.31	414.84	461.12	505.26	561.08	621.66
305.47	326.54	354.00	393.58	437.98	483.19	533.17	591.37
811.86	**930.49**	**1,082.46**	**1,231.09**	**1,360.79**	**1,488.65**	**1,614.55**	**1,738.27**
2.11	8.01	8.01	8.01	8.01	8.01	8.01	8.01
813.97	**938.50**	**1,090.47**	**1,239.09**	**1,368.80**	**1,496.66**	**1,622.56**	**1,746.27**
28.18	29.84	34.68	39.40	43.53	47.59	51.60	55.53
64.10	**70.48**	**81.32**	**91.91**	**101.76**	**111.45**	**121.09**	**130.95**
7.43	**9.23**	**9.32**	**9.53**	**9.73**	**9.93**	**10.12**	**10.30**
142.03	**151.38**	**161.64**	**174.54**	**187.41**	**200.08**	**212.93**	**226.29**
28.95	**34.68**	**38.49**	**41.14**	**39.46**	**38.29**	**37.79**	**36.88**
8.89%	**9.24%**	**8.82%**	**8.30%**	**7.21%**	**6.40%**	**5.82%**	**5.28%**
2.65%	**2.06%**	**0.95%**	**2.26%**	**2.13%**	**2.01%**	**1.88%**	**1.85%**
0.96%	0.96%	0.96%	-1.11%	-1.11%	-1.11%	-1.11%	-1.11%
0.20%	0.20%	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%
1.16%	**1.16%**	**1.16%**	**-1.11%**	**-1.11%**	**-1.11%**	**-1.11%**	**-1.11%**
1.49%	**0.90%**	**-0.21%**	**3.37%**	**3.24%**	**3.12%**	**2.99%**	**2.96%**
0.85%	**3.20%**	**2.15%**	**1.92%**	**2.02%**	**2.03%**	**2.26%**	**2.08%**
2.35%	**4.13%**	**1.94%**	**5.35%**	**5.33%**	**5.21%**	**5.32%**	**5.09%**
7.43	**9.23**	**9.32**	**9.53**	**9.73**	**9.93**	**10.12**	**10.30**
40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%
8.30%	8.30%	8.30%	8.30%	8.30%	8.30%	8.30%	8.30%
5.77%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%
6.78%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%

6.60%	**2018-22 5 year average ROE**

D **2015**	E **2016**	F **2017**	G **2018**	H **2019**	I **2020**	J **2021**	K **2022**
3.21%	3.23%	3.25%	3.23%	3.24%	3.24%	3.24%	3.24%
27.02	31.16	36.20	41.14	45.44	49.69	53.87	57.98

F Factor Calculation Example Table
($ millions)

	Description	Calculation	A **2018**	B **2019**	C **2020**	D **2021**	E **2022**
	F Factor Calculation						
1	Base F Factor		1.84				
2	Current Year F Factor (Base F Factor Indexed by I-X)	row 1 Year 1 x row 7 for Year 2 and Each Subsequent Year to Current Year		1.90	1.96	2.02	2.08
3	Previous Year F Factor	row 4 for Previous Year		1.84	3.74	5.70	7.72
4	**Total F Factor**	sum row 1 to row 3	**1.84**	**3.74**	**5.70**	**7.72**	**9.79**
	I and X Factors						
5	**I Factor Rate (%)**[1]			2.13%	2.01%	1.88%	1.85%
6	**X Factor Rate (%)**[1]			(1.11%)	(1.11%)	(1.11%)	(1.11%)
7	**(I-X) + 100%**[1]	(row 5 - row 6) + 100%		103.24%	103.12%	102.99%	102.96%

[1] Year 1 I-X Factor not required for the F Factor calculation

Distribution Rate Base - Capital Additions 2018 Model Year

2018 F Factor - Using 2013 - 2017 Average and Indexed Capital Adds to create 2018 Forecast

($ millions)

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
		1943	**1944**	**1945**	**1946**	**1947**	**1948**	**1949**	**1950**	**1951**	**1952**	**1953**	**1954**	**1955**	**1956**	**1957**	**1958**	**1959**	**1960**	**1961**	**1962**	**1963**	**1964**	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
	362 Station Equipment
1	Distribution Substation Life Cycle Replacements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.02	0.02	0.03	0.04	0.05	0.05	0.04	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.05	0.04	0.03	0.04	0.04	0.05	0.04
2	**Total**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.02	0.02	0.03	0.04	0.05	0.05	0.04	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.05	0.04	0.03	0.04	0.04	0.05	0.04
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices
3	Distribution Pole and Aerial Line Life Cycle Replacements	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.04	0.03	0.99	0.05	0.04	0.05	0.07	0.07	0.09	0.07	0.06	0.06	0.06	0.06	0.06	0.08	0.09	0.09	0.14	0.21	0.18	0.14	0.20	0.18	(0.02)	0.33	0.42	0.30	0.36	0.49	0.70	0.78	0.78	0.60	0.38	0.34	0.38	0.49	0.50	0.56	0.49	0.58	0.60	0.77	0.62	0.43	0.60	0.72	0.80	0.73
4	Capitalized Aerial System Damage	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.33	0.02	0.01	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.07	0.06	0.05	0.07	0.06	(0.01)	0.11	0.14	0.10	0.12	0.16	0.24	0.26	0.26	0.20	0.13	0.11	0.13	0.16	0.17	0.19	0.17	0.19	0.20	0.26	0.21	0.14	0.20	0.24	0.27	0.25
5	Remedial Pole Treatments	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.02	0.02	0.03	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.02	0.03	0.04	0.04	0.04
6	Lightning Arrestor Replacement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.01	0.02	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.03	0.02	0.03	0.04	0.04	0.04
7	Installation of Insulators in 25 kV Supporting Guy Wires	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	**Life Cycle Total**	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.06	0.05	1.43	0.08	0.06	0.08	0.10	0.11	0.13	0.11	0.09	0.09	0.09	0.08	0.08	0.12	0.13	0.13	0.21	0.31	0.26	0.21	0.29	0.25	(0.03)	0.47	0.61	0.43	0.53	0.71	1.02	1.12	1.13	0.87	0.54	0.49	0.56	0.71	0.72	0.80	0.71	0.83	0.86	1.11	0.90	0.62	0.87	1.04	1.16	1.06
9	Distribution System Neutral Installations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01
10	**Total**	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.06	0.05	1.44	0.08	0.06	0.08	0.11	0.11	0.14	0.11	0.09	0.09	0.09	0.09	0.08	0.12	0.13	0.13	0.21	0.31	0.26	0.21	0.29	0.26	(0.03)	0.48	0.61	0.43	0.53	0.71	1.03	1.13	1.14	0.87	0.55	0.49	0.56	0.71	0.73	0.81	0.72	0.84	0.87	1.12	0.90	0.62	0.87	1.05	1.17	1.06
	367 Underground Conductors & Devices
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	0.01	0.01	0.02	0.02	0.05	0.07	0.06	0.13	0.10	2.98	0.16	0.13	0.16	0.22	0.22	0.28	0.22	0.18	0.18	0.18	0.18	0.17	0.25	0.27	0.28	0.43	0.63	0.53	0.43	0.60	0.53	(0.06)	0.99	1.26	0.89	1.09	1.47	2.11	2.33	2.35	1.80	1.13	1.01	1.15	1.47	1.50	1.67	1.48	1.73	1.79	2.30	1.86	1.28	1.80	2.16	2.41	2.19
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.42	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.04	0.04	0.06	0.09	0.08	0.06	0.09	0.07	(0.01)	0.14	0.18	0.13	0.15	0.21	0.30	0.33	0.33	0.25	0.16	0.14	0.16	0.21	0.21	0.24	0.21	0.24	0.25	0.33	0.26	0.18	0.25	0.31	0.34	0.31
13	**Growth Total**	0.01	0.01	0.02	0.02	0.05	0.08	0.07	0.15	0.11	3.40	0.18	0.15	0.18	0.25	0.25	0.32	0.25	0.21	0.21	0.20	0.20	0.19	0.28	0.31	0.31	0.49	0.72	0.61	0.49	0.69	0.60	(0.06)	1.13	1.44	1.01	1.25	1.68	2.41	2.66	2.68	2.05	1.29	1.16	1.32	1.68	1.71	1.90	1.69	1.97	2.05	2.63	2.12	1.46	2.05	2.46	2.75	2.50
14	Switching Cubicle Life Cycle Replacement	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.30	0.02	0.01	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.07	0.05	0.04	0.06	0.05	(0.01)	0.10	0.13	0.09	0.11	0.15	0.22	0.24	0.24	0.18	0.12	0.10	0.12	0.15	0.15	0.17	0.15	0.18	0.18	0.24	0.19	0.13	0.18	0.22	0.25	0.22
15	Replacement of Faulted Distribution PILC Cables	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.20	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.04	0.03	0.04	0.04	(0.00)	0.07	0.08	0.06	0.07	0.10	0.14	0.16	0.16	0.12	0.08	0.07	0.08	0.10	0.10	0.11	0.10	0.12	0.12	0.15	0.12	0.09	0.12	0.14	0.16	0.15
16	Life Cycle Replacement of PILC Cable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	Capitalized Underground System Damage	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.02	0.61	0.03	0.03	0.03	0.04	0.04	0.06	0.04	0.04	0.04	0.04	0.04	0.03	0.05	0.06	0.06	0.09	0.13	0.11	0.09	0.12	0.11	(0.01)	0.20	0.26	0.18	0.22	0.30	0.43	0.48	0.48	0.37	0.23	0.21	0.24	0.30	0.31	0.34	0.30	0.35	0.37	0.47	0.38	0.26	0.37	0.44	0.49	0.45
18	Life Cycle Replacement of Oil Switches – Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	(0.00)	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.02
19	Life Cycle Replacement and Extension of Underground Distribution Cable	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.06	0.05	1.39	0.07	0.06	0.07	0.10	0.10	0.13	0.10	0.09	0.08	0.08	0.08	0.08	0.11	0.13	0.13	0.20	0.30	0.25	0.20	0.28	0.25	(0.03)	0.46	0.59	0.41	0.51	0.69	0.99	1.09	1.10	0.84	0.53	0.47	0.54	0.69	0.70	0.78	0.69	0.81	0.84	1.08	0.87	0.60	0.84	1.01	1.12	1.02
20	Neighbourhood Renewal Program	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.22	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.05	0.04	0.03	0.04	0.04	(0.00)	0.07	0.09	0.07	0.08	0.11	0.16	0.17	0.17	0.13	0.08	0.07	0.09	0.11	0.11	0.12	0.11	0.13	0.13	0.17	0.14	0.09	0.13	0.16	0.18	0.16
21	Underground Asbestos Abatement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.01
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02
23	DAM - Distribution Manhole Rebuilds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	**Life Cycle Total**	0.01	0.01	0.02	0.02	0.05	0.06	0.06	0.13	0.09	2.80	0.15	0.12	0.15	0.20	0.21	0.26	0.21	0.17	0.17	0.17	0.17	0.16	0.23	0.26	0.26	0.40	0.60	0.50	0.40	0.57	0.50	(0.05)	0.93	1.19	0.83	1.03	1.39	1.99	2.19	2.21	1.69	1.06	0.95	1.09	1.39	1.41	1.57	1.39	1.63	1.69	2.17	1.75	1.20	1.69	2.03	2.27	2.06
26	**Total**	0.02	0.02	0.04	0.04	0.10	0.14	0.13	0.28	0.20	6.20	0.33	0.27	0.33	0.45	0.46	0.58	0.46	0.38	0.38	0.37	0.37	0.35	0.51	0.57	0.57	0.89	1.32	1.10	0.89	1.26	1.10	(0.12)	2.05	2.63	1.85	2.28	3.07	4.40	4.85	4.89	3.74	2.35	2.11	2.40	3.07	3.11	3.47	3.09	3.60	3.73	4.80	3.87	2.66	3.74	4.50	5.02	4.57
	367 Underground Conductors & Devices - Underground Secondary Networks
27	Network Reconfigurations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.01	0.02	0.01	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.18	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.03	0.03	0.04	0.03	(0.00)	0.06	0.08	0.05	0.07	0.09	0.13	0.14	0.15	0.11	0.07	0.06	0.07	0.09	0.09	0.10	0.09	0.11	0.11	0.14	0.12	0.08	0.11	0.13	0.15	0.14
29	Upgrading Protection on the Downtown Vaults and Manholes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
30	Installation of Locking Mechanisms on Network Vault Lids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
31	**Life Cycle Total**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.21	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.05	0.04	0.03	0.04	0.04	(0.00)	0.07	0.09	0.06	0.08	0.11	0.15	0.17	0.17	0.13	0.08	0.07	0.08	0.11	0.11	0.12	0.11	0.12	0.13	0.16	0.13	0.09	0.13	0.15	0.17	0.16
32	Installation of Network Current Limiting Fuse Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01	(0.00)	0.03	0.03	0.02	0.03	0.04	0.06	0.06	0.06	0.05	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.05	0.05	0.06	0.05	0.04	0.05	0.06	0.07	0.06
33	**Total**	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.34	0.02	0.01	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.07	0.06	0.05	0.07	0.06	(0.01)	0.11	0.14	0.10	0.12	0.17	0.24	0.26	0.27	0.20	0.13	0.11	0.13	0.17	0.17	0.19	0.17	0.20	0.20	0.26	0.21	0.14	0.20	0.24	0.27	0.25
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	0.01	0.01	0.01	0.01	0.03	0.04	0.04	0.07	0.05	1.64	0.09	0.07	0.09	0.12	0.12	0.15	0.12	0.10	0.10	0.10	0.10	0.09	0.14	0.15	0.15	0.24	0.35	0.29	0.24	0.33	0.29	(0.03)	0.54	0.70	0.49	0.60	0.81	1.17	1.28	1.30	0.99	0.62	0.56	0.64	0.81	0.83	0.92	0.82	0.95	0.99	1.27	1.03	0.71	0.99	1.19	1.33	1.21
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	0.01	0.01	0.01	0.02	0.04	0.06	0.05	0.11	0.08	2.40	0.13	0.11	0.13	0.18	0.18	0.23	0.18	0.15	0.15	0.14	0.14	0.13	0.20	0.22	0.22	0.35	0.51	0.43	0.35	0.49	0.43	(0.05)	0.80	1.02	0.71	0.88	1.19	1.71	1.88	1.89	1.45	0.91	0.82	0.93	1.19	1.21	1.34	1.20	1.39	1.45	1.86	1.50	1.03	1.45	1.74	1.94	1.77
36	Franchise Agreement Driven Relocations and Conversions	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.06	0.05	1.39	0.07	0.06	0.07	0.10	0.10	0.13	0.10	0.08	0.08	0.08	0.08	0.08	0.11	0.13	0.13	0.20	0.30	0.25	0.20	0.28	0.25	(0.03)	0.46	0.59	0.41	0.51	0.69	0.99	1.08	1.09	0.84	0.53	0.47	0.54	0.69	0.70	0.78	0.69	0.81	0.84	1.07	0.87	0.60	0.84	1.01	1.12	1.02
37	New 15kV and 25kV Circuit Additions	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.02	0.65	0.03	0.03	0.03	0.05	0.05	0.06	0.05	0.04	0.04	0.04	0.04	0.04	0.05	0.06	0.06	0.09	0.14	0.12	0.09	0.13	0.11	(0.01)	0.21	0.28	0.19	0.24	0.32	0.46	0.51	0.51	0.39	0.25	0.22	0.25	0.32	0.33	0.36	0.32	0.38	0.39	0.50	0.41	0.28	0.39	0.47	0.52	0.48
38	Queen Elizabeth II Highway & 41 Avenue SW Interchange Distribution System Relocations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	Walterdale Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	W1 Circuit Extension	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.02	0.02	0.02
41	13 E Diversion and Reconductoring	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
42	Summerside Feeders	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.34	0.02	0.01	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.07	0.06	0.05	0.07	0.06	(0.01)	0.11	0.15	0.10	0.13	0.17	0.24	0.27	0.27	0.21	0.13	0.12	0.13	0.17	0.17	0.19	0.17	0.20	0.21	0.27	0.21	0.15	0.21	0.25	0.28	0.25
43	Poundmaker Feeders	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.34	0.02	0.01	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.07	0.06	0.05	0.07	0.06	(0.01)	0.11	0.14	0.10	0.12	0.17	0.24	0.26	0.27	0.20	0.13	0.11	0.13	0.17	0.17	0.19	0.17	0.20	0.20	0.26	0.21	0.15	0.20	0.25	0.27	0.25
44	NLRT Distribution System Relocations	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.03	0.82	0.04	0.04	0.04	0.06	0.06	0.08	0.06	0.05	0.05	0.05	0.05	0.05	0.07	0.07	0.08	0.12	0.17	0.15	0.12	0.17	0.14	(0.02)	0.27	0.35	0.24	0.30	0.40	0.58	0.64	0.65	0.49	0.31	0.28	0.32	0.41	0.41	0.46	0.41	0.48	0.49	0.63	0.51	0.35	0.49	0.59	0.66	0.60
45	SE & W LRT Distribution System Relocation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	**Growth Total**	0.03	0.02	0.05	0.05	0.12	0.18	0.17	0.34	0.25	7.62	0.41	0.33	0.40	0.56	0.56	0.71	0.56	0.47	0.46	0.46	0.45	0.42	0.63	0.70	0.71	1.10	1.63	1.36	1.10	1.54	1.35	(0.14)	2.52	3.23	2.27	2.80	3.77	5.41	5.96	6.01	4.60	2.89	2.59	2.95	3.77	3.83	4.26	3.79	4.42	4.59	5.90	4.76	3.27	4.60	5.53	6.17	5.61
47	Aerial and UG Ground Replacements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.02	(0.00)	0.03	0.04	0.03	0.03	0.04	0.06	0.07	0.07	0.05	0.03	0.03	0.03	0.04	0.05	0.05	0.04	0.05	0.05	0.07	0.06	0.04	0.05	0.07	0.07	0.07
48	Distribution System Aerial and Underground Fault Indicators and Fusing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.17	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.04	0.03	0.02	0.03	0.03	(0.00)	0.06	0.07	0.05	0.06	0.08	0.12	0.13	0.13	0.10	0.06	0.06	0.06	0.08	0.08	0.09	0.08	0.10	0.10	0.13	0.10	0.07	0.10	0.12	0.13	0.12
49	Installation of Automated Switches on Selected 25KV Circuits	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.38	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.08	0.07	0.05	0.08	0.07	(0.01)	0.12	0.16	0.11	0.14	0.19	0.27	0.29	0.30	0.23	0.14	0.13	0.15	0.19	0.19	0.21	0.19	0.22	0.23	0.29	0.24	0.16	0.23	0.27	0.30	0.28
50	High Load Corridor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.01	0.02	0.01	0.01	0.02	0.03	0.03	0.03	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.03	0.03	0.03
51	**Performance Improvement Total**	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.02	0.58	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.05	0.05	0.05	0.08	0.12	0.10	0.08	0.12	0.10	(0.01)	0.19	0.25	0.17	0.21	0.29	0.41	0.46	0.46	0.35	0.22	0.20	0.23	0.29	0.29	0.33	0.29	0.34	0.35	0.45	0.36	0.25	0.35	0.42	0.47	0.43
52	**Total**	0.03	0.03	0.05	0.06	0.13	0.19	0.18	0.37	0.27	8.29	0.45	0.36	0.44	0.61	0.61	0.78	0.61	0.51	0.51	0.50	0.49	0.46	0.68	0.76	0.77	1.19	1.77	1.48	1.20	1.68	1.47	(0.16)	2.75	3.52	2.47	3.05	4.10	5.89	6.49	6.54	5.01	3.14	2.82	3.22	4.10	4.17	4.64	4.13	4.81	4.99	6.42	5.18	3.56	5.01	6.01	6.71	6.11
	368 Line Transformers
53	Voltage Regulator Additions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.01	0.02	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.03	0.02	0.03	0.03	0.04	0.03
54	Network Transformer Lifecycle Replacement	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.28	0.02	0.01	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.06	0.05	0.04	0.06	0.05	(0.01)	0.09	0.12	0.08	0.10	0.14	0.20	0.22	0.22	0.17	0.11	0.10	0.11	0.14	0.14	0.16	0.14	0.16	0.17	0.22	0.17	0.12	0.17	0.20	0.23	0.21
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.06	0.05	1.43	0.08	0.06	0.08	0.11	0.11	0.13	0.11	0.09	0.09	0.09	0.09	0.08	0.12	0.13	0.13	0.21	0.31	0.26	0.21	0.29	0.25	(0.03)	0.48	0.61	0.43	0.53	0.71	1.02	1.12	1.13	0.87	0.54	0.49	0.56	0.71	0.72	0.80	0.71	0.83	0.86	1.11	0.90	0.62	0.87	1.04	1.16	1.06
56	PCB Transformer Changeouts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.01	0.02	0.01	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.03	0.03	0.03
57	**Total**	0.01	0.01	0.01	0.01	0.03	0.04	0.04	0.08	0.06	1.80	0.10	0.08	0.10	0.13	0.13	0.17	0.13	0.11	0.11	0.11	0.11	0.10	0.15	0.16	0.17	0.26	0.38	0.32	0.26	0.37	0.32	(0.03)	0.60	0.77	0.54	0.66	0.89	1.28	1.41	1.42	1.09	0.68	0.61	0.70	0.89	0.91	1.01	0.90	1.05	1.09	1.40	1.13	0.77	1.09	1.31	1.46	1.33
	370 Conventional Meters & 371 Automated Meters
58	Customer Revenue Metering - Growth & Life Cycle Replacements	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.04	0.03	0.94	0.05	0.04	0.05	0.07	0.07	0.09	0.07	0.06	0.06	0.06	0.06	0.05	0.08	0.09	0.09	0.14	0.20	0.17	0.14	0.19	0.17	(0.02)	0.31	0.40	0.28	0.34	0.46	0.67	0.73	0.74	0.57	0.36	0.32	0.36	0.46	0.47	0.53	0.47	0.55	0.57	0.73	0.59	0.40	0.57	0.68	0.76	0.69
	373 Street Lighting and Signal Systems
59	Street Light Service Connections and Security Lighting Addition and Capital Replacement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.18	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.03	0.03	0.04	0.03	(0.00)	0.06	0.08	0.05	0.07	0.09	0.13	0.14	0.14	0.11	0.07	0.06	0.07	0.09	0.09	0.10	0.09	0.11	0.11	0.14	0.11	0.08	0.11	0.13	0.15	0.14
	389 General Plant – Land
60	Land Purchase for Slurry Placement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01	(0.00)	0.03	0.03	0.02	0.03	0.04	0.06	0.06	0.06	0.05	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.05	0.05	0.06	0.05	0.04	0.05	0.06	0.07	0.06
	390 General Plant - Structures & Improvements
61	Furniture Life Cycle Replacements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.02	0.02	0.03	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.02	0.03	0.04	0.04	0.04
62	North and South Service Center Building Life Cycle Replacements	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.44	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.02	0.04	0.04	0.04	0.06	0.09	0.08	0.06	0.09	0.08	(0.01)	0.14	0.19	0.13	0.16	0.22	0.31	0.34	0.34	0.26	0.17	0.15	0.17	0.22	0.22	0.24	0.22	0.25	0.26	0.34	0.27	0.19	0.26	0.32	0.35	0.32
63	Work Centre Redevelopment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
64	**Life Cycle Total**	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.49	0.03	0.02	0.03	0.04	0.04	0.05	0.04	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.07	0.10	0.09	0.07	0.10	0.09	(0.01)	0.16	0.21	0.15	0.18	0.24	0.35	0.38	0.39	0.30	0.19	0.17	0.19	0.24	0.25	0.27	0.24	0.28	0.30	0.38	0.31	0.21	0.30	0.36	0.40	0.36
65	Service Center Consolidation Project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.16	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.02	0.03	0.03	(0.00)	0.05	0.07	0.05	0.06	0.08	0.12	0.13	0.13	0.10	0.06	0.06	0.06	0.08	0.08	0.09	0.08	0.10	0.10	0.13	0.10	0.07	0.10	0.12	0.13	0.12
66	**Total**	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.03	0.02	0.68	0.04	0.03	0.04	0.05	0.05	0.06	0.05	0.04	0.04	0.04	0.04	0.04	0.06	0.06	0.06	0.10	0.15	0.12	0.10	0.14	0.12	(0.01)	0.23	0.29	0.20	0.25	0.34	0.49	0.53	0.54	0.41	0.26	0.23	0.26	0.34	0.34	0.38	0.34	0.40	0.41	0.53	0.43	0.29	0.41	0.50	0.55	0.50
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and
67	Advanced Metering Infrastructure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	391.1 General Plant – Computer hardware & voice and data network equipment
68	IT Hardware Lifecycle Replacements and Additions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.02	(0.00)	0.03	0.04	0.03	0.03	0.04	0.06	0.07	0.07	0.05	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.05	0.05	0.07	0.05	0.04	0.05	0.06	0.07	0.06
	391.2 General Plant - Computer software and applications
69	Business Systems Upgrades	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.02	(0.00)	0.03	0.04	0.03	0.03	0.05	0.07	0.07	0.07	0.06	0.04	0.03	0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.07	0.06	0.04	0.06	0.07	0.08	0.07

Distribution Rate Base - Capital Additions

2018 F Factor - Using 2013 - 2017 Average and Indexed Capita
($ millions)

		BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CI
																								Indexed for 2017 $s							
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 A	2013 A	2014 A	2015 D	2016 F	2017 F	2018 F based on 13-17 Avg (Col CH)	2004-2012D Average Adds	% of Total Average Adds	Category	2013 Indexed	2014 Indexed	2015 Indexed	2016 Indexed	2017	2013-17 Average Adds	2018 Inflated & Growth Average Adds	Notes
	362 Station Equipment																							*I Rate*	*2.75%*	*2.65%*	*2.06%*	*0.95%*		*102.26%*	
1	Distribution Substation Life Cycle Replacements	0.07	0.08	0.08	0.06	0.04	0.10	0.53	0.15	0.03	0.09	0.05	0.22	0.09	0.039	0.19	0.05	0.05	0.05	0.08	0.14	0.3%	K Bar	0.04	0.20	0.05	0.05	0.05	0.08	0.08	
2	**Total**	**0.07**	**0.08**	**0.08**	**0.06**	**0.04**	**0.10**	**0.53**	**0.15**	**0.03**	**0.09**	**0.05**	**0.22**	**0.09**	**0.04**	**0.19**	**0.05**	**0.05**	**0.05**	**0.08**	**0.14**	**0.3%**							**0.08**	**0.08**	
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices																														
3	Distribution Pole and Aerial Line Life Cycle Replacements	1.24	1.43	1.35	0.98	1.50	0.77	2.92	1.71	1.41	1.97	3.47	3.34	2.65	1.44	3.74	5.16	3.59	4.07	3.79	2.40	4.3%	K Bar	1.56	3.96	5.32	3.63	4.07	3.71	3.79	
4	Capitalized Aerial System Damage	0.42	0.48	0.45	0.33	-	0.19	0.50	0.71	1.02	1.08	1.12	1.41	1.38	1.29	1.44	1.46	1.50	1.53	1.53	0.81	1.5%	K Bar	1.40	1.52	1.50	1.51	1.53	1.49	1.53	
5	Remedial Pole Treatments	0.07	0.08	0.07	0.05	0.20	0.21	-	-	-	-	0.29	0.22	0.23	0.25	0.12	0.30	0.27	0.28	0.26	0.13	0.2%	K Bar	0.27	0.12	0.31	0.27	0.28	0.25	0.26	
6	Lightning Arrestor Replacement	0.06	0.07	0.07	0.05	0.73	0.20	0.14	-	-	-	-	-	-	-	-	-	-	-	-	0.12	0.2%	K Bar	-	-	-	-	-	-	-	
7	Installation of Insulators in 25 kV Supporting Guy Wires	0.01	0.01	0.01	0.00		0.06	0.02	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.0%	K Bar	-	-	-	-	-	-	-	
8	**Life Cycle Total**	**1.79**	**2.06**	**1.95**	**1.42**	**2.43**	**1.42**	**3.58**	**2.42**	**2.43**	**3.05**	**4.88**	**4.97**	**4.26**	**2.98**	**5.30**	**6.92**	**5.37**	**5.88**	**5.58**	**3.47**	**6.3%**							**5.45**	**5.58**	
9	Distribution System Neutral Installations	0.01	0.01	0.01	0.01	-	-	-	0.02	0.10	-	-	0.11	0.10	-	-	-	-	-	-	0.03	0.0%	K Bar	-	-	-	-	-	-	-	
10	**Total**	**1.80**	**2.08**	**1.97**	**1.43**	**2.43**	**1.42**	**3.58**	**2.44**	**2.53**	**3.05**	**4.88**	**5.08**	**4.36**	**2.98**	**5.30**	**6.92**	**5.37**	**5.88**	**5.58**	**3.50**	**6.3%**							**5.45**	**5.58**	
	367 Underground Conductors & Devices																														
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	3.71	4.29	4.06	2.94	7.50	8.17	5.93	6.82	6.95	3.90	6.30	8.85	16.50	19.53	17.94	18.10	18.52	18.51	19.64	7.21	13.0%	K Bar	21.22	18.98	18.65	18.70	18.51	19.21	19.64	
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	0.53	0.61	0.57	0.42	0.10	(0.31)	0.45	1.61	1.63	1.65	1.51	1.07	2.65	1.40	1.53	1.33	2.20	2.26	1.84	1.02	1.8%	K Bar	1.52	1.62	1.37	2.22	2.26	1.80	1.84	
13	**Growth Total**	**4.24**	**4.89**	**4.63**	**3.36**	**7.61**	**7.86**	**6.38**	**8.43**	**8.58**	**5.55**	**7.81**	**9.92**	**19.15**	**20.92**	**19.47**	**19.43**	**20.72**	**20.77**	**21.48**	**8.23**	**14.9%**							**21.01**	**21.48**	
14	Switching Cubicle Life Cycle Replacement	0.38	0.44	0.42	0.30	-	0.43	0.49	0.45	0.81	0.99	0.85	1.41	0.93	0.48	0.66	0.87	1.57	1.49	1.06	0.74	1.3%	K Bar	0.52	0.70	0.90	1.58	1.49	1.04	1.06	
15	Replacement of Faulted Distribution PILC Cables	0.25	0.29	0.27	0.20	0.42	0.44	0.43	0.13	0.33	0.58	0.31	1.30	0.71	0.88	2.14	1.01	1.34	1.38	1.43	0.48	0.9%	K Bar	0.96	2.26	1.04	1.36	1.38	1.40	1.43	
16	Life Cycle Replacement of PILC Cable	-	-	-	-	-	-	-	-	-	-	-	-	-		1.08	1.70	2.22	2.25	1.51	-	0.0%	K Bar	-	1.14	1.75	2.24	2.25	1.48	1.51	
17	Capitalized Underground System Damage	0.76	0.88	0.83	0.60	-	0.22	0.65	0.48	1.44	1.98	2.48	3.82	3.56	3.17	2.67	3.72	3.43	3.49	3.49	1.47	2.7%	K Bar	3.45	2.82	3.84	3.47	3.49	3.41	3.49	
18	Life Cycle Replacement of Oil Switches – Program	0.04	0.05	0.04	0.03	-	-	-	-	-	-	0.64	-	0.49		0.23	-	-	-	0.05	0.08	0.1%	K Bar	-	0.25	-	-	-	0.05	0.05	
19	Life Cycle Replacement and Extension of Underground Distribution Cable	1.73	2.00	1.89	1.37	0.15	-	0.71	0.36	3.35	2.56	4.07	8.50	10.17	3.21	10.36	14.50	9.87	10.16	10.13	3.37	6.1%	K Bar	3.49	10.96	14.94	9.97	10.16	9.90	10.13	
20	Neighbourhood Renewal Program	0.27	0.32	0.30	0.22	-	-	-	-	-	-	1.20	2.56	1.71	1.17	0.54	2.29	-	-	0.86	0.53	1.0%	K Bar	1.27	0.57	2.36	-	-	0.84	0.86	
21	Underground Asbestos Abatement	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	0.09	-		-	-	-	-	-	0.02	0.0%	K Bar	-	-	-	-	-	-	-	
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	0.03	0.03	0.03	0.02	-	-	-	-	-	-	-	-	0.35	0.01	-	-	-	-	0.00	0.05	0.1%	K Bar	0.01	-	-	-	-	0.00	0.00	
23	DAM - Distribution Manhole Rebuilds	0.02	0.02	0.02	0.01	-	-	-	-	-	-	-	-	0.19	0.12	0.02	0.34	0.11	0.20	0.16	0.03	0.1%	K Bar	0.13	0.02	0.35	0.11	0.20	0.16	0.16	
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	0.01	0.01	0.01	0.00	-	-	-	-	-	-	-	-	-	0.14	0.06	0.12	0.13	0.13	0.12	0.01	0.0%	K Bar	0.15	0.07	0.13	0.13	0.13	0.12	0.12	
25	**Life Cycle Total**	**3.49**	**4.03**	**3.82**	**2.77**	**0.56**	**1.09**	**2.28**	**1.41**	**5.93**	**6.11**	**9.55**	**17.68**	**18.10**	**9.17**	**17.76**	**24.57**	**18.68**	**19.11**	**18.82**	**6.79**	**12.3%**							**18.40**	**18.82**	
26	**Total**	**7.73**	**8.92**	**8.44**	**6.13**	**8.17**	**8.95**	**8.66**	**9.84**	**14.51**	**11.66**	**17.36**	**27.60**	**37.26**	**30.10**	**37.23**	**44.00**	**39.40**	**39.88**	**40.30**	**15.02**	**27.1%**							**39.41**	**40.30**	
	367 Underground Conductors & Devices - Underground Secondary Networks																														
27	Network Reconfigurations	0.05	0.06	0.06	0.04	0.04	0.24	0.26	0.07	-	-	-	-	0.00	-	-	0.66	1.63	3.53	1.20	0.10	0.2%	K Bar	-	-	0.68	1.64	3.53	1.17	1.20	
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	0.23	0.27	0.25	0.18	1.08	0.89	0.28	0.04	-	-	0.29	0.45	0.78	0.56	1.15	1.25	1.20	1.23	1.14	0.45	0.81%	K Bar	0.61	1.21	1.29	1.21	1.23	1.11	1.14	
29	Upgrading Protection on the Downtown Vaults and Manholes	0.02	0.02	0.02	0.01	-	0.18	0.12	-	-	-	-	-	-		-	-	-	-	-	0.03	0.1%	K Bar	-	-	-	-	-	-	-	
30	Installation of Locking Mechanisms on Network Vault Lids	0.02	0.02	0.02	0.01	-	-	-	-	-	-	-	0.09	1.02	0.00	-	-	-	-	0.00	0.035	0.1%	K Bar	0.00	-	-	-	-	0.00	0.00	
31	**Life Cycle Total**	**0.27**	**0.31**	**0.29**	**0.21**	**1.08**	**1.07**	**0.40**	**0.04**	**-**	**-**	**0.29**	**0.54**	**1.80**	**0.56**	**1.15**	**1.25**	**1.20**	**1.23**	**1.14**	**0.52**	**0.9%**							**1.11**	**1.14**	
32	Installation of Network Current Limiting Fuse Program	0.10	0.12	0.11	0.08	-	-	-	0.18	0.06	-	0.56	0.41	0.38	0.34	-	-	-	-	0.08	0.20	0.4%	K Bar	0.37	-	-	-	-	0.07	0.08	
33	**Total**	**0.42**	**0.49**	**0.46**	**0.33**	**1.12**	**1.31**	**0.66**	**0.29**	**0.06**	**-**	**0.85**	**0.95**	**2.18**	**0.91**	**1.15**	**1.91**	**2.83**	**4.76**	**2.41**	**0.82**	**1.5%**							**2.36**	**2.41**	
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices																														
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	2.05	2.37	2.24	1.62	2.59	1.16	3.12	4.58	2.14	5.59	4.11	5.66	7.65	6.70	6.48	8.33	8.14	6.14	7.58	3.98	7.2%	K Bar	7.28	6.85	8.59	8.22	6.14	7.42	7.58	
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	2.99	3.46	3.27	2.37	4.01	3.04	4.33	6.39	5.85	8.24	6.30	6.81	9.94	10.00	10.69	9.52	11.16	11.34	11.16	5.82	10.5%	K Bar	10.87	11.30	9.81	11.27	11.34	10.92	11.16	
36	Franchise Agreement Driven Relocations and Conversions	1.73	2.00	1.89	1.37	2.62	1.89	2.63	3.48	4.26	3.18	2.05	6.25	5.34	3.25	3.10	3.77	3.08	2.97	-	3.36	6.1%	Tracker	3.53	3.27	3.89	3.10	2.97	3.35	-	Note 1
37	New 15kV and 25kV Circuit Additions	0.81	0.93	0.88	0.64	0.20	0.26	0.92	0.02	4.11	1.50	0.30	4.39	2.69	1.55	4.55	8.43	5.45	12.41	6.77	1.57	2.8%	K Bar	1.68	4.81	8.69	5.50	12.41	6.62	6.77	
38	Queen Elizabeth II Highway & 41 Avenue SW Interchange Distribution System Relocations	-	-	-	-	-	-	-	-	-	-	-	-	-	2.50	-	-	-	-	-	-	0.0%	Tracker	2.71	-	-	-	-	0.54	-	Note 1
39	Walterdale Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.51	4.22	-	-	-	-	0.0%	Tracker	-	0.54	4.34	-	-	0.98	-	Note 1
40	W1 Circuit Extension	0.03	0.03	0.03	0.02	-	-	0.52	0.01	-	-	-	-	-	-	-	-	-	-	-	0.06	0.1%	K Bar	-	-	-	-	-	-	-	
41	13 E Diversion and Reconductoring	0.02	0.02	0.02	0.01	-	0.33	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.1%	K Bar	-	-	-	-	-	-	-	
42	Summerside Feeders	0.43	0.49	0.47	0.34	-	-	-	-	-	-	7.29	0.18	0.02	-	-	-	-	-	-	0.83	1.5%	K Bar	-	-	-	-	-	-	-	
43	Poundmaker Feeders	0.42	0.49	0.46	0.33	-	-	-	-	-	-	-	0.15	11.09	0.23	-	-	-	-	0.05	0.82	1.5%	K Bar	0.25	-	-	-	-	0.05	0.05	
44	NLRT Distribution System Relocations	1.02	1.18	1.12	0.81	-	-	-	-	-	-	-	17.39	1.30		-	-	-	-	-	1.98	3.6%	Tracker	-	-	-	-	-	-	-	
45	SE & W LRT Distribution System Relocation	-	-	-	-	-	-	-	-	-	-	-	-	-	5.22	8.65	18.02	9.31	7.70	-	-	0.0%	Tracker	5.68	9.15	18.57	9.40	7.70	10.10		
46	**Growth Total**	**9.50**	**10.97**	**10.38**	**7.53**	**9.41**	**6.69**	**11.52**	**14.48**	**16.36**	**18.51**	**20.05**	**40.83**	**38.04**	**29.45**	**33.96**	**52.30**	**37.14**	**40.56**	**25.56**	**18.46**	**33.3%**							**39.97**	**25.56**	
47	Aerial and UG Ground Replacements	0.11	0.13	0.12	0.09	0.16	0.15	0.13	0.24	0.22	0.25	0.17	0.29	0.41	0.30	0.42	0.45	0.42	0.42	0.43	0.22	0.4%	K Bar	0.33	0.45	0.46	0.42	0.42	0.42	0.43	
48	Distribution System Aerial and Underground Fault Indicators and Fusing	0.21	0.24	0.23	0.16	0.34	0.26	0.44	0.20	0.06	0.46	0.53	0.39	0.46	0.34	1.47	1.34	0.60	0.75	0.95	0.40	0.7%	K Bar	0.37	1.55	1.38	0.60	0.75	0.93	0.95	
49	Installation of Automated Switches on Selected 25KV Circuits	0.47	0.54	0.51	0.37	-	-	0.02	0.01	1.61	2.06	0.78	2.32	1.53	0.34	0.27	0.89	0.71	0.92	0.66	0.91	1.6%	K Bar	0.37	0.29	0.92	0.72	0.92	0.64	0.66	
50	High Load Corridor	0.05	0.06	0.06	0.04	-	-	0.27	0.62	-	-	-	-	-	-	-	-	-	-	-	0.10	0.2%	K Bar	-	-	-	-	-	-	-	
51	**Performance Improvement Total**	**0.73**	**0.84**	**0.80**	**0.58**	**0.34**	**0.26**	**0.73**	**0.83**	**1.67**	**2.52**	**1.31**	**2.71**	**1.99**	**0.68**	**1.74**	**2.23**	**1.30**	**1.67**	**1.61**	**1.41**	**2.6%**							**1.57**	**1.61**	
52	**Total**	**10.34**	**11.94**	**11.30**	**8.20**	**9.91**	**7.09**	**12.38**	**15.55**	**18.25**	**21.28**	**21.53**	**43.82**	**40.44**	**30.43**	**36.12**	**54.98**	**38.86**	**42.65**	**27.60**	**20.09**	**36.3%**							**41.96**	**27.60**	
	368 Line Transformers																														
53	Voltage Regulator Additions	0.06	0.07	0.06	0.05	-	-	-	0.42	0.14	-	-	0.24	0.05	0.00	-	-	0.19	-	0.04	0.11	0.2%	K Bar	0.00	-	-	0.19	-	0.04	0.04	
54	Network Transformer Lifecycle Replacement	0.35	0.40	0.38	0.28	1.70	0.15	0.85	0.36	0.46	0.65	0.58	0.61	0.44	0.54	0.96	3.96	2.16	2.57	2.13	0.68	1.2%	K Bar	0.59	1.01	4.08	2.18	2.57	2.08	2.13	
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	1.79	2.07	1.96	1.42	0.35	2.00	2.50	3.62	4.60	5.15	4.21	4.12	5.30	5.19	5.24	5.18	5.50	5.62	5.66	3.48	6.3%	K Bar	5.64	5.54	5.34	5.55	5.62	5.54	5.66	
56	PCB Transformer Changeouts	0.05	0.06	0.06	0.04	-	-	-	-	-	-	0.17	0.45	0.38	0.06	0.14	0.43	0.27	0.28	0.24	0.10	0.2%	K Bar	0.06	0.15	0.44	0.27	0.28	0.24	0.24	
57	**Total**	**2.25**	**2.60**	**2.46**	**1.78**	**2.04**	**2.15**	**3.35**	**4.40**	**5.20**	**5.80**	**4.96**	**5.42**	**6.18**	**5.80**	**6.34**	**9.57**	**8.11**	**8.46**	**8.08**	**4.37**	**7.9%**							**7.90**	**8.08**	
	370 Conventional Meters & 371 Automated Meters																														
58	Customer Revenue Metering - Growth & Life Cycle Replacements	1.17	1.35	1.28	0.93	2.19	2.29	2.18	2.94	3.05	2.20	1.71	1.70	2.52	4.63	5.32	4.19	3.20	2.84	4.30	2.28	4.1%	K Bar	5.04	5.62	4.32	3.23	2.84	4.21	4.30	
	373 Street Lighting and Signal Systems																														
59	Street Light Service Connections and Security Lighting Addition and Capital Replacement	0.23	0.26	0.25	0.18	0.26	0.29	0.23	0.23	0.39	0.67	0.69	0.63	0.68	0.68	0.51	0.69	0.56	0.58	0.64	0.44	0.8%	K Bar	0.74	0.54	0.71	0.57	0.58	0.63	0.64	
	389 General Plant – Land																														
60	Land Purchase for Slurry Placement	0.10	0.12	0.11	0.08	-	0.91	0.43	(0.00)	-	0.01	0.23	0.14	0.21	-	-	-	-	-	-	0.20	0.4%	K Bar	-	-	-	-	-	-	-	
	390 General Plant - Structures & Improvements																														
61	Furniture Life Cycle Replacements	0.07	0.08	0.07	0.05	0.04	-	0.14	0.13	0.14	0.13	0.17	0.18	0.42	0.15	0.18	0.18	0.19	0.19	0.19	0.13	0.2%	K Bar	0.16	0.19	0.18	0.19	0.19	0.18	0.19	
62	North and South Service Center Building Life Cycle Replacements	0.54	0.63	0.60	0.43	0.77	1.06	1.56	0.65	1.11	0.93	0.84	1.88	0.67	0.38	0.49	0.16	0.17	0.18	0.30	1.06	1.9%	K Bar	0.41	0.52	0.17	0.17	0.18	0.29	0.30	
63	Work Centre Redevelopment	0.04	0.04	0.04	0.03	-	-	-	-	-	-	-	-	0.34	0.03	0.15	-	38.41	20.23	-	0.07	0.1%	Tracker	0.03	0.16	-	38.78	20.23	11.84		Note 1
64	**Life Cycle Total**	**0.61**	**0.71**	**0.67**	**0.48**	**0.80**	**1.06**	**1.70**	**0.78**	**1.25**	**1.06**	**1.01**	**2.05**	**1.09**	**0.53**	**0.68**	**0.34**	**0.36**	**0.37**	**0.49**	**1.19**	**2.1%**							**0.47**	**0.49**	
65	Service Center Consolidation Project	0.20	0.24	0.22	0.16	-	2.73	0.85	-	-	-	-	-	-	-	-	-	-	-	-	0.40	0.7%	K Bar	-	-	-	-	-	-	-	
66	**Total**	**0.85**	**0.98**	**0.93**	**0.67**	**0.80**	**3.79**	**2.55**	**0.78**	**1.25**	**1.06**	**1.01**	**2.05**	**1.43**	**0.56**	**0.82**	**0.34**	**38.77**	**20.60**	**0.49**	**1.65**	**3.0%**							**12.31**	**0.49**	
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and																														
67	Advanced Metering Infrastructure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32.74	26.04	-	-	0.0%	Tracker	-	-	-	33.05	26.04	11.82		Note 1
	391.1 General Plant – Computer hardware & voice and data network equipment																														
68	IT Hardware Lifecycle Replacements and Additions	0.11	0.12	0.12	0.09	0.16	0.16	0.15	0.30	0.17	0.18	0.31	0.20	0.25	0.31	0.29	0.32	0.97	0.41	0.48	0.21	0.4%	K Bar	0.34	0.31	0.33	0.98	0.41	0.47	0.48	
	391.2 General Plant - Computer software and applications																														
69	Business Systems Upgrades	0.12	0.13	0.13	0.09	0.24	0.05	0.11	0.11	0.29	0.60	0.01	0.18	0.38	0.58	0.15	0.13	0.24	1.67	0.58	0.23	0.4%	K Bar	0.63	0.15	0.14	0.24	1.67	0.57	0.58	

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
		1943	**1944**	**1945**	**1946**	**1947**	**1948**	**1949**	**1950**	**1951**	**1952**	**1953**	**1954**	**1955**	**1956**	**1957**	**1958**	**1959**	**1960**	**1961**	**1962**	**1963**	**1964**	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
70	Work Management System Upgrade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.02	(0.00)	0.03	0.04	0.03	0.03	0.04	0.06	0.07	0.07	0.05	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.05	0.05	0.07	0.05	0.04	0.05	0.06	0.07	0.06
71	GIS - Performance Improvement Project	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.44	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.02	0.04	0.04	0.04	0.06	0.09	0.08	0.06	0.09	0.08	(0.01)	0.15	0.19	0.13	0.16	0.22	0.31	0.35	0.35	0.27	0.17	0.15	0.17	0.22	0.22	0.25	0.22	0.26	0.27	0.34	0.28	0.19	0.27	0.32	0.36	0.33
72	OMS/DMS Life Cycle Replacement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	**Life Cycle Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.03**	**0.02**	**0.62**	**0.03**	**0.03**	**0.03**	**0.05**	**0.05**	**0.06**	**0.05**	**0.04**	**0.04**	**0.04**	**0.04**	**0.03**	**0.05**	**0.06**	**0.06**	**0.09**	**0.13**	**0.11**	**0.09**	**0.13**	**0.11**	**(0.01)**	**0.21**	**0.26**	**0.19**	**0.23**	**0.31**	**0.44**	**0.49**	**0.49**	**0.38**	**0.24**	**0.21**	**0.24**	**0.31**	**0.31**	**0.35**	**0.31**	**0.36**	**0.38**	**0.48**	**0.39**	**0.27**	**0.38**	**0.45**	**0.50**	**0.46**
74	Meter Reading Route Optimization	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.01	0.02	0.01	0.01	0.02	0.03	0.03	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.03	0.03	0.03
75	Automation of Off Cycle Meter Read Project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01
76	Inventory Bar Coding Application	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01
77	AMI Software and Applications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	Engineering and Design Software Modifications	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.03	0.02	0.02	0.03	0.04	0.05	0.05	0.04	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.03	0.04	0.04	0.05	0.04
79	Safety Software	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
80	**Performance Improvement Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.13**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.03**	**0.02**	**0.02**	**0.03**	**0.02**	**(0.00)**	**0.04**	**0.06**	**0.04**	**0.05**	**0.07**	**0.10**	**0.10**	**0.11**	**0.08**	**0.05**	**0.05**	**0.05**	**0.07**	**0.07**	**0.07**	**0.07**	**0.08**	**0.08**	**0.10**	**0.08**	**0.06**	**0.08**	**0.10**	**0.11**	**0.10**
81	**Total**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.02**	**0.02**	**0.03**	**0.02**	**0.76**	**0.04**	**0.03**	**0.04**	**0.06**	**0.06**	**0.07**	**0.06**	**0.05**	**0.05**	**0.05**	**0.04**	**0.04**	**0.06**	**0.07**	**0.07**	**0.11**	**0.16**	**0.14**	**0.11**	**0.15**	**0.13**	**(0.01)**	**0.25**	**0.32**	**0.23**	**0.28**	**0.38**	**0.54**	**0.59**	**0.60**	**0.46**	**0.29**	**0.26**	**0.29**	**0.38**	**0.38**	**0.42**	**0.38**	**0.44**	**0.46**	**0.59**	**0.47**	**0.33**	**0.46**	**0.55**	**0.61**	**0.56**
	391.3 General Plant - Load settlement software and applications																																																									
82	STARS Settlement System Modifications	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.01	0.02	0.01	0.01	0.02	0.03	0.03	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.03	0.03	0.03
83	IBPM (flow) Upgrade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
84	Regulated Default Supply	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.02	0.60	0.03	0.03	0.03	0.04	0.04	0.06	0.04	0.04	0.04	0.04	0.04	0.03	0.05	0.05	0.06	0.09	0.13	0.11	0.09	0.12	0.11	(0.01)	0.20	0.25	0.18	0.22	0.30	0.43	0.47	0.47	0.36	0.23	0.20	0.23	0.30	0.30	0.34	0.30	0.35	0.36	0.46	0.38	0.26	0.36	0.44	0.49	0.44
85	Directive 52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02
86	Tariff Bill Code Data Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01
87	Micro Generation Records upgrade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Dropchute Replacement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02
89	Interval Meter Data Collection and Processing (MV-90 Upgrade)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
90	STARS Upgrade	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91	**Life Cycle Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.02**	**0.02**	**0.03**	**0.02**	**0.72**	**0.04**	**0.03**	**0.04**	**0.05**	**0.05**	**0.07**	**0.05**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.06**	**0.07**	**0.07**	**0.10**	**0.15**	**0.13**	**0.10**	**0.15**	**0.13**	**(0.01)**	**0.24**	**0.31**	**0.22**	**0.27**	**0.36**	**0.51**	**0.57**	**0.57**	**0.44**	**0.27**	**0.25**	**0.28**	**0.36**	**0.36**	**0.41**	**0.36**	**0.42**	**0.44**	**0.56**	**0.45**	**0.31**	**0.44**	**0.53**	**0.59**	**0.53**
	392 General Plant - Transportation, Fleet vehicles																																																									
92	Vehicles - Growth and Life Cycle Replacements	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.04	0.03	0.95	0.05	0.04	0.05	0.07	0.07	0.09	0.07	0.06	0.06	0.06	0.06	0.05	0.08	0.09	0.09	0.14	0.20	0.17	0.14	0.19	0.17	(0.02)	0.32	0.41	0.28	0.35	0.47	0.68	0.75	0.75	0.58	0.36	0.32	0.37	0.47	0.48	0.53	0.48	0.55	0.57	0.74	0.60	0.41	0.58	0.69	0.77	0.70
	394 General Plant - Tools, shop, garage, stores and laboratory equipment																																																									
93	Capital Tools and Instrument Purchases	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.27	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.06	0.05	0.04	0.06	0.05	(0.01)	0.09	0.12	0.08	0.10	0.14	0.19	0.21	0.22	0.17	0.10	0.09	0.11	0.14	0.14	0.15	0.14	0.16	0.16	0.21	0.17	0.12	0.17	0.20	0.22	0.20
94	Meter Reading Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	(0.00)	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.01	0.02	0.02	0.03	0.02
95	**Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.31**	**0.02**	**0.01**	**0.02**	**0.02**	**0.02**	**0.03**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.03**	**0.03**	**0.03**	**0.04**	**0.07**	**0.05**	**0.04**	**0.06**	**0.05**	**(0.01)**	**0.10**	**0.13**	**0.09**	**0.11**	**0.15**	**0.22**	**0.24**	**0.24**	**0.18**	**0.12**	**0.10**	**0.12**	**0.15**	**0.15**	**0.17**	**0.15**	**0.18**	**0.18**	**0.24**	**0.19**	**0.13**	**0.19**	**0.22**	**0.25**	**0.23**
	Distribution Assets - Contributed by Transmission																																																									
96	Argyll to Bellamy Transmission Contingency																																																									
	Transmission Contribution for Distribution Assets																																																									
97	Bellamy Contribution																																																									
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##	Poundmaker Contributions (East Industrial '07-'08)																																																									
##	Clover Bar POD Addition Contribution																																																									
##	Victoria Substation MV Breaker Purchase																																																									
##	East Industrial Contribution																																																									
##	**Total**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Adjustments																																																									
##	Corporate Allocation for the OH 2002-2004																																																									
##	Capital Addition Adjustments																																																									
##	**Total**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Grand Total																																																									
##	**Grand Total**	**0.08**	**0.07**	**0.14**	**0.16**	**0.37**	**0.53**	**0.50**	**1.03**	**0.75**	**22.84**	**1.23**	**1.00**	**1.21**	**1.67**	**1.68**	**2.14**	**1.68**	**1.40**	**1.39**	**1.38**	**1.35**	**1.27**	**1.88**	**2.09**	**2.12**	**3.29**	**4.87**	**4.07**	**3.30**	**4.63**	**4.04**	**(0.43)**	**7.57**	**9.70**	**6.80**	**8.39**	**11.31**	**16.23**	**17.87**	**18.03**	**13.80**	**8.65**	**7.77**	**8.86**	**11.31**	**11.48**	**12.79**	**11.38**	**13.26**	**13.76**	**17.69**	**14.28**	**9.81**	**13.80**	**16.57**	**18.49**	**16.84**
##	**Total Capital Additions from DLM**	**0.08**	**0.07**	**0.14**	**0.16**	**0.37**	**0.53**	**0.50**	**1.03**	**0.75**	**22.84**	**1.23**	**1.00**	**1.21**	**1.67**	**1.68**	**2.14**	**1.68**	**1.40**	**1.39**	**1.38**	**1.35**	**1.27**	**1.88**	**2.09**	**2.12**	**3.29**	**4.87**	**4.07**	**3.30**	**4.63**	**4.04**	**(0.43)**	**7.57**	**9.70**	**6.80**	**8.39**	**11.31**	**16.23**	**17.87**	**18.03**	**13.80**	**8.65**	**7.77**	**8.86**	**11.31**	**11.48**	**12.79**	**11.38**	**13.26**	**13.76**	**17.69**	**14.28**	**9.81**	**13.80**	**16.57**	**18.49**	**16.84**

		BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CI
																								Indexed for 2017 $s							
		2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012 A**	**2013 A**	**2014 A**	**2015 D**	**2016 F**	**2017 F**	**2018 F based on 13-17 Avg (Col CH)**	**2004-2012D Average Adds**	**% of Total Average Adds**	**Category**	**2013 Indexed**	**2014 Indexed**	**2015 Indexed**	**2016 Indexed**	**2017**	**2013-17 Average Adds**	**2018 Inflated & Growth Average Adds**	**Notes**
70	Work Management System Upgrade	0.11	0.13	0.12	0.09	0.16	0.10	0.25	-	-	-	-	-	1.50	0.41	0.37	-	0.73	1.25	0.58	0.21	0.4%	K Bar	0.44	0.39	-	0.74	1.25	0.56	0.58	
71	GIS - Performance Improvement Project	0.55	0.64	0.60	0.44	-	-	-	-	-	-	7.92	0.91	0.64	0.00	1.44	-	-	-	0.31	1.07	1.9%	K Bar	0.00	1.52	-	-	-	0.31	0.31	
72	OMS/DMS Life Cycle Replacement	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	-	9.09	-	5.38	-	-	0.0%	Tracker	-	-	9.37	-	5.38	2.95		Note 1
73	**Life Cycle Total**	**0.78**	**0.90**	**0.85**	**0.62**	**0.40**	**0.15**	**0.36**	**0.11**	**0.29**	**0.60**	**7.93**	**1.09**	**2.51**	**0.99**	**1.96**	**9.22**	**0.97**	**8.29**	**1.47**	**1.51**	**2.7%**							**4.39**	**1.47**	
74	Meter Reading Route Optimization	0.05	0.06	0.05	0.04	-	-	-	0.21	0.65	-	-	-	-	-	-	-	-	-	-	0.10	0.2%	K Bar	-	-	-	-	-	-	-	
75	Automation of Off Cycle Meter Read Project	0.01	0.01	0.01	0.01	-	-	-	-	0.19	-	-	-	-	-	-	-	-	-	-	0.02	0.0%	K Bar	-	-	-	-	-	-	-	
76	Inventory Bar Coding Application	0.01	0.02	0.02	0.01	-	-	-	0.28	-	(0.06)	-		-	-	-	-	-	-	-	0.03	0.0%	K Bar	-	-	-	-	-	-	-	
77	AMI Software and Applications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	K Bar	-	-	-	-	-	-	-	
78	Engineering and Design Software Modifications	0.08	0.09	0.08	0.06	0.34	0.60	0.12	0.01	-	-	-	-	0.31	0.37	0.02	-	-	0.32	0.15	0.15	0.3%	K Bar	0.41	0.02	-	-	0.32	0.15	0.15	
79	Safety Software	0.02	0.02	0.02	0.01	-	-	-	-	-	-	-	0.04	(0.00)	-	-	-	-	-	-	0.03	0.1%	K Bar	-	-	-	-	-	-	-	
80	**Performance Improvement Total**	**0.17**	**0.19**	**0.18**	**0.13**	**0.34**	**0.60**	**0.12**	**0.50**	**0.84**	**(0.06)**	**-**	**0.04**	**0.31**	**0.37**	**0.02**	**-**	**-**	**0.32**	**0.15**	**0.32**	**0.6%**							**0.15**	**0.15**	
81	**Total**	**0.95**	**1.09**	**1.03**	**0.75**	**0.74**	**0.75**	**0.48**	**0.61**	**1.13**	**0.54**	**7.93**	**1.13**	**2.82**	**1.37**	**1.98**	**9.22**	**0.97**	**8.61**	**1.62**	**1.84**	**3.3%**							**4.53**	**1.62**	
	391.3 General Plant - Load settlement software and applications																														
82	STARS Settlement System Modifications	0.05	0.06	0.05	0.04	-	-	-	-	-	-	0.42	0.19	0.05	0.38	0.06	-	-	-	0.10	0.09	0.2%	K Bar	0.41	0.06	-	-	-	0.10	0.10	
83	IBPM (flow) Upgrade	0.02	0.02	0.02	0.01	-	-	-	-	0.33	-	-	-	-	-	-	-	-	-	-	0.04	0.1%	K Bar	-	-	-	-	-	-	-	
84	Regulated Default Supply	0.75	0.86	0.82	0.59	(0.01)	-	11.91	-	1.19	-	-	-	-	-	-	-	-	-	-	1.45	2.6%	K Bar	-	-	-	-	-	-	-	
85	Directive 52	0.03	0.03	0.03	0.02	-	-	-	-	0.46	-	-	-	-	-	-	-	-	-	-	0.05	0.1%	K Bar	-	-	-	-	-	-	-	
86	Tariff Bill Code Data Retention	0.01	0.01	0.01	0.01	-	-	-	-	0.22	-	-	-	-	-	-	-	-	-	-	0.02	0.0%	K Bar	-	-	-	-	-	-	-	
87	Micro Generation Records upgrade	0.01	0.01	0.01	0.00	-	-	-	-	0.11	-	-	-	-	-	-	-	-	-	-	0.01	0.0%	K Bar	-	-	-	-	-	-	-	
88	Dropchute Replacement	0.03	0.03	0.03	0.02	-	-	-	-	-	-	-	-	0.16	-	-	-	-	-	-	0.05	0.1%	K Bar	-	-	-	-	-	-	-	
89	Interval Meter Data Collection and Processing (MV-90 Upgrade)	0.02	0.02	0.02	0.01	0.05	-	-	0.27	(0.06)	-	-	-	-	-	2.57	-	-	-	-	0.03	0.1%	Tracker	-	2.72	-	-	-	0.54		Note 1
90	STARS Upgrade	-	-	-	-	-	-	-	-	-	-	-	-	-	0.27	-	-	-	-	0.06	-	0.0%	K Bar	0.29	-	-	-	-	0.06	0.06	
91	**Life Cycle Total**	**0.90**	**1.04**	**0.99**	**0.72**	**0.04**	**-**	**11.91**	**0.27**	**2.25**	**-**	**0.42**	**0.19**	**0.21**	**0.65**	**2.63**	**-**	**-**	**-**	**0.16**	**1.76**	**3.2%**							**0.70**	**0.16**	
	392 General Plant - Transportation, Fleet vehicles																														
92	Vehicles - Growth and Life Cycle Replacements	1.19	1.37	1.30	0.94	1.48	5.49	1.14	2.35	1.76	0.99	1.23	2.12	3.89	1.36	1.86	2.60	4.95	3.99	3.09	2.31	4.2%	K Bar	1.48	1.97	2.68	5.00	3.99	3.02	3.09	
	394 General Plant - Tools, shop, garage, stores and laboratory equipment																														
93	Capital Tools and Instrument Purchases	0.34	0.39	0.37	0.27	0.33	0.41	0.34	0.67	0.57	0.44	1.19	0.86	1.12	0.98	0.90	0.87	1.18	0.58	0.96	0.66	1.2%	K Bar	1.06	0.95	0.89	1.20	0.58	0.94	0.96	
94	Meter Reading Equipment	0.04	0.05	0.04	0.03	-	0.04	0.08	0.28	0.25	-	0.06	-	-	-	0.23	0.20	-	-	0.09	0.08	0.1%	K Bar	-	0.25	0.20	-	-	0.09	0.09	
95	**Total**	**0.38**	**0.44**	**0.42**	**0.30**	**0.33**	**0.44**	**0.42**	**0.95**	**0.82**	**0.44**	**1.25**	**0.86**	**1.12**	**0.98**	**1.14**	**1.06**	**1.18**	**0.58**	**1.05**	**0.74**	**1.3%**							**1.03**	**1.05**	
	Distribution Assets - Contributed by Transmission																														
96	Argyll to Bellamy Transmission Contingency					-	-	0.79	-	-	-	-	-	-	-	-	-	-	-	-			K Bar	-	-	-	-	-	-	-	
	Transmission Contribution for Distribution Assets																														
97	Bellamy Contribution					-	-	(0.79)	-	-	-	-	-	-	-	-	-	-	-	-			K Bar	-	-	-	-	-	-	-	
	Distribution Contribution for Transmission Assets																														
98	Garneau Expansion					-	-	-	-	-	-	-	-	-	-	-	-	-	47.94	-			Tracker	-	-	-	-	47.94	9.59		Note 1
99	Summerside Substation Contribution					-	-	-	-	-	-	13.87	(0.48)	-	-	-	-	-	-	-			Tracker	-	-	-	-	-	-	-	
##	Poundmaker Contributions (East Industrial '07-'08)					-	-	-	(0.13)	-	-	-	-	14.17	(2.17)	-	-	-	-	-			Tracker	(2.35)	-	-	-	-	(0.47)		Note 1
##	Clover Bar POD Addition Contribution					-	-	-	-	3.12	1.49	-	-	-	-	-	-	-	-	-			Tracker	-	-	-	-	-	-	-	
##	Victoria Substation MV Breaker Purchase					-	-	-	-	-	-	-	0.09	-	-	-	-	-	-	-			Tracker	-	-	-	-	-	-	-	
##	East Industrial Contribution					-	-	4.82	-	-	-	-	-	-	-	-	-	-	-	-			Tracker	-	-	-	-	-	-	-	
##	**Total**	**-**	**-**	**-**	**-**	**-**	**-**	**4.82**	**(0.13)**	**3.12**	**1.49**	**13.87**	**(0.38)**	**14.17**	**(2.17)**	**-**	**-**	**-**	**47.94**	**-**									**9.12**	**-**	
	Adjustments																														
##	Corporate Allocation for the OH 2002-2004					-	1.37	-	-	-	-	-	-	-	-	-	-	-	-	-			K Bar	-	-	-	-	-	-	-	
##	Capital Addition Adjustments					(0.06)	(0.04)	0.01	-	-	-	-	-	-	-	-	-	-	-	-			K Bar	-	-	-	-	-	-	-	
##	**Total**	**-**	**-**	**-**	**-**	**(0.06)**	**1.33**	**0.01**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**									**-**	**-**	
	Grand Total																														
##	**Grand Total**	**28.49**	**32.90**	**31.13**	**22.58**	**29.67**	**36.48**	**53.48**	**40.98**	**54.52**	**49.46**	**78.28**	**91.73**	**117.80**	**78.61**	**100.87**	**135.87**	**177.96**	**213.27**	**95.88**	**55.37**	**100.0%**							**145.00**	**95.88**	
##	**Total Capital Additions from DLM**	**28.49**	**32.90**	**31.13**	**22.58**																										

Distribution Revenue Requirement Incurred 2018 Model Year
2018 F Factor - Using 2013 - 2017 Average and Indexed Capital Adds to create 2018 Forecast
($ millions)

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU
		Asset Age in 2018	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8
		Indicative Service Life	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
	362 Station Equipment																																															
1	Distribution Substation Life Cycle Replacements	48						0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.04	0.01	0.00	0.01	0.00
2	**Total**		-	-	-	-	-	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.04	0.01	0.00	0.01	0.00
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices																																															
3	Distribution Pole and Aerial Line Life Cycle Replacements	45									0.00	(0.00)	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.03	0.02	0.03	0.04	0.05	0.04	0.08	0.09	0.09	0.06	0.10	0.05	0.20	0.12	0.10	0.15	0.26
4	Capitalized Aerial System Damage	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.03	0.03	0.02	-	0.01	0.03	0.05	0.07	0.08	0.08
5	Remedial Pole Treatments	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	-	-	-	-	0.02
6	Lightning Arrestor Replacement	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.01	0.01	-	-	-	-
7	Installation of Insulators in 25 kV Supporting Guy Wires	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	-	-	-	-
8	**Life Cycle Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.01	0.02	0.01	0.02	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.04	0.04	0.06	0.05	0.03	0.05	0.06	0.07	0.06	0.11	0.13	0.13	0.09	0.16	0.10	0.25	0.17	0.18	0.23	0.37
9	Distribution System Neutral Installations	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	0.00	0.01	-	-
10	**Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.01	0.02	0.01	0.02	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.04	0.04	0.06	0.05	0.03	0.05	0.06	0.07	0.06	0.11	0.13	0.13	0.09	0.16	0.10	0.25	0.17	0.18	0.23	0.37
	367 Underground Conductors & Devices																																															
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	40														0.01	0.04	0.06	0.07	0.07	0.06	0.04	0.04	0.04	0.06	0.06	0.07	0.07	0.08	0.09	0.11	0.09	0.07	0.10	0.12	0.14	0.13	0.23	0.27	0.26	0.19	0.50	0.56	0.42	0.49	0.51	0.29	0.49
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	40														0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.04	0.03	0.01	#####	0.03	0.12	0.12	0.12	0.12
13	**Growth Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.04	0.07	0.08	0.08	0.07	0.04	0.04	0.05	0.07	0.07	0.08	0.08	0.09	0.10	0.13	0.11	0.08	0.11	0.14	0.16	0.15	0.26	0.31	0.30	0.22	0.51	0.54	0.45	0.61	0.63	0.42	0.60
14	Switching Cubicle Life Cycle Replacement	40														0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.03	0.02	-	0.03	0.03	0.03	0.06	0.07	0.07
15	Replacement of Faulted Distribution PILC Cables	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.03	0.03	0.03	0.01	0.02	0.04	0.02
16	Life Cycle Replacement of PILC Cable	40														-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	Capitalized Underground System Damage	40														0.00	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.03	0.05	0.05	0.05	0.04	-	0.02	0.05	0.03	0.11	0.15	0.19
18	Life Cycle Replacement of Oil Switches – Program	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	0.05
19	Life Cycle Replacement and Extension of Underground Distribution Cable	40														0.01	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.03	0.05	0.06	0.06	0.06	0.11	0.12	0.12	0.09	0.01	-	0.05	0.03	0.25	0.19	0.31
20	Neighbourhood Renewal Program	40														0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	-	-	0.09
21	Underground Asbestos Abatement	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-
23	DAM - Distribution Manhole Rebuilds	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-
25	**Life Cycle Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.04	0.06	0.07	0.07	0.06	0.04	0.03	0.04	0.05	0.06	0.07	0.06	0.07	0.08	0.11	0.09	0.06	0.09	0.11	0.13	0.12	0.21	0.25	0.24	0.18	0.04	0.08	0.16	0.10	0.44	0.46	0.74
26	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	0.08	0.12	0.14	0.15	0.12	0.08	0.08	0.09	0.12	0.13	0.15	0.14	0.17	0.18	0.24	0.20	0.14	0.20	0.25	0.29	0.27	0.47	0.56	0.54	0.40	0.55	0.62	0.61	0.71	1.07	0.88	1.34
	367 Underground Conductors & Devices - Underground Secondary Networks																																															
27	Network Reconfigurations	35																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	-	-	-
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	50				0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.07	0.06	0.02	0.00	-	-	0.02
29	Upgrading Protection on the Downtown Vaults and Manholes	42												0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.01	0.01	-	-	-	-
30	Installation of Locking Mechanisms on Network Vault Lids	42												0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-
31	**Life Cycle Total**		-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.07	0.07	0.03	0.00	-	-	0.02
32	Installation of Network Current Limiting Fuse Program	35																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	-	-	-	0.01	0.00	-	0.04
33	**Total**		-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.03	0.03	0.02	0.07	0.09	0.05	0.02	0.00	-	0.07
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices																																															
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	43											0.01	0.02	0.01	0.02	0.02	0.04	0.04	0.04	0.04	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.06	0.05	0.04	0.05	0.07	0.08	0.07	0.13	0.15	0.14	0.11	0.17	0.08	0.22	0.33	0.16	0.42	0.31
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	43											0.01	0.03	0.02	0.02	0.03	0.05	0.06	0.06	0.05	0.03	0.03	0.04	0.05	0.05	0.06	0.05	0.07	0.07	0.09	0.08	0.06	0.08	0.10	0.11	0.11	0.18	0.22	0.21	0.16	0.27	0.21	0.30	0.46	0.43	0.62	0.48
36	Franchise Agreement Driven Relocations and Conversions	43											0.01	0.01	0.01	0.01	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.03	0.05	0.06	0.07	0.06	0.11	0.12	0.12	0.09	0.18	0.13	0.18	0.25	0.31	0.24	0.16
37	New 15kV and 25kV Circuit Additions	43											0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.03	0.02	0.01	0.02	0.03	0.03	0.03	0.05	0.06	0.06	0.04	0.01	0.02	0.06	0.00	0.30	0.11	0.02
38	QE II Highway & 41 Ave SW	43											-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	Walterdale Bridge	43											-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	W1 Circuit Extension	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.04	0.00	-	-	-
41	13 E Diversion and Reconductoring	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.02	-	-	-	-	-
42	Summerside Feeders	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.02	-	-	-	-	-	-	0.55
43	Poundmaker Feeders	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.03	0.03	0.02	-	-	-	-	-	-	-
44	NLRT Distribution System Relocations	45									0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.03	0.03	0.04	0.04	0.06	0.07	0.07	0.05	-	-	-	-	-	-	-
45	SE & W LRT Distribution System Relocation	44										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	**Growth Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.04	0.08	0.06	0.08	0.11	0.17	0.19	0.21	0.16	0.11	0.10	0.12	0.16	0.17	0.19	0.17	0.21	0.23	0.30	0.25	0.18	0.25	0.31	0.36	0.33	0.58	0.69	0.67	0.49	0.63	0.46	0.81	1.04	1.20	1.38	1.52
47	Aerial and UG Ground Replacements	43										(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01
48	Distribution System Aerial and Underground Fault Indicators and Fusing	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.03	0.01	0.00	0.03	0.04
49	Installation of Automated Switches on Selected 25KV Circuits	44										(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.02	-	-	0.00	0.00	0.12	0.15	0.06
50	High Load Corridor	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.02	0.04	-	-	-
51	**Performance Improvement Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.00	0.01	0.00	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.04	0.02	0.02	0.05	0.06	0.12	0.19	0.10
52	**Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.04	0.09	0.07	0.09	0.12	0.18	0.21	0.22	0.18	0.12	0.11	0.13	0.17	0.18	0.21	0.19	0.23	0.25	0.33	0.27	0.19	0.28	0.34	0.39	0.36	0.63	0.75	0.72	0.54	0.66	0.49	0.87	1.11	1.33	1.59	1.64
	368 Line Transformers																																															
53	Voltage Regulator Additions	35																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	0.03	0.01	-	-
54	Network Transformer Lifecycle Replacement	35																			0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.11	0.01	0.06	0.03	0.03	0.05	0.05
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	35																			0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.03	0.05	0.06	0.07	0.06	0.11	0.13	0.12	0.09	0.02	0.14	0.18	0.26	0.35	0.40	0.33
56	PCB Transformer Changeouts	35																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	0.01
57	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.07	0.06	0.04	0.06	0.07	0.08	0.08	0.14	0.16	0.16	0.12	0.14	0.15	0.24	0.32	0.39	0.45	0.39
	370 Conventional Meters & 371 Automated Meters																																															
58	Customer Revenue Metering - Growth & Life Cycle Replacements	15																																							0.03	0.16	0.17	0.17	0.25	0.27	0.20	0.17
59	Meter Depreciation	3																																														

Distribution Revenue Requirement Incurred
2018 F Factor - Using 2013 - 2017 Average and Indexed Capital A
($ millions)

		AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF
		7	6	5	4	3	2	1	0			
		2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2018 Total RR Incurred Before Adjustment**	**2018 Additional Allocated RR Incurred**	**2018 RR Incurred Total**
	362 Station Equipment											
1	Distribution Substation Life Cycle Replacements	0.02	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.18	-	0.18
2	**Total**	**0.02**	**0.01**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.18**	**-**	**0.18**
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices											
3	Distribution Pole and Aerial Line Life Cycle Replacements	0.26	0.21	0.11	0.30	0.43	0.30	0.35	0.16	4.04	-	4.04
4	Capitalized Aerial System Damage	0.11	0.11	0.10	0.12	0.12	0.13	0.13	0.07	1.53	-	1.53
5	Remedial Pole Treatments	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.25	-	0.25
6	Lightning Arrestor Replacement	-	-	-	-	-	-	-	-	0.12	-	0.12
7	Installation of Insulators in 25 kV Supporting Guy Wires	-	-	-	-	-	-	-	-	0.01	-	0.01
8	**Life Cycle Total**	**0.38**	**0.33**	**0.24**	**0.43**	**0.57**	**0.45**	**0.50**	**0.24**	**5.95**	**-**	**5.95**
9	Distribution System Neutral Installations	0.01	0.01	-	-	-	-	-	-	0.03	-	0.03
10	**Total**	**0.39**	**0.34**	**0.24**	**0.43**	**0.57**	**0.45**	**0.50**	**0.24**	**5.98**	**-**	**5.98**
	367 Underground Conductors & Devices											
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	0.70	1.32	1.60	1.50	1.54	1.61	1.64	0.88	16.61	-	16.61
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	0.08	0.21	0.11	0.13	0.11	0.19	0.20	0.08	1.98	-	1.98
13	**Growth Total**	**0.78**	**1.54**	**1.71**	**1.63**	**1.65**	**1.80**	**1.84**	**0.96**	**18.59**	**-**	**18.59**
14	Switching Cubicle Life Cycle Replacement	0.11	0.07	0.04	0.06	0.07	0.14	0.13	0.05	1.23	-	1.23
15	Replacement of Faulted Distribution PILC Cables	0.10	0.06	0.07	0.18	0.09	0.12	0.12	0.06	1.16	-	1.16
16	Life Cycle Replacement of PILC Cable	-	-	-	0.09	0.14	0.19	0.20	0.07	0.69	-	0.69
17	Capitalized Underground System Damage	0.30	0.29	0.26	0.22	0.32	0.30	0.31	0.16	3.21	-	3.21
18	Life Cycle Replacement of Oil Switches – Program	-	0.04	-	0.02	-	-	-	0.00	0.14	-	0.14
19	Life Cycle Replacement and Extension of Underground Distribution Cable	0.67	0.82	0.26	0.87	1.23	0.86	0.90	0.45	8.09	-	8.09
20	Neighbourhood Renewal Program	0.20	0.14	0.10	0.05	0.20	-	-	0.04	0.99	-	0.99
21	Underground Asbestos Abatement	0.01	-	-	-	-	-	-	-	0.01	-	0.01
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	-	0.03	0.00	-	-	-	-	0.00	0.05	-	0.05
23	DAM - Distribution Manhole Rebuilds	-	0.02	0.01	0.00	0.03	0.01	0.02	0.01	0.10	-	0.10
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	-	-	0.01	0.01	0.01	0.01	0.01	0.01	0.06	-	0.06
25	**Life Cycle Total**	**1.39**	**1.45**	**0.75**	**1.48**	**2.09**	**1.62**	**1.69**	**0.84**	**15.74**	**-**	**15.74**
26	**Total**	**2.17**	**2.99**	**2.46**	**3.11**	**3.75**	**3.42**	**3.52**	**1.80**	**34.33**	**-**	**34.33**
	367 Underground Conductors & Devices - Underground Secondary Networks											
27	Network Reconfigurations	-	0.00	-	-	0.06	0.15	0.32	0.06	0.66	-	0.66
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	0.03	0.06	0.04	0.09	0.10	0.10	0.10	0.05	0.94	-	0.94
29	Upgrading Protection on the Downtown Vaults and Manholes	-	-	-	-	-	-	-	-	0.03	-	0.03
30	Installation of Locking Mechanisms on Network Vault Lids	0.01	0.08	0.00	-	-	-	-	0.00	0.10	-	0.10
31	**Life Cycle Total**	**0.04**	**0.14**	**0.04**	**0.09**	**0.10**	**0.10**	**0.10**	**0.05**	**1.07**	**-**	**1.07**
32	Installation of Network Current Limiting Fuse Program	0.03	0.03	0.03	-	-	-	-	0.00	0.22	-	0.22
33	**Total**	**0.07**	**0.17**	**0.07**	**0.09**	**0.16**	**0.25**	**0.43**	**0.11**	**1.95**	**-**	**1.95**
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices											
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	0.44	0.61	0.54	0.53	0.70	0.69	0.53	0.33	7.56	-	7.56
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	0.53	0.79	0.81	0.88	0.80	0.95	0.98	0.49	11.17	-	11.17
36	Franchise Agreement Driven Relocations and Conversions	0.49	0.42	0.26	0.25	0.32	0.26	0.26	-	4.97	-	4.97
37	New 15kV and 25kV Circuit Additions	0.34	0.21	0.12	0.37	0.71	0.46	1.08	0.30	4.72	-	4.72
38	QE II Highway & 41 Ave SW	-	-	0.20	-	-	-	-	-	0.20	-	0.20
39	Walterdale Bridge	-	-	-	0.04	0.35	-	-	-	0.39	-	0.39
40	W1 Circuit Extension	-	-	-	-	-	-	-	-	0.06	-	0.06
41	13 E Diversion and Reconductoring	-	-	-	-	-	-	-	-	0.04	-	0.04
42	Summerside Feeders	0.01	0.00	-	-	-	-	-	-	0.89	-	0.89
43	Poundmaker Feeders	0.01	0.87	0.02	-	-	-	-	0.00	1.22	-	1.22
44	NLRT Distribution System Relocations	1.34	0.10	-	-	-	-	-	-	2.20	-	2.20
45	SE & W LRT Distribution System Relocation	-	-	0.42	0.71	1.50	0.79	0.66	-	4.08	-	4.08
46	**Growth Total**	**3.16**	**3.00**	**2.37**	**2.79**	**4.37**	**3.16**	**3.51**	**1.12**	**37.49**	**-**	**37.49**
47	Aerial and UG Ground Replacements	0.02	0.03	0.02	0.03	0.04	0.04	0.04	0.02	0.42	-	0.42
48	Distribution System Aerial and Underground Fault Indicators and Fusing	0.03	0.04	0.03	0.12	0.11	0.05	0.06	0.04	0.80	-	0.80
49	Installation of Automated Switches on Selected 25KV Circuits	0.18	0.12	0.03	0.02	0.07	0.06	0.08	0.03	1.27	-	1.27
50	High Load Corridor	-	-	-	-	-	-	-	-	0.10	-	0.10
51	**Performance Improvement Total**	**0.21**	**0.16**	**0.05**	**0.14**	**0.19**	**0.11**	**0.14**	**0.07**	**2.17**	**-**	**2.17**
52	**Total**	**3.39**	**3.19**	**2.45**	**2.97**	**4.59**	**3.31**	**3.69**	**1.21**	**40.08**	**-**	**40.08**
	368 Line Transformers											
53	Voltage Regulator Additions	0.02	0.00	0.00	-	-	0.02	-	0.00	0.12	-	0.12
54	Network Transformer Lifecycle Replacement	0.05	0.04	0.05	0.08	0.35	0.19	0.24	0.10	1.64	-	1.64
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	0.33	0.44	0.44	0.45	0.46	0.49	0.52	0.26	6.13	-	6.13
56	PCB Transformer Changeouts	0.04	0.03	0.00	0.01	0.04	0.02	0.03	0.01	0.23	-	0.23
57	**Total**	**0.44**	**0.51**	**0.49**	**0.55**	**0.84**	**0.73**	**0.78**	**0.37**	**8.11**	**-**	**8.11**
	370 Conventional Meters & 371 Automated Meters											
58	Customer Revenue Metering - Growth & Life Cycle Replacements	0.17	0.27	0.51	0.61	0.50	0.39	0.36	0.28	4.51	-	4.51
59	Meter Depreciation									-	-	-

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU
		Asset Age in 2018	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8
		Indicative Service Life	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
60	**Customer Revenue Metering Subtotal**																																								-	0.03	0.16	0.17	0.17	0.25	0.27	0.20	0.17
	373 Street Lighting and Signal Systems																																															
61	Street Light Service Connections and Security Lighting Addition and Capital Replacement	20																																	0.00	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.06	0.06
	389 General Plant – Land																																															
62	Land Purchase for Slurry Placement	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	-	0.06	0.03	(0.00)	-	0.00	0.02
	390 General Plant - Structures & Improvements																																															
63	Furniture Life Cycle Replacements	8																																														0.01
64	North and South Service Center Building Life Cycle Replacements	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.04	0.03	0.05	0.07	0.11	0.05	0.08	0.07	0.06
65	Work Centre Redevelopment	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-
66	**Life Cycle Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.04	0.03	0.05	0.07	0.11	0.05	0.08	0.07	0.07
67	Service Center Consolidation Project	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	0.19	0.06	-	-	-	-
68	**Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.03	0.03	0.03	0.05	0.06	0.05	0.04	0.05	0.26	0.17	0.05	0.08	0.07	0.07
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications																																															
69	Advanced Metering Infrastructure	15																																							-	-	-	-	-	-	-	-
	391.1 General Plant – Computer hardware & voice and data network equipment																																															
70	IT Hardware Lifecycle Replacements and Additions	4																																														
	391.2 General Plant - Computer software and applications																																															
71	Business Systems Upgrades	10																																												0.01	0.06	0.00
72	Work Management System Upgrade	10																																												-	-	-
73	GIS - Performance Improvement Project	10																																												-	-	0.89
74	OMS/DMS Life Cycle Replacement	10																																												-	-	-
75	**Life Cycle Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.06	0.90
76	Meter Reading Route Optimization	10																																												0.03	-	-
77	Automation of Off Cycle Meter Read Project	10																																												0.01	-	-
78	Inventory Bar Coding Application	10																																												-	(0.01)	-
79	AMI Software and Applications	10																																												-	-	-
80	Engineering and Design Software Modifications	10																																												-	-	-
81	Safety Software	10																																												-	-	-
82	**Performance Improvement Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	(0.01)	-
83	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06	0.06	0.90
	391.3 General Plant - Load settlement software and applications																																															
84	STARS Settlement System Modifications	10																																												-	-	0.05
85	IBPM (flow) Upgrade	10																																												0.02	-	-
86	Regulated Default Supply	10																																												0.06	-	-
87	Directive 52	10																																												0.02	-	-
88	Tariff Bill Code Data Retention	10																																												0.01	-	-
89	Micro Generation Records upgrade	10																																												0.01	-	-
90	Dropchute Replacement	10																																												-	-	-
91	Interval Meter Data Collection (MV-90 Upgrade)	10																																												#####	-	-
92	STARS Upgrade	10																																												-	-	-
93	**Life Cycle Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.12	-	0.05
	392 General Plant - Transportation, Fleet vehicles																																															
94	Vehicles - Growth and Life Cycle Replacements	11																																											0.00	0.01	0.01	0.02
	394 General Plant - Tools, shop, garage, stores and laboratory equipment																																															
95	Capital Tools and Instrument Purchases	10																																												0.03	0.05	0.13
96	Meter Reading Equipment	10																																												0.01	-	0.01
97	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.05	0.14
	Distribution Assets - Contributed by Transmission																																															
98	Argyll to Bellamy Transmission Contingency	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06	-	-	-	-
	Transmission Contribution for Distribution Assets																																															
99	Bellamy Contribution	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#####	-	-	-	-
	Distribution Contribution for Transmission Assets																																															
100	Garneau Expansion	45									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
101	Summerside Substation Contribution	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.09
102	Poundmaker Contributions (East Industrial '07-'08)	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(0.01)	-	-	-
103	Clover Bar POD Addition Contribution	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.23	0.11	-
104	Victoria Substation MV Breaker Purchase	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
105	East Industrial Contribution	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.34	-	-	-	-
106	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.34	(0.01)	0.23	0.11	1.09
	Adjustments																																															
107	Corporate Allocation for the OH 2002-2004	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	-	-	-	-
108	Capital Addition Adjustments	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#####	#####	0.00	-	-	-	-
	Grand Total																																															
109	**Grand Total**		-	-	-	0.00	0.00	0.00	0.00	0.00	0.01	(0.00)	0.06	0.12	0.09	0.14	0.24	0.36	0.42	0.45	0.37	0.26	0.24	0.28	0.38	0.40	0.46	0.42	0.51	0.55	0.73	0.61	0.43	0.62	0.77	0.88	0.83	1.44	1.71	1.66	1.27	1.81	2.05	2.78	2.66	3.83	3.71	6.32
110																																																
111																																																
112																																																
113																																																
114																																																
115																																																
116																																																

		AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF
		7	6	5	4	3	2	1	0			
		2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2018 Total RR Incurred Before Adjustment**	**2018 Additional Allocated RR Incurred**	**2018 RR Incurred Total**
60	**Customer Revenue Metering Subtotal**	**0.17**	**0.27**	**0.51**	**0.61**	**0.50**	**0.39**	**0.36**	**0.28**	**4.51**	**-**	**4.51**
	373 Street Lighting and Signal Systems											
61	Street Light Service Connections and Security Lighting Addition and Capital Replacement	0.06	0.07	0.07	0.05	0.07	0.06	0.06	0.04	0.77	-	0.77
	389 General Plant – Land											
62	Land Purchase for Slurry Placement	0.01	0.02	-	-	-	-	-	-	0.21	-	0.21
	390 General Plant - Structures & Improvements											
63	Furniture Life Cycle Replacements	0.02	0.06	0.02	0.03	0.03	0.03	0.03	0.02	0.26	-	0.26
64	North and South Service Center Building Life Cycle Replacements	0.14	0.05	0.03	0.04	0.01	0.01	0.02	0.01	1.22	-	1.22
65	Work Centre Redevelopment	-	0.03	0.00	0.01	-	3.24	1.74	-	5.04	-	5.04
66	**Life Cycle Total**	**0.17**	**0.11**	**0.05**	**0.07**	**0.04**	**0.05**	**0.05**	**0.03**	**1.48**	**-**	**1.48**
67	Service Center Consolidation Project	-	-	-	-	-	-	-	-	0.40	-	0.40
68	**Total**	**0.17**	**0.14**	**0.06**	**0.08**	**0.04**	**3.29**	**1.79**	**0.03**	**6.92**	**-**	**6.92**
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications											
69	Advanced Metering Infrastructure	-	-	-	-	-	4.03	3.32	-	7.34	-	7.34
	391.1 General Plant – Computer hardware & voice and data network equipment											
70	IT Hardware Lifecycle Replacements and Additions				0.04	0.09	0.27	0.12	0.07	0.59	-	0.59
	391.2 General Plant - Computer software and applications											
71	Business Systems Upgrades	0.02	0.05	0.08	0.02	0.02	0.04	0.26	0.05	0.61	-	0.61
72	Work Management System Upgrade	-	0.19	0.05	0.05	-	0.11	0.20	0.05	0.65	-	0.65
73	GIS - Performance Improvement Project	0.11	0.08	0.00	0.20	-	-	-	0.03	1.31	-	1.31
74	OMS/DMS Life Cycle Replacement	-	0.00	-	-	1.32	-	0.85	-	2.18	-	2.18
75	**Life Cycle Total**	**0.13**	**0.32**	**0.13**	**0.27**	**1.34**	**0.15**	**1.31**	**0.12**	**4.75**	**-**	**4.75**
76	Meter Reading Route Optimization	-	-	-	-	-	-	-	-	0.03	-	0.03
77	Automation of Off Cycle Meter Read Project	-	-	-	-	-	-	-	-	0.01	-	0.01
78	Inventory Bar Coding Application	-	-	-	-	-	-	-	-	(0.01)	-	(0.01)
79	AMI Software and Applications	-	-	-	-	-	-	-	-	-	-	-
80	Engineering and Design Software Modifications	-	0.04	0.05	0.00	-	-	0.05	0.01	0.15	-	0.15
81	Safety Software	0.01	#####	-	-	-	-	-	-	0.00	-	0.00
82	**Performance Improvement Total**	**0.01**	**0.04**	**0.05**	**0.00**	**-**	**-**	**0.05**	**0.01**	**0.20**	**-**	**0.20**
83	**Total**	**0.14**	**0.36**	**0.18**	**0.27**	**1.34**	**0.15**	**1.37**	**0.13**	**4.94**	**-**	**4.94**
	391.3 General Plant - Load settlement software and applications											
84	STARS Settlement System Modifications	0.02	0.01	0.05	0.01	-	-	-	0.01	0.14	-	0.14
85	IBPM (flow) Upgrade	-	-	-	-	-	-	-	-	0.02	-	0.02
86	Regulated Default Supply	-	-	-	-	-	-	-	-	0.06	-	0.06
87	Directive 52	-	-	-	-	-	-	-	-	0.02	-	0.02
88	Tariff Bill Code Data Retention	-	-	-	-	-	-	-	-	0.01	-	0.01
89	Micro Generation Records upgrade	-	-	-	-	-	-	-	-	0.01	-	0.01
90	Dropchute Replacement	-	0.02	-	-	-	-	-	-	0.02	-	0.02
91	Interval Meter Data Collection (MV-90 Upgrade)	-	-	-	0.36	-	-	-	-	0.35	-	0.35
92	STARS Upgrade	-	-	0.04	-	-	-	-	0.00	0.04	-	0.04
93	**Life Cycle Total**	**0.02**	**0.03**	**0.09**	**0.37**	**-**	**-**	**-**	**0.01**	**0.68**	**-**	**0.68**
	392 General Plant - Transportation, Fleet vehicles											
94	Vehicles - Growth and Life Cycle Replacements	0.05	0.11	0.05	0.08	0.12	0.26	0.24	0.10	1.06	-	1.06
	394 General Plant - Tools, shop, garage, stores and laboratory equipment											
95	Capital Tools and Instrument Purchases	0.10	0.14	0.13	0.13	0.13	0.18	0.09	0.08	1.18	-	1.18
96	Meter Reading Equipment	-	-	-	0.03	0.03	-	-	0.01	0.09	-	0.09
97	**Total**	**0.10**	**0.14**	**0.13**	**0.16**	**0.15**	**0.18**	**0.09**	**0.08**	**1.27**	**-**	**1.27**
	Distribution Assets - Contributed by Transmission											
98	Argyll to Bellamy Transmission Contingency	-	-	-	-	-	-	-	-	0.06	-	0.06
	Transmission Contribution for Distribution Assets											
99	Bellamy Contribution	-	-	-	-	-	-	-	-	(0.06)	-	(0.06)
	Distribution Contribution for Transmission Assets											
100	Garneau Expansion	-	-	-	-	-	-	4.11	-	4.11	-	4.11
101	Summerside Substation Contribution	(0.04)	-	-	-	-	-	-	-	1.05	-	1.05
102	Poundmaker Contributions (East Industrial '07-'08)	-	1.17	(0.18)	-	-	-	-	-	0.98	-	0.98
103	Clover Bar POD Addition Contribution	-	-	-	-	-	-	-	-	0.35	-	0.35
104	Victoria Substation MV Breaker Purchase	0.01	-	-	-	-	-	-	-	0.01	-	0.01
105	East Industrial Contribution	-	-	-	-	-	-	-	-	0.34	-	0.34
106	**Total**	**(0.03)**	**1.17**	**(0.18)**	**-**	**-**	**-**	**4.11**	**-**	**6.84**	**-**	**6.84**
	Adjustments											
107	Corporate Allocation for the OH 2002-2004	-	-	-	-	-	-	-	-	0.10	-	0.10
108	Capital Addition Adjustments	-	-	-	-	-	-	-	-	(0.01)	-	(0.01)
	Grand Total											
109	**Grand Total**	**7.17**	**9.51**	**6.61**	**8.81**	**12.24**	**16.79**	**20.38**	**4.47**	**125.87**	**-**	**125.87**
110												
111												
112										**2018 F**		
113												
114									Total 2018 RR for Capital	**125.87**		
115									Difference	-		
116		2018 WACC	6.50%							0.00%	DLM Difference	

Distribution Incurred RR vs PBR Recovered RR
2018 F Factor - Using 2013 - 2017 Average and Indexed Capital Adds to create 2018 Forecast
($ millions)

F Factor **1.84**

		A	B	C	D	E	F
Notes	**Project**	**2018 RR Incurred (per tab 2 2018 RR)**	**2018 PBR Recovered (Per tab 4)**	**2018 Variance Incurred Vs. Recovered**	**Adjustment^1**	**Capital Shortfall After Revenue Adjustments**	**Category**
				A - B		**C + D**	
	362 Station Equipment						
1	Distribution Substation Life Cycle Replacements	0.18	0.19	(0.01)		(0.01)	K Bar
2	**Total**	**0.18**	**0.19**	**(0.01)**		(0.01)	
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices						
3	Distribution Pole and Aerial Line Life Cycle Replacements	4.04	3.99	0.05		0.05	K Bar
4	Capitalized Aerial System Damage	1.53	1.50	0.03		0.03	K Bar
5	Remedial Pole Treatments	0.25	0.24	0.01		0.01	K Bar
6	Lightning Arrestor Replacement	0.12	0.13	(0.01)		(0.01)	K Bar
7	Installation of Insulators in 25 kV Supporting Guy Wires	0.01	0.01	(0.00)		(0.00)	K Bar
8	**Life Cycle Total**	**5.95**	**5.87**	**0.07**		0.07	
9	Distribution System Neutral Installations	0.03	0.04	(0.00)		(0.00)	K Bar
10	**Total**	**5.98**	**5.91**	**0.07**		0.07	
	367 Underground Conductors & Devices						
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	16.61	16.09	0.52		0.52	K Bar
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	1.98	1.94	0.04		0.04	K Bar
13	**Growth Total**	**18.59**	**18.03**	**0.56**		**0.56**	
14	Switching Cubicle Life Cycle Replacement	1.23	1.20	0.02		0.02	K Bar
15	Replacement of Faulted Distribution PILC Cables	1.16	1.12	0.04		0.04	K Bar
16	Life Cycle Replacement of PILC Cable	0.69	0.56	0.13		0.13	K Bar
17	Capitalized Underground System Damage	3.21	3.13	0.08		0.08	K Bar
18	Life Cycle Replacement of Oil Switches – Program	0.14	0.15	(0.01)		(0.01)	K Bar
19	Life Cycle Replacement and Extension of Underground Distribution Cable	8.09	7.75	0.34		0.34	K Bar
20	Neighbourhood Renewal Program	0.99	1.03	(0.04)		(0.04)	K Bar
21	Underground Asbestos Abatement	0.01	0.01	(0.00)		(0.00)	K Bar
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	0.05	0.05	(0.00)		(0.00)	K Bar
23	DAM - Distribution Manhole Rebuilds	0.10	0.09	0.01		0.01	K Bar
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	0.06	0.05	0.01		0.01	K Bar
25	**Life Cycle Total**	**15.74**	**15.15**	**0.59**		**0.59**	
26	**Total**	**34.33**	**33.19**	**1.15**		**1.15**	
	367 Underground Conductors & Devices - Underground Secondary Networks						
27	Network Reconfigurations	0.66	0.47	0.18		0.18	K Bar
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	0.94	0.90	0.04		0.04	K Bar
29	Upgrading Protection on the Downtown Vaults and Manholes	0.03	0.04	(0.00)		(0.00)	K Bar
30	Installation of Locking Mechanisms on Network Vault Lids	0.10	0.11	(0.01)		(0.01)	K Bar
31	**Life Cycle Total**	**1.07**	**1.05**	**0.03**		**0.03**	
32	Installation of Network Current Limiting Fuse Program	0.22	0.23	(0.02)		(0.02)	K Bar
33	**Total**	**1.95**	**1.75**	**0.20**		**0.20**	
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices						
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	7.56	7.49	0.06		0.06	K Bar
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	11.17	10.97	0.20		0.20	K Bar
36	Franchise Agreement Driven Relocations and Conversions	4.97	5.22	(0.25)		(0.25)	Tracker
37	New 15kV and 25kV Circuit Additions	4.72	4.17	0.54		0.54	K Bar
38	Queen Elizabeth II Highway & 41 Avenue SW Interchange Distribution System Relocations	0.20	0.22	(0.01)		(0.01)	Tracker
39	Walterdale Bridge	0.39	0.42	(0.03)		(0.03)	Tracker
40	W1 Circuit Extension	0.06	0.06	(0.00)		(0.00)	K Bar
41	13 E Diversion and Reconductoring	0.04	0.04	(0.00)		(0.00)	K Bar
42	Summerside Feeders	0.89	0.96	(0.07)		(0.07)	K Bar
43	Poundmaker Feeders	1.22	1.31	(0.09)		(0.09)	K Bar
44	NLRT Distribution System Relocations	2.20	2.38	(0.17)		(0.17)	Tracker
45	SE & W LRT Distribution System Relocation	4.08	4.02	0.06		0.06	Tracker
46	**Growth Total**	**37.49**	**37.26**	**0.23**		**0.23**	
47	Aerial and UG Ground Replacements	0.42	0.41	0.01		0.00	K Bar
48	Distribution System Aerial and Underground Fault Indicators and Fusing	0.80	0.78	0.02		0.02	K Bar
49	Installation of Automated Switches on Selected 25KV Circuits	1.27	1.30	(0.02)		(0.02)	K Bar
50	High Load Corridor	0.10	0.11	(0.01)		(0.01)	K Bar
51	**Performance Improvement Total**	**2.17**	**2.18**	**(0.01)**		**(0.01)**	
52	**Total**	**40.08**	**39.85**	**0.22**		**0.22**	
	368 Line Transformers						
53	Voltage Regulator Additions	0.12	0.13	(0.01)		(0.01)	K Bar
54	Network Transformer Lifecycle Replacement	1.64	1.54	0.10		0.10	K Bar
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	6.13	6.09	0.04		0.04	K Bar
56	PCB Transformer Changeouts	0.23	0.22	0.01		0.01	K Bar
57	**Total**	**8.11**	**7.97**	**0.14**		**0.14**	
	370 Conventional Meters & 371 Automated Meters						
58	Customer Revenue Metering - Growth & Life Cycle Replacements	4.51	4.52	(0.02)		(0.02)	
58a	Meter Depreciation	-	-	-		-	
58b	**Customer Revenue Metering Subtotal**	**4.51**	**4.52**	**(0.02)**		**(0.02)**	K Bar

			A	B	C	D	E	F
	Notes	**Project**	**2018 RR Incurred (per tab 2 2018 RR)**	**2018 PBR Recovered (Per tab 4)**	**2018 Variance Incurred Vs. Recovered**	**Adjustment^1**	**Capital Shortfall After Revenue Adjustments**	**Category**
		373 Street Lighting and Signal Systems						
59		Street Light Service Connections and Security Lighting Addition and Capital Replacement	0.77	0.77	(0.00)		(0.00)	K Bar
		389 General Plant – Land						
60		Land Purchase for Slurry Placement	0.21	0.23	(0.02)		(0.02)	K Bar
		390 General Plant - Structures & Improvements						
61		Furniture Life Cycle Replacements	0.26	0.27	(0.01)		(0.01)	K Bar
62		North and South Service Center Building Life Cycle Replacements	1.22	1.30	(0.07)		(0.07)	K Bar
63		Work Centre Redevelopment	5.04	4.47	0.58		0.58	Tracker
64		**Life Cycle Total**	**1.48**	**1.57**	**(0.08)**		**(0.08)**	
65		Service Center Consolidation Project	0.40	0.43	(0.03)		(0.03)	K Bar
66		**Total**	**6.92**	**6.46**	**0.46**		**0.46**	
		Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications						
67		Advanced Metering Infrastructure	7.34	6.17	1.17		1.17	Tracker
		391.1 General Plant – Computer hardware & voice and data network equipment						
68		IT Hardware Lifecycle Replacements and Additions	0.59	0.59	0.00		0.00	K Bar
		391.2 General Plant - Computer software and applications						
69		Business Systems Upgrades	0.61	0.50	0.11		0.11	K Bar
70		Work Management System Upgrade	0.65	0.55	0.10		0.10	K Bar
71		GIS - Performance Improvement Project	1.31	1.43	(0.12)		(0.12)	K Bar
72		OMS/DMS Life Cycle Replacement	2.18	1.91	0.26		0.26	Tracker
73		**Life Cycle Total**	**4.75**	**4.39**	**0.35**		**0.35**	
74		Meter Reading Route Optimization	0.03	0.08	(0.05)		(0.05)	K Bar
75		Automation of Off Cycle Meter Read Project	0.01	0.02	(0.01)		(0.01)	K Bar
76		Inventory Bar Coding Application	(0.01)	0.01	(0.01)		(0.01)	K Bar
77		AMI Software and Applications	-	-	-		-	K Bar
78		Engineering and Design Software Modifications	0.15	0.13	0.03		0.03	K Bar
79		Safety Software	0.00	0.01	(0.00)		(0.00)	K Bar
80		**Performance Improvement Total**	**0.20**	**0.25**	**(0.05)**		**(0.05)**	
81		**Total**	**4.94**	**4.64**	**0.30**		**0.30**	
		391.3 General Plant - Load settlement software and applications						
82		STARS Settlement System Modifications	0.14	0.15	(0.01)		(0.01)	K Bar
83		IBPM (flow) Upgrade	0.02	0.04	(0.02)		(0.02)	K Bar
84		Regulated Default Supply	0.06	0.13	(0.07)		(0.07)	K Bar
85		Directive 52	0.02	0.05	(0.03)		(0.03)	K Bar
86		Tariff Bill Code Data Retention	0.01	0.02	(0.01)		(0.01)	K Bar
87		Micro Generation Records upgrade	0.01	0.01	(0.01)		(0.01)	K Bar
88		Dropchute Replacement	0.02	0.02	(0.00)		(0.00)	K Bar
89		Interval Meter Data Collection and Processing (MV-90 Upgrade)	0.35	0.40	(0.05)		(0.05)	Tracker
90		STARS Upgrade	0.04	0.04	0.00		0.00	K Bar
91		**Life Cycle Total**	**0.68**	**0.87**	**(0.20)**		**(0.20)**	
		392 General Plant - Transportation, Fleet vehicles						
92		Vehicles - Growth and Life Cycle Replacements	1.06	1.04	0.02		0.02	K Bar
		394 General Plant - Tools, shop, garage, stores and laboratory equipment						
93		Capital Tools and Instrument Purchases	1.18	1.24	(0.06)		(0.06)	K Bar
94		Meter Reading Equipment	0.09	0.12	(0.03)		(0.03)	K Bar
95		**Total**	**1.27**	**1.36**	**(0.09)**		**(0.09)**	
		Distribution Assets - Contributed by Transmission						
96		Argyll to Bellamy Transmission Contingency	0.06	0.06	(0.00)		(0.00)	K Bar
		Transmission Contribution for Distribution Assets						
97		Bellamy Contribution	(0.06)	(0.06)	0.00		0.00	K Bar
		Distribution Contribution for Transmission Assets						
98		Garneau Expansion	4.11	2.18	1.93		1.93	Tracker
99		Summerside Substation Contribution	1.05	1.14	(0.08)		(0.08)	Tracker
100		Poundmaker Contributions (East Industrial '07-'08)	0.98	1.05	(0.08)		(0.08)	Tracker
101		Clover Bar POD Addition Contribution	0.35	0.38	(0.03)		(0.03)	Tracker
102		Victoria Substation MV Breaker Purchase	0.01	0.01	(0.00)		(0.00)	Tracker
103		East Industrial Contribution	0.34	0.37	(0.03)		(0.03)	Tracker
104		**Total**	**6.84**	**5.13**	**1.71**		**1.71**	
		Adjustments						
105		Corporate Allocation for the OH 2002-2004	0.10	0.10	(0.01)		(0.01)	K Bar
106		Capital Addition Adjustments	(0.01)	(0.01)	0.00		0.00	K Bar
107		**Grand Total All Projects**	**125.87**	**120.75**	**5.11**		**5.11**	
108		**Grand Total of K Bar (F Factor) Projects Only**	**92.26**	**90.42**	**1.84**	-	**1.84**	K Bar Total

Notes

[1] Adjustments are used in cases such as Asset Usage Fees where EDTI Distribution has received funding from other sources on behalf of capital assets, but the funds received do not draw down the capital additions. In order to avoid double recovery where this is the case, the Revenue Requirement is reduced in this column. This adjustment is only required for new projects where the asset usage fee would not have been included in Going-In Rates.

[2] Capital Tracker Projects do not Qualify for F Factor Status.

Distribution 2018 Revenue Requirement Recovered | **2017 Model Year**
2018 F Factor - Using 2013 - 2017 Average and Indexed Capital Adds to create 2018 Forecast
($ millions)

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	O	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
		Asset Age in 2017	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19
		Indicative Service Life	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
	362 Station Equipment																																			
1	Distribution Substation Life Cycle Replacements	48					0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	**Total**		-	-	-	-	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**(0.00)**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices																																			
3	Distribution Pole and Aerial Line Life Cycle Replacements	45								0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.03	0.02	0.03	0.04	0.05
4	Capitalized Aerial System Damage	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
5	Remedial Pole Treatments	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Lightning Arrestor Replacement	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Installation of Insulators in 25 kV Supporting Guy Wires	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	**Life Cycle Total**		-	-	-	-	-	-	-	**0.00**	**0.01**	**(0.00)**	**0.01**	**0.02**	**0.01**	**0.02**	**0.02**	**0.03**	**0.04**	**0.04**	**0.03**	**0.02**	**0.02**	**0.02**	**0.03**	**0.03**	**0.04**	**0.03**	**0.04**	**0.04**	**0.06**	**0.05**	**0.03**	**0.05**	**0.06**	**0.07**
9	Distribution System Neutral Installations	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	**Total**		-	-	-	-	-	-	-	**0.00**	**0.01**	**(0.00)**	**0.01**	**0.02**	**0.01**	**0.02**	**0.02**	**0.03**	**0.04**	**0.04**	**0.03**	**0.02**	**0.02**	**0.02**	**0.03**	**0.03**	**0.04**	**0.03**	**0.04**	**0.04**	**0.06**	**0.05**	**0.03**	**0.05**	**0.06**	**0.07**
	367 Underground Conductors & Devices																																			
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	40													0.01	0.03	0.04	0.06	0.07	0.08	0.06	0.04	0.04	0.05	0.06	0.06	0.07	0.07	0.08	0.09	0.12	0.10	0.07	0.10	0.12	0.14
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	40													0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02
13	**Growth Total**		-	-	-	-	-	-	-	-	-	-	-	-	**0.01**	**0.03**	**0.05**	**0.07**	**0.08**	**0.09**	**0.07**	**0.05**	**0.04**	**0.05**	**0.07**	**0.07**	**0.08**	**0.08**	**0.09**	**0.10**	**0.13**	**0.11**	**0.08**	**0.11**	**0.14**	**0.16**
14	Switching Cubicle Life Cycle Replacement	40													0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
15	Replacement of Faulted Distribution PILC Cables	40													0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01
16	Life Cycle Replacement of PILC Cable	40													-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	Capitalized Underground System Damage	40													0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.03	0.03
18	Life Cycle Replacement of Oil Switches – Program	40													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Life Cycle Replacement and Extension of Underground Distribution Cable	40													0.01	0.01	0.02	0.03	0.03	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.03	0.05	0.06	0.07
20	Neighbourhood Renewal Program	40													0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
21	Underground Asbestos Abatement	40													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	40													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	DAM - Distribution Manhole Rebuilds	40													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	40													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	**Life Cycle Total**		-	-	-	-	-	-	-	-	-	-	-	-	**0.01**	**0.03**	**0.04**	**0.06**	**0.07**	**0.07**	**0.06**	**0.04**	**0.04**	**0.04**	**0.06**	**0.06**	**0.07**	**0.06**	**0.08**	**0.08**	**0.11**	**0.09**	**0.07**	**0.09**	**0.12**	**0.13**
26	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	**0.02**	**0.06**	**0.09**	**0.13**	**0.15**	**0.16**	**0.13**	**0.09**	**0.08**	**0.10**	**0.13**	**0.13**	**0.15**	**0.14**	**0.17**	**0.18**	**0.24**	**0.20**	**0.14**	**0.21**	**0.26**	**0.30**
	367 Underground Conductors & Devices - Underground Secondary Networks																																			
27	Network Reconfigurations	35																		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	50			0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01
29	Upgrading Protection on the Downtown Vaults and Manholes	42											0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	Installation of Locking Mechanisms on Network Vault Lids	42											0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	**Life Cycle Total**		-	-	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**(0.00)**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
32	Installation of Network Current Limiting Fuse Program	35																		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	**Total**		-	-	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**(0.00)**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices																																			
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	43										(0.00)	0.01	0.02	0.01	0.02	0.03	0.04	0.04	0.05	0.04	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.07	0.05	0.04	0.06	0.07	0.08
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	43										(0.00)	0.02	0.03	0.02	0.03	0.04	0.06	0.06	0.07	0.05	0.03	0.03	0.04	0.05	0.05	0.06	0.06	0.07	0.07	0.10	0.08	0.06	0.08	0.10	0.12
36	Franchise Agreement Driven Relocations and Conversions	43										(0.00)	0.01	0.02	0.01	0.01	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.04	0.04	0.06	0.05	0.03	0.05	0.06	0.07
37	New 15kV and 25kV Circuit Additions	43										(0.00)	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.03	0.03
38	QE II Highway & 41 Ave SW	43										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	Walterdale Bridge	43										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	W1 Circuit Extension	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	13 E Diversion and Reconductoring	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42	Summerside Feeders	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
43	Poundmaker Feeders	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
44	NLRT Distribution System Relocations	45								0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.03	0.04
45	SE & W LRT Distribution System Relocation	44									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	**Growth Total**		-	-	-	-	-	-	-	**0.00**	**0.01**	**(0.00)**	**0.06**	**0.09**	**0.06**	**0.08**	**0.12**	**0.18**	**0.20**	**0.21**	**0.17**	**0.11**	**0.10**	**0.12**	**0.16**	**0.17**	**0.20**	**0.18**	**0.22**	**0.23**	**0.31**	**0.26**	**0.18**	**0.26**	**0.32**	**0.37**
47	Aerial and UG Ground Replacements	43										(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48	Distribution System Aerial and Underground Fault Indicators and Fusing	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
49	Installation of Automated Switches on Selected 25KV Circuits	44									0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02
50	High Load Corridor	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	**Performance Improvement Total**		-	-	-	-	-	-	-	**0.00**	**0.00**	**(0.00)**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**	**0.02**	**0.02**	**0.02**	**0.02**	**0.01**	**0.02**	**0.02**	**0.03**
52	**Total**		-	-	-	-	-	-	-	**0.00**	**0.01**	**(0.00)**	**0.07**	**0.09**	**0.07**	**0.09**	**0.13**	**0.19**	**0.22**	**0.23**	**0.19**	**0.12**	**0.11**	**0.13**	**0.18**	**0.19**	**0.21**	**0.20**	**0.24**	**0.25**	**0.33**	**0.28**	**0.20**	**0.28**	**0.35**	**0.40**
	368 Line Transformers																																			
53	Voltage Regulator Additions	35																		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
54	Network Transformer Lifecycle Replacement	35																		0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	35																		0.02	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.03	0.05	0.06	0.07
56	PCB Transformer Changeouts	35																		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
57	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.02**	**0.03**	**0.02**	**0.02**	**0.03**	**0.03**	**0.04**	**0.04**	**0.04**	**0.05**	**0.05**	**0.07**	**0.06**	**0.04**	**0.06**	**0.07**	**0.09**
	370 Conventional Meters & 371 Automated Meters																																			
58	Customer Revenue Metering - Growth & Life Cycle Replacements	15																																		
59	Meter Depreciation	3																																		
60	**Customer Revenue Metering Subtotal**																																			
	373 Street Lighting and Signal Systems																																			
61	Street Light Service Connections and Security Lighting Addition and Capital Replacement	20																																	0.00	0.01
	389 General Plant – Land																																			
62	Land Purchase for Slurry Placement	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	390 General Plant - Structures & Improvements																																			
63	Furniture Life Cycle Replacements	8																																		

Distribution 2018 Revenue Requirement Recovered
2018 F Factor - Using 2013 - 2017 Average and Indexed Capit
($ millions)

		AJ	AK	AL	AM	AN	AO	AP	AO	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF
		18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0				
		1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2017 Total RR Incurred Before Adjustment**	**2017 Additional Allocated RR Incurred**	**2017 RR Incurred Total**	**2018 PBR Recovered (col. BE x (I-X) x Q)**
	362 Station Equipment																							
1	Distribution Substation Life Cycle Replacements	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.04	0.01	0.00	0.01	0.00	0.02	0.01	0.00	0.02	0.00	0.00	0.00	0.18	-	0.18	0.19
2	**Total**	**0.00**	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.01**	**0.04**	**0.01**	**0.00**	**0.01**	**0.00**	**0.02**	**0.01**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.18**	**-**	**0.18**	**0.19**
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices																							
3	Distribution Pole and Aerial Line Life Cycle Replacements	0.04	0.08	0.09	0.09	0.07	0.10	0.05	0.21	0.12	0.10	0.15	0.27	0.26	0.21	0.12	0.31	0.44	0.31	0.18	3.79	-	3.79	3.99
4	Capitalized Aerial System Damage	0.02	0.03	0.03	0.03	0.02	-	0.01	0.04	0.05	0.08	0.08	0.09	0.11	0.11	0.11	0.12	0.12	0.13	0.07	1.43	-	1.43	1.50
5	Remedial Pole Treatments	0.00	0.00	0.01	0.00	0.00	0.01	0.01	-	-	-	-	0.02	0.02	0.02	0.02	0.01	0.03	0.02	0.01	0.23	-	0.23	0.24
6	Lightning Arrestor Replacement	0.00	0.00	0.00	0.00	0.00	0.05	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	0.12	-	0.12	0.13
7	Installation of Insulators in 25 kV Supporting Guy Wires	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	0.01	-	0.01	0.01
8	**Life Cycle Total**	**0.06**	**0.11**	**0.13**	**0.13**	**0.09**	**0.17**	**0.10**	**0.26**	**0.18**	**0.18**	**0.23**	**0.38**	**0.39**	**0.34**	**0.24**	**0.44**	**0.58**	**0.46**	**0.25**	**5.57**	**-**	**5.57**	**5.87**
9	Distribution System Neutral Installations	0.00	0.00	0.00	0.00	0.00	-	-	-	0.00	0.01	-	-	0.01	0.01	-	-	-	-	-	0.04	-	0.04	0.04
10	**Total**	**0.07**	**0.11**	**0.13**	**0.13**	**0.10**	**0.17**	**0.10**	**0.26**	**0.18**	**0.19**	**0.23**	**0.38**	**0.40**	**0.35**	**0.24**	**0.44**	**0.58**	**0.46**	**0.25**	**5.61**	**-**	**5.61**	**5.91**
	367 Underground Conductors & Devices																							
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	0.13	0.23	0.27	0.27	0.20	0.52	0.58	0.43	0.50	0.52	0.30	0.50	0.71	1.35	1.63	1.53	1.57	1.64	0.83	15.27	-	15.27	16.09
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	0.02	0.03	0.04	0.04	0.03	0.01	(0.02)	0.03	0.12	0.12	0.13	0.12	0.09	0.22	0.12	0.13	0.12	0.19	0.10	1.84	-	1.84	1.94
13	**Growth Total**	**0.15**	**0.26**	**0.31**	**0.30**	**0.23**	**0.52**	**0.55**	**0.46**	**0.62**	**0.65**	**0.43**	**0.61**	**0.80**	**1.57**	**1.75**	**1.66**	**1.69**	**1.83**	**0.93**	**17.12**	**-**	**17.12**	**18.03**
14	Switching Cubicle Life Cycle Replacement	0.01	0.02	0.03	0.03	0.02	-	0.03	0.04	0.03	0.06	0.08	0.07	0.11	0.08	0.04	0.06	0.08	0.14	0.07	1.14	-	1.14	1.20
15	Replacement of Faulted Distribution PILC Cables	0.01	0.02	0.02	0.02	0.01	0.03	0.03	0.03	0.01	0.02	0.04	0.02	0.10	0.06	0.07	0.18	0.09	0.12	0.06	1.06	-	1.06	1.12
16	Life Cycle Replacement of PILC Cable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09	0.15	0.20	0.10	0.54	-	0.54	0.56
17	Capitalized Underground System Damage	0.03	0.05	0.06	0.05	0.04	-	0.02	0.05	0.04	0.11	0.15	0.19	0.31	0.29	0.26	0.23	0.32	0.30	0.16	2.97	-	2.97	3.13
18	Life Cycle Replacement of Oil Switches – Program	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	0.05	-	0.04	-	0.02	-	-	-	0.14	-	0.14	0.15
19	Life Cycle Replacement and Extension of Underground Distribution Cable	0.06	0.11	0.13	0.12	0.09	0.01	-	0.05	0.03	0.25	0.20	0.32	0.68	0.83	0.27	0.88	1.26	0.87	0.45	7.36	-	7.36	7.75
20	Neighbourhood Renewal Program	0.01	0.02	0.02	0.02	0.01	-	-	-	-	-	-	0.09	0.21	0.14	0.10	0.05	0.20	-	-	0.98	-	0.98	1.03
21	Underground Asbestos Abatement	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	0.01	-	0.01	0.01
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	0.03	0.00	-	-	-	-	0.05	-	0.05	0.05
23	DAM - Distribution Manhole Rebuilds	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	0.02	0.01	0.00	0.03	0.01	0.01	0.09	-	0.09	0.09
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	0.05	-	0.05	0.05
25	**Life Cycle Total**	**0.13**	**0.22**	**0.26**	**0.25**	**0.19**	**0.04**	**0.08**	**0.16**	**0.10**	**0.45**	**0.47**	**0.75**	**1.42**	**1.48**	**0.77**	**1.51**	**2.13**	**1.65**	**0.85**	**14.38**	**-**	**14.38**	**15.15**
26	**Total**	**0.28**	**0.48**	**0.57**	**0.55**	**0.41**	**0.56**	**0.63**	**0.62**	**0.73**	**1.09**	**0.90**	**1.36**	**2.21**	**3.05**	**2.51**	**3.17**	**3.82**	**3.48**	**1.78**	**31.50**	**-**	**31.50**	**33.19**
	367 Underground Conductors & Devices - Underground Secondary Networks																							
27	Network Reconfigurations	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	-	-	-	-	0.00	-	-	0.06	0.15	0.16	0.45	-	0.45	0.47
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	0.01	0.01	0.02	0.02	0.01	0.07	0.06	0.02	0.00	-	-	0.02	0.03	0.06	0.04	0.09	0.10	0.10	0.05	0.86	-	0.86	0.90
29	Upgrading Protection on the Downtown Vaults and Manholes	0.00	0.00	0.00	0.00	0.00	-	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	0.03	-	0.03	0.04
30	Installation of Locking Mechanisms on Network Vault Lids	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	0.01	0.08	0.00	-	-	-	-	0.10	-	0.10	0.11
31	**Life Cycle Total**	**0.01**	**0.02**	**0.02**	**0.02**	**0.01**	**0.07**	**0.07**	**0.03**	**0.00**	**-**	**-**	**0.02**	**0.04**	**0.14**	**0.05**	**0.09**	**0.10**	**0.10**	**0.05**	**0.99**	**-**	**0.99**	**1.05**
32	Installation of Network Current Limiting Fuse Program	0.00	0.01	0.01	0.01	0.01	-	-	-	0.01	0.00	-	0.05	0.03	0.03	0.03	-	-	-	-	0.22	-	0.22	0.23
33	**Total**	**0.02**	**0.03**	**0.03**	**0.03**	**0.02**	**0.08**	**0.09**	**0.05**	**0.02**	**0.00**	**-**	**0.07**	**0.08**	**0.18**	**0.07**	**0.09**	**0.16**	**0.25**	**0.22**	**1.67**	**-**	**1.67**	**1.75**
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices																							
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	0.07	0.13	0.15	0.15	0.11	0.18	0.08	0.22	0.33	0.16	0.43	0.32	0.45	0.62	0.55	0.54	0.71	0.71	0.27	7.11	-	7.11	7.49
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	0.11	0.19	0.22	0.21	0.16	0.28	0.21	0.31	0.47	0.44	0.63	0.49	0.54	0.80	0.82	0.89	0.81	0.97	0.50	10.41	-	10.41	10.97
36	Franchise Agreement Driven Relocations and Conversions	0.06	0.11	0.13	0.12	0.09	0.18	0.13	0.19	0.25	0.32	0.24	0.16	0.50	0.43	0.27	0.26	0.32	0.27	0.13	4.95	-	4.95	5.22
37	New 15kV and 25kV Circuit Additions	0.03	0.05	0.06	0.06	0.04	0.01	0.02	0.07	0.00	0.31	0.11	0.02	0.35	0.22	0.13	0.38	0.72	0.47	0.54	3.96	-	3.96	4.17
38	QE II Highway & 41 Ave SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.21	-	-	-	-	0.21	-	0.21	0.22
39	Walterdale Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.36	-	-	0.40	-	0.40	0.42
40	W1 Circuit Extension	0.00	0.00	0.00	0.00	0.00	-	-	0.04	0.00	-	-	-	-	-	-	-	-	-	-	0.06	-	0.06	0.06
41	13 E Diversion and Reconductoring	0.00	0.00	0.00	0.00	0.00	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	0.04	0.04
42	Summerside Feeders	0.02	0.03	0.03	0.03	0.02	-	-	-	-	-	-	0.56	0.01	0.00	-	-	-	-	-	0.91	-	0.91	0.96
43	Poundmaker Feeders	0.02	0.03	0.03	0.03	0.02	-	-	-	-	-	-	-	0.01	0.89	0.02	-	-	-	-	1.24	-	1.24	1.31
44	NLRT Distribution System Relocations	0.04	0.06	0.08	0.07	0.05	-	-	-	-	-	-	-	1.37	0.10	-	-	-	-	-	2.26	-	2.26	2.38
45	SE & W LRT Distribution System Relocation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.43	0.72	1.53	0.80	0.33	3.81	-	3.81	4.02
46	**Growth Total**	**0.34**	**0.59**	**0.70**	**0.68**	**0.51**	**0.65**	**0.47**	**0.83**	**1.06**	**1.22**	**1.41**	**1.55**	**3.22**	**3.06**	**2.42**	**2.84**	**4.45**	**3.22**	**1.77**	**35.36**	**-**	**35.36**	**37.26**
47	Aerial and UG Ground Replacements	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.02	0.03	0.02	0.04	0.04	0.04	0.02	0.39	-	0.39	0.41
48	Distribution System Aerial and Underground Fault Indicators and Fusing	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.03	0.01	0.00	0.03	0.04	0.03	0.04	0.03	0.12	0.11	0.05	0.03	0.74	-	0.74	0.78
49	Installation of Automated Switches on Selected 25KV Circuits	0.02	0.03	0.03	0.03	0.02	-	-	0.00	0.00	0.12	0.16	0.06	0.18	0.12	0.03	0.02	0.08	0.06	0.04	1.23	-	1.23	1.30
50	High Load Corridor	0.00	0.00	0.00	0.00	0.00	-	-	0.02	0.05	-	-	-	-	-	-	-	-	-	-	0.10	-	0.10	0.11
51	**Performance Improvement Total**	**0.03**	**0.05**	**0.05**	**0.05**	**0.04**	**0.02**	**0.02**	**0.05**	**0.06**	**0.12**	**0.19**	**0.10**	**0.21**	**0.16**	**0.06**	**0.14**	**0.19**	**0.11**	**0.07**	**2.07**	**-**	**2.07**	**2.18**
52	**Total**	**0.37**	**0.65**	**0.77**	**0.74**	**0.55**	**0.68**	**0.50**	**0.89**	**1.14**	**1.36**	**1.62**	**1.67**	**3.46**	**3.25**	**2.50**	**3.02**	**4.68**	**3.37**	**1.86**	**37.83**	**-**	**37.83**	**39.85**
	368 Line Transformers																							
53	Voltage Regulator Additions	0.00	0.00	0.00	0.00	0.00	-	-	-	0.03	0.01	-	-	0.02	0.00	0.00	-	-	0.02	-	0.12	-	0.12	0.13
54	Network Transformer Lifecycle Replacement	0.01	0.02	0.03	0.03	0.02	0.12	0.01	0.06	0.03	0.04	0.05	0.05	0.05	0.04	0.05	0.08	0.36	0.20	0.12	1.46	-	1.46	1.54
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	0.06	0.11	0.13	0.13	0.10	0.02	0.14	0.18	0.27	0.35	0.41	0.34	0.34	0.45	0.45	0.46	0.47	0.50	0.26	5.78	-	5.78	6.09
56	PCB Transformer Changeouts	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	0.01	0.04	0.03	0.00	0.01	0.04	0.02	0.01	0.21	-	0.21	0.22
57	**Total**	**0.08**	**0.14**	**0.17**	**0.16**	**0.12**	**0.14**	**0.15**	**0.24**	**0.33**	**0.40**	**0.46**	**0.40**	**0.45**	**0.52**	**0.50**	**0.56**	**0.86**	**0.74**	**0.39**	**7.57**	**-**	**7.57**	**7.97**
	370 Conventional Meters & 371 Automated Meters																							
58	Customer Revenue Metering - Growth & Life Cycle Replacements				0.04	0.07	0.16	0.18	0.18	0.26	0.28	0.21	0.17	0.18	0.28	0.53	0.63	0.52	0.41	0.18	4.29	-	4.29	4.52
59	Meter Depreciation																				-	-	-	-
60	**Customer Revenue Metering Subtotal**				**0.04**	**0.07**	**0.16**	**0.18**	**0.18**	**0.26**	**0.28**	**0.21**	**0.17**	**0.18**	**0.28**	**0.53**	**0.63**	**0.52**	**0.41**	**0.18**	**4.29**	**-**	**4.29**	**4.52**
	373 Street Lighting and Signal Systems																							
61	Street Light Service Connections and Security Lighting Addition and Capital Replacement	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.06	0.06	0.06	0.07	0.07	0.05	0.08	0.06	0.03	0.74	-	0.74	0.77
	389 General Plant – Land																							
62	Land Purchase for Slurry Placement	0.00	0.01	0.01	0.01	0.01	-	0.06	0.03	(0.00)	-	0.00	0.02	0.01	0.02	-	-	-	-	-	0.22	-	0.22	0.23
	390 General Plant - Structures & Improvements																							
63	Furniture Life Cycle Replacements											0.01	0.02	0.02	0.06	0.02	0.03	0.03	0.03	0.02	0.26	-	0.26	0.27

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
		Asset Age in 2017	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19
		Indicative Service Life	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
64	North and South Service Center Building Life Cycle Replacements	45								0.00	0.00	(0.00)	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.02
65	Work Centre Redevelopment	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
66	**Life Cycle Total**		-	-	-	-	-	-	-	**0.00**	**0.00**	**(0.00)**	**0.00**	**0.01**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**
67	Service Center Consolidation Project	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
68	**Total**		-	-	-	-	-	-	-	**0.00**	**0.00**	**(0.00)**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.02**	**0.03**	**0.02**	**0.01**	**0.02**	**0.03**	**0.03**
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications																																			
69	Advanced Metering Infrastructure	15																																		
	391.1 General Plant – Computer hardware & voice and data network equipment																																			
70	IT Hardware Lifecycle Replacements and Additions	4																																		
	391.2 General Plant - Computer software and applications																																			
71	Business Systems Upgrades	10																																		
72	Work Management System Upgrade	10																																		
73	GIS - Performance Improvement Project	10																																		
74	OMS/DMS Life Cycle Replacement	10																																		
75	**Life Cycle Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
76	Meter Reading Route Optimization	10																																		
77	Automation of Off Cycle Meter Read Project	10																																		
78	Inventory Bar Coding Application	10																																		
79	AMI Software and Applications	10																																		
80	Engineering and Design Software Modifications	10																																		
81	Safety Software	10																																		
82	**Performance Improvement Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	391.3 General Plant - Load settlement software and applications																																			
84	STARS Settlement System Modifications	10																																		
85	IBPM (flow) Upgrade	10																																		
86	Regulated Default Supply	10																																		
87	Directive 52	10																																		
88	Tariff Bill Code Data Retention	10																																		
89	Micro Generation Records upgrade	10																																		
90	Dropchute Replacement	10																																		
91	Interval Meter Data Collection (MV-90 Upgrade)	10																																		
92	STARS Upgrade	10																																		
93	**Life Cycle Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	392 General Plant - Transportation, Fleet vehicles																																			
94	Vehicles - Growth and Life Cycle Replacements	11																																		
	394 General Plant - Tools, shop, garage, stores and laboratory equipment																																			
95	Capital Tools and Instrument Purchases	10																																		
96	Meter Reading Equipment	10																																		
97	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Distribution Assets - Contributed by Transmission																																			
98	Argyll to Bellamy Transmission Contingency	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Transmission Contribution for Distribution Assets																																			
99	Bellamy Contribution	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Distribution Contribution for Transmission Assets																																			
100	Garneau Expansion	45								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
101	Summerside Substation Contribution	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
102	Poundmaker Contributions (East Industrial '07-'08)	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
103	Clover Bar POD Addition Contribution	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
104	Victoria Substation MV Breaker Purchase	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
105	East Industrial Contribution	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
106	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Adjustments																																			
107	Corporate Allocation for the OH 2002-2004	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
108	Capital Addition Adjustments	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Grand Total																																			
109	**Grand Total**		-	-	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.02**	**(0.00)**	**0.09**	**0.12**	**0.11**	**0.18**	**0.25**	**0.38**	**0.44**	**0.49**	**0.41**	**0.27**	**0.25**	**0.30**	**0.39**	**0.41**	**0.48**	**0.44**	**0.53**	**0.57**	**0.75**	**0.62**	**0.44**	**0.64**	**0.79**	**0.91**
110																																				
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117	**Grand Total**																																			

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		AJ	AK	AL	AM	AN	AO	AP	AO	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF
		18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0				
		1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2017 Total RR Incurred Before Adjustment**	**2017 Additional Allocated RR Incurred**	**2017 RR Incurred Total**	**2018 PBR Recovered (col. BE x (I-X) x Q)**
64	North and South Service Center Building Life Cycle Replacements	0.02	0.03	0.04	0.04	0.03	0.05	0.07	0.11	0.05	0.08	0.07	0.06	0.15	0.05	0.03	0.04	0.01	0.01	0.01	1.23	-	1.23	1.30
65	Work Centre Redevelopment	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	0.03	0.00	0.01	-	3.29	0.88	4.24	-	4.24	4.47
66	**Life Cycle Total**	**0.02**	**0.03**	**0.04**	**0.04**	**0.03**	**0.05**	**0.07**	**0.11**	**0.05**	**0.08**	**0.08**	**0.09**	**0.17**	**0.12**	**0.05**	**0.07**	**0.05**	**0.05**	**0.03**	**1.49**	**-**	**1.49**	**1.57**
67	Service Center Consolidation Project	0.01	0.01	0.02	0.01	0.01	-	0.19	0.06	-	-	-	-	-	-	-	-	-	-	-	0.41	-	0.41	0.43
68	**Total**	**0.03**	**0.05**	**0.06**	**0.06**	**0.04**	**0.05**	**0.26**	**0.17**	**0.05**	**0.08**	**0.08**	**0.09**	**0.17**	**0.14**	**0.06**	**0.08**	**0.05**	**3.34**	**0.90**	**6.13**	**-**	**6.13**	**6.46**
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications																							
69	Advanced Metering Infrastructure				-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.17	1.69	5.85	-	5.85	6.17
	391.1 General Plant – Computer hardware & voice and data network equipment																							
70	IT Hardware Lifecycle Replacements and Additions															0.04	0.08	0.09	0.29	0.06	0.56	-	0.56	0.59
	391.2 General Plant - Computer software and applications																							
71	Business Systems Upgrades									0.01	0.03	0.07	0.00	0.02	0.05	0.08	0.02	0.02	0.04	0.13	0.47	-	0.47	0.50
72	Work Management System Upgrade									-	-	-	-	-	0.20	0.06	0.05	-	0.12	0.10	0.53	-	0.53	0.55
73	GIS - Performance Improvement Project									-	-	-	0.95	0.11	0.08	0.00	0.21	-	-	-	1.36	-	1.36	1.43
74	OMS/DMS Life Cycle Replacement									-	-	-	-	-	0.00	-	-	1.38	-	0.44	1.82	-	1.82	1.91
75	**Life Cycle Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.01**	**0.03**	**0.07**	**0.95**	**0.14**	**0.33**	**0.14**	**0.28**	**1.40**	**0.15**	**0.67**	**4.17**	**-**	**4.17**	**4.39**
76	Meter Reading Route Optimization									0.01	0.07	-	-	-	-	-	-	-	-	-	0.08	-	0.08	0.08
77	Automation of Off Cycle Meter Read Project									-	0.02	-	-	-	-	-	-	-	-	-	0.02	-	0.02	0.02
78	Inventory Bar Coding Application									0.01	-	(0.01)	-	-	-	-	-	-	-	-	0.01	-	0.01	0.01
79	AMI Software and Applications									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80	Engineering and Design Software Modifications									0.00	-	-	-	-	0.04	0.05	0.00	-	-	0.03	0.12	-	0.12	0.13
81	Safety Software									-	-	-	-	0.01	(0.00)	-	-	-	-	-	0.01	-	0.01	0.01
82	**Performance Improvement Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.03**	**0.09**	**(0.01)**	**-**	**0.01**	**0.04**	**0.05**	**0.00**	**-**	**-**	**0.03**	**0.24**	**-**	**0.24**	**0.25**
83	**Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.03**	**0.12**	**0.06**	**0.95**	**0.14**	**0.37**	**0.19**	**0.29**	**1.40**	**0.15**	**0.70**	**4.41**	**-**	**4.41**	**4.64**
	391.3 General Plant - Load settlement software and applications																							
84	STARS Settlement System Modifications									-	-	-	0.05	0.02	0.01	0.05	0.01	-	-	-	0.14	-	0.14	0.15
85	IBPM (flow) Upgrade									-	0.04	-	-	-	-	-	-	-	-	-	0.04	-	0.04	0.04
86	Regulated Default Supply									-	0.13	-	-	-	-	-	-	-	-	-	0.13	-	0.13	0.13
87	Directive 52									-	0.05	-	-	-	-	-	-	-	-	-	0.05	-	0.05	0.05
88	Tariff Bill Code Data Retention									-	0.02	-	-	-	-	-	-	-	-	-	0.02	-	0.02	0.02
89	Micro Generation Records upgrade									-	0.01	-	-	-	-	-	-	-	-	-	0.01	-	0.01	0.01
90	Dropchute Replacement									-	-	-	-	-	0.02	-	-	-	-	-	0.02	-	0.02	0.02
91	Interval Meter Data Collection (MV-90 Upgrade)									0.01	(0.01)	-	-	-	-	-	0.37	-	-	-	0.38	-	0.38	0.40
92	STARS Upgrade									-	-	-	-	-	-	0.04	-	-	-	-	0.04	-	0.04	0.04
93	**Life Cycle Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.01**	**0.24**	**-**	**0.05**	**0.02**	**0.03**	**0.09**	**0.38**	**-**	**-**	**-**	**0.83**	**-**	**0.83**	**0.87**
	392 General Plant - Transportation, Fleet vehicles																							
94	Vehicles - Growth and Life Cycle Replacements								0.00	0.01	0.02	0.02	0.03	0.06	0.14	0.06	0.09	0.14	0.29	0.12	0.98	-	0.98	1.04
	394 General Plant - Tools, shop, garage, stores and laboratory equipment																							
95	Capital Tools and Instrument Purchases									0.03	0.06	0.05	0.14	0.11	0.15	0.14	0.13	0.13	0.19	0.05	1.18	-	1.18	1.24
96	Meter Reading Equipment									0.01	0.03	-	0.01	-	-	-	0.03	0.03	-	-	0.11	-	0.11	0.12
97	**Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.05**	**0.09**	**0.05**	**0.15**	**0.11**	**0.15**	**0.14**	**0.17**	**0.16**	**0.19**	**0.05**	**1.29**	**-**	**1.29**	**1.36**
	Distribution Assets - Contributed by Transmission																							
98	Argyll to Bellamy Transmission Contingency	-	-	-	-	-	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	0.06	-	0.06	0.06
	Transmission Contribution for Distribution Assets																							
99	Bellamy Contribution	-	-	-	-	-	-	-	(0.06)	-	-	-	-	-	-	-	-	-	-	-	(0.06)	-	(0.06)	(0.06)
	Distribution Contribution for Transmission Assets																							
100	Garneau Expansion	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.07	2.07	-	2.07	2.18
101	Summerside Substation Contribution	-	-	-	-	-	-	-	-	-	-	-	1.12	(0.04)	-	-	-	-	-	-	1.08	-	1.08	1.14
102	Poundmaker Contributions (East Industrial '07-'08)	-	-	-	-	-	-	-	-	(0.01)	-	-	-	-	1.19	(0.19)	-	-	-	-	1.00	-	1.00	1.05
103	Clover Bar POD Addition Contribution	-	-	-	-	-	-	-	-	-	0.24	0.12	-	-	-	-	-	-	-	-	0.36	-	0.36	0.38
104	Victoria Substation MV Breaker Purchase	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	0.01	-	0.01	0.01
105	East Industrial Contribution	-	-	-	-	-	-	-	0.35	-	-	-	-	-	-	-	-	-	-	-	0.35	-	0.35	0.37
106	**Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.35**	**(0.01)**	**0.24**	**0.12**	**1.12**	**(0.03)**	**1.19**	**(0.19)**	**-**	**-**	**-**	**2.07**	**4.87**	**-**	**4.87**	**5.13**
	Adjustments																							
107	Corporate Allocation for the OH 2002-2004	-	-	-	-	-	-	0.10	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	0.10	0.10
108	Capital Addition Adjustments	-	-	-	-	-	(0.00)	(0.00)	0.00	-	-	-	-	-	-	-	-	-	-	-	(0.01)	-	(0.01)	(0.01)
	Grand Total																							
109	**Grand Total**	**0.85**	**1.48**	**1.75**	**1.74**	**1.33**	**1.86**	**2.11**	**2.86**	**2.83**	**4.16**	**3.81**	**6.52**	**7.34**	**9.74**	**6.81**	**9.06**	**12.53**	**17.21**	**10.31**	**114.62**	**-**	**114.62**	**120.75**

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113 **2017 F**
114 Total 2017 RR for Capital **114.62**
115 Difference -
116 2017 WACC 6.50% 0.00% DLM Difference
117 **Grand Total**

Factors

	Year	I Rate	X Rate	I - X Rate	Growth Rate (Q)	Threshold $
118						
119	**2013**	2.87%	1.16%	1.71%	1.46%	101,710
120	**2014**	2.75%	1.16%	1.59%	1.96%	103,327
121	**2015**	2.65%	1.16%	1.49%	0.85%	104,867
122	**2016**	2.06%	1.16%	0.90%	3.20%	105,811
123	**2017**	0.95%	1.16%	-0.21%	2.15%	105,588
124	**2018**	2.26%	-1.11%	3.37%	1.92%	109,142
125	**2019**	2.13%	-1.11%	3.24%	2.02%	112,682
126	**2020**	2.01%	-1.11%	3.12%	2.03%	116,198
127	**2021**	1.88%	-1.11%	2.99%	2.26%	119,674
128	**2022**	1.85%	-1.11%	2.96%	2.08%	123,212
129	**2023**	2.03%	-1.11%	3.14%	2.06%	127,075

Distribution Rate Base - Capital Additions
2018 F Factor - Using 2018 Forecast
($ millions)

2018 Model Year

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX
		1943	**1944**	**1945**	**1946**	**1947**	**1948**	**1949**	**1950**	**1951**	**1952**	**1953**	**1954**	**1955**	**1956**	**1957**	**1958**	**1959**	**1960**	**1961**	**1962**	**1963**	**1964**	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**
	362 Station Equipment																																																		
1	Distribution Substation Life Cycle Replacements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.02	0.02	0.03	0.04	0.05	0.05	0.04	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04
2	**Total**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.02	0.02	0.03	0.04	0.05	0.05	0.04	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices																																																		
3	Distribution Pole and Aerial Line Life Cycle Replacements	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.04	0.03	0.99	0.05	0.04	0.05	0.07	0.07	0.09	0.07	0.06	0.06	0.06	0.06	0.06	0.08	0.09	0.09	0.14	0.21	0.18	0.14	0.20	0.18	(0.02)	0.33	0.42	0.30	0.36	0.49	0.70	0.78	0.78	0.60	0.38	0.34	0.38	0.49	0.50	0.56	0.49	0.58	0.60
4	Capitalized Aerial System Damage	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.33	0.02	0.01	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.07	0.06	0.05	0.07	0.06	(0.01)	0.11	0.14	0.10	0.12	0.16	0.24	0.26	0.26	0.20	0.13	0.11	0.13	0.16	0.17	0.19	0.17	0.19	0.20
5	Remedial Pole Treatments	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.02	0.02	0.03	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
6	Lightning Arrestor Replacement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.01	0.02	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.03
7	Installation of Insulators in 25 kV Supporting Guy Wires	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	**Life Cycle Total**	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.06	0.05	1.43	0.08	0.06	0.08	0.10	0.11	0.13	0.11	0.09	0.09	0.09	0.08	0.08	0.12	0.13	0.13	0.21	0.31	0.26	0.21	0.29	0.25	(0.03)	0.47	0.61	0.43	0.53	0.71	1.02	1.12	1.13	0.87	0.54	0.49	0.56	0.71	0.72	0.80	0.71	0.83	0.86
9	Distribution System Neutral Installations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
10	**Total**	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.06	0.05	1.44	0.08	0.06	0.08	0.11	0.11	0.14	0.11	0.09	0.09	0.09	0.09	0.08	0.12	0.13	0.13	0.21	0.31	0.26	0.21	0.29	0.26	(0.03)	0.48	0.61	0.43	0.53	0.71	1.03	1.13	1.14	0.87	0.55	0.49	0.56	0.71	0.73	0.81	0.72	0.84	0.87
	367 Underground Conductors & Devices																																																		
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	0.01	0.01	0.02	0.02	0.05	0.07	0.06	0.13	0.10	2.98	0.16	0.13	0.16	0.22	0.22	0.28	0.22	0.18	0.18	0.18	0.18	0.17	0.25	0.27	0.28	0.43	0.63	0.53	0.43	0.60	0.53	(0.06)	0.99	1.26	0.89	1.09	1.47	2.11	2.33	2.35	1.80	1.13	1.01	1.15	1.47	1.50	1.67	1.48	1.73	1.79
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.42	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.04	0.04	0.06	0.09	0.08	0.06	0.09	0.07	(0.01)	0.14	0.18	0.13	0.15	0.21	0.30	0.33	0.33	0.25	0.16	0.14	0.16	0.21	0.21	0.24	0.21	0.24	0.25
13	**Growth Total**	0.01	0.01	0.02	0.02	0.05	0.08	0.07	0.15	0.11	3.40	0.18	0.15	0.18	0.25	0.25	0.32	0.25	0.21	0.21	0.20	0.20	0.19	0.28	0.31	0.31	0.49	0.72	0.61	0.49	0.69	0.60	(0.06)	1.13	1.44	1.01	1.25	1.68	2.41	2.66	2.68	2.05	1.29	1.16	1.32	1.68	1.71	1.90	1.69	1.97	2.05
14	Switching Cubicle Life Cycle Replacement	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.30	0.02	0.01	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.07	0.05	0.04	0.06	0.05	(0.01)	0.10	0.13	0.09	0.11	0.15	0.22	0.24	0.24	0.18	0.12	0.10	0.12	0.15	0.15	0.17	0.15	0.18	0.18
15	Replacement of Faulted Distribution PILC Cables	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.20	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.04	0.03	0.04	0.04	(0.00)	0.07	0.08	0.06	0.07	0.10	0.14	0.16	0.16	0.12	0.08	0.07	0.08	0.10	0.10	0.11	0.10	0.12	0.12
16	Life Cycle Replacement of PILC Cable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	Capitalized Underground System Damage	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.02	0.61	0.03	0.03	0.03	0.04	0.04	0.06	0.04	0.04	0.04	0.04	0.04	0.03	0.05	0.06	0.06	0.09	0.13	0.11	0.09	0.12	0.11	(0.01)	0.20	0.26	0.18	0.22	0.30	0.43	0.48	0.48	0.37	0.23	0.21	0.24	0.30	0.31	0.34	0.30	0.35	0.37
18	Life Cycle Replacement of Oil Switches – Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	(0.00)	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
19	Life Cycle Replacement and Extension of Underground Distribution Cable	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.06	0.05	1.39	0.07	0.06	0.07	0.10	0.10	0.13	0.10	0.09	0.08	0.08	0.08	0.08	0.11	0.13	0.13	0.20	0.30	0.25	0.20	0.28	0.25	(0.03)	0.46	0.59	0.41	0.51	0.69	0.99	1.09	1.10	0.84	0.53	0.47	0.54	0.69	0.70	0.78	0.69	0.81	0.84
20	Neighbourhood Renewal Program	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.22	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.05	0.04	0.03	0.04	0.04	(0.00)	0.07	0.09	0.07	0.08	0.11	0.16	0.17	0.17	0.13	0.08	0.07	0.09	0.11	0.11	0.12	0.11	0.13	0.13
21	Underground Asbestos Abatement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
23	DAM - Distribution Manhole Rebuilds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	**Life Cycle Total**	0.01	0.01	0.02	0.02	0.05	0.06	0.06	0.13	0.09	2.80	0.15	0.12	0.15	0.20	0.21	0.26	0.21	0.17	0.17	0.17	0.17	0.16	0.23	0.26	0.26	0.40	0.60	0.50	0.40	0.57	0.50	(0.05)	0.93	1.19	0.83	1.03	1.39	1.99	2.19	2.21	1.69	1.06	0.95	1.09	1.39	1.41	1.57	1.39	1.63	1.69
26	**Total**	0.02	0.02	0.04	0.04	0.10	0.14	0.13	0.28	0.20	6.20	0.33	0.27	0.33	0.45	0.46	0.58	0.46	0.38	0.38	0.37	0.37	0.35	0.51	0.57	0.57	0.89	1.32	1.10	0.89	1.26	1.10	(0.12)	2.05	2.63	1.85	2.28	3.07	4.40	4.85	4.89	3.74	2.35	2.11	2.40	3.07	3.11	3.47	3.09	3.60	3.73
	367 Underground Conductors & Devices - Underground Secondary Networks																																																		
27	Network Reconfigurations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.01	0.02	0.01	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.18	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.03	0.03	0.04	0.03	(0.00)	0.06	0.08	0.05	0.07	0.09	0.13	0.14	0.15	0.11	0.07	0.06	0.07	0.09	0.09	0.10	0.09	0.11	0.11
29	Upgrading Protection on the Downtown Vaults and Manholes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
30	Installation of Locking Mechanisms on Network Vault Lids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
31	**Life Cycle Total**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.21	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.05	0.04	0.03	0.04	0.04	(0.00)	0.07	0.09	0.06	0.08	0.11	0.15	0.17	0.17	0.13	0.08	0.07	0.08	0.11	0.11	0.12	0.11	0.12	0.13
32	Installation of Network Current Limiting Fuse Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01	(0.00)	0.03	0.03	0.02	0.03	0.04	0.06	0.06	0.06	0.05	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.05	0.05
33	**Total**	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.34	0.02	0.01	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.07	0.06	0.05	0.07	0.06	(0.01)	0.11	0.14	0.10	0.12	0.17	0.24	0.26	0.27	0.20	0.13	0.11	0.13	0.17	0.17	0.19	0.17	0.20	0.20
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices																																																		
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	0.01	0.01	0.01	0.01	0.03	0.04	0.04	0.07	0.05	1.64	0.09	0.07	0.09	0.12	0.12	0.15	0.12	0.10	0.10	0.10	0.10	0.09	0.14	0.15	0.15	0.24	0.35	0.29	0.24	0.33	0.29	(0.03)	0.54	0.70	0.49	0.60	0.81	1.17	1.28	1.30	0.99	0.62	0.56	0.64	0.81	0.83	0.92	0.82	0.95	0.99
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	0.01	0.01	0.01	0.02	0.04	0.06	0.05	0.11	0.08	2.40	0.13	0.11	0.13	0.18	0.18	0.23	0.18	0.15	0.15	0.14	0.14	0.13	0.20	0.22	0.22	0.35	0.51	0.43	0.35	0.49	0.43	(0.05)	0.80	1.02	0.71	0.88	1.19	1.71	1.88	1.89	1.45	0.91	0.82	0.93	1.19	1.21	1.34	1.20	1.39	1.45
36	Franchise Agreement Driven Relocations and Conversions	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.06	0.05	1.39	0.07	0.06	0.07	0.10	0.10	0.13	0.10	0.08	0.08	0.08	0.08	0.08	0.11	0.13	0.13	0.20	0.30	0.25	0.20	0.28	0.25	(0.03)	0.46	0.59	0.41	0.51	0.69	0.99	1.08	1.09	0.84	0.53	0.47	0.54	0.69	0.70	0.78	0.69	0.81	0.84
37	New 15kV and 25kV Circuit Additions	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.02	0.65	0.03	0.03	0.03	0.05	0.05	0.06	0.05	0.04	0.04	0.04	0.04	0.04	0.05	0.06	0.06	0.09	0.14	0.12	0.09	0.13	0.11	(0.01)	0.21	0.28	0.19	0.24	0.32	0.46	0.51	0.51	0.39	0.25	0.22	0.25	0.32	0.33	0.36	0.32	0.38	0.39
38	Queen Elizabeth II Highway & 41 Avenue SW Interchange Distribution System Relocations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	Walterdale Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	W1 Circuit Extension	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
41	13 E Diversion and Reconductoring	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
42	Summerside Feeders	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.34	0.02	0.01	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.07	0.06	0.05	0.07	0.06	(0.01)	0.11	0.15	0.10	0.13	0.17	0.24	0.27	0.27	0.21	0.13	0.12	0.13	0.17	0.17	0.19	0.17	0.20	0.21
43	Poundmaker Feeders	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.34	0.02	0.01	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.07	0.06	0.05	0.07	0.06	(0.01)	0.11	0.14	0.10	0.12	0.17	0.24	0.26	0.27	0.20	0.13	0.11	0.13	0.17	0.17	0.19	0.17	0.20	0.20
44	NLRT Distribution System Relocations	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.03	0.82	0.04	0.04	0.04	0.06	0.06	0.08	0.06	0.05	0.05	0.05	0.05	0.05	0.07	0.07	0.08	0.12	0.17	0.15	0.12	0.17	0.14	(0.02)	0.27	0.35	0.24	0.30	0.40	0.58	0.64	0.65	0.49	0.31	0.28	0.32	0.41	0.41	0.46	0.41	0.48	0.49
45	SE & W LRT Distribution System Relocation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	**Growth Total**	0.03	0.02	0.05	0.05	0.12	0.18	0.17	0.34	0.25	7.62	0.41	0.33	0.40	0.56	0.56	0.71	0.56	0.47	0.46	0.46	0.45	0.42	0.63	0.70	0.71	1.10	1.63	1.36	1.10	1.54	1.35	(0.14)	2.52	3.23	2.27	2.80	3.77	5.41	5.96	6.01	4.60	2.89	2.59	2.95	3.77	3.83	4.26	3.79	4.42	4.59
47	Aerial and UG Ground Replacements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.02	(0.00)	0.03	0.04	0.03	0.03	0.04	0.06	0.07	0.07	0.05	0.03	0.03	0.03	0.04	0.05	0.05	0.04	0.05	0.05
48	Distribution System Aerial and Underground Fault Indicators and Fusing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.17	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.04	0.03	0.02	0.03	0.03	(0.00)	0.06	0.07	0.05	0.06	0.08	0.12	0.13	0.13	0.10	0.06	0.06	0.06	0.08	0.08	0.09	0.08	0.10	0.10
49	Installation of Automated Switches on Selected 25KV Circuits	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.38	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.08	0.07	0.05	0.08	0.07	(0.01)	0.12	0.16	0.11	0.14	0.19	0.27	0.29	0.30	0.23	0.14	0.13	0.15	0.19	0.19	0.21	0.19	0.22	0.23
50	High Load Corridor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.01	0.02	0.01	0.01	0.02	0.03	0.03	0.03	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02
51	**Performance Improvement Total**	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.02	0.58	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.05	0.05	0.05	0.08	0.12	0.10	0.08	0.12	0.10	(0.01)	0.19	0.25	0.17	0.21	0.29	0.41	0.46	0.46	0.35	0.22	0.20	0.23	0.29	0.29	0.33	0.29	0.34	0.35
52	**Total**	0.03	0.03	0.05	0.06	0.13	0.19	0.18	0.37	0.27	8.29	0.45	0.36	0.44	0.61	0.61	0.78	0.61	0.51	0.51	0.50	0.49	0.46	0.68	0.76	0.77	1.19	1.77	1.48	1.20	1.68	1.47	(0.16)	2.75	3.52	2.47	3.05	4.10	5.89	6.49	6.54	5.01	3.14	2.82	3.22	4.10	4.17	4.64	4.13	4.81	4.99
	368 Line Transformers																																																		
53	Voltage Regulator Additions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.01	0.02	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.03
54	Network Transformer Lifecycle Replacement	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.28	0.02	0.01	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.06	0.05	0.04	0.06	0.05	(0.01)	0.09	0.12	0.08	0.10	0.14	0.20	0.22	0.22	0.17	0.11	0.10	0.11	0.14	0.14	0.16	0.14	0.16	0.17
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.06	0.05	1.43	0.08	0.06	0.08	0.11	0.11	0.13	0.11	0.09	0.09	0.09	0.09	0.08	0.12	0.13	0.13	0.21	0.31	0.26	0.21	0.29	0.25	(0.03)	0.48	0.61	0.43	0.53	0.71	1.02	1.12	1.13	0.87	0.54	0.49	0.56	0.71	0.72	0.80	0.71	0.83	0.86
56	PCB Transformer Changeouts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.01	0.02	0.01	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02
57	**Total**	0.01	0.01	0.01	0.01	0.03	0.04	0.04	0.08	0.06	1.80	0.10	0.08	0.10	0.13	0.13	0.17	0.13	0.11	0.11	0.11	0.11	0.10	0.15	0.16	0.17	0.26	0.38	0.32	0.26	0.37	0.32	(0.03)	0.60	0.77	0.54	0.66	0.89	1.28	1.41	1.42	1.09	0.68	0.61	0.70	0.89	0.91	1.01	0.90	1.05	1.09
	370 Conventional Meters & 371 Automated Meters																																																		
58	Customer Revenue Metering - Growth & Life Cycle Replacements	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.04	0.03	0.94	0.05	0.04	0.05	0.07	0.07	0.09	0.07	0.06	0.06	0.06	0.06	0.05	0.08	0.09	0.09	0.14	0.20	0.17	0.14	0.19	0.17	(0.02)	0.31	0.40	0.28	0.34	0.46	0.67	0.73	0.74	0.57	0.36	0.32	0.36	0.46	0.47	0.53	0.47	0.55	0.57
	373 Street Lighting and Signal Systems																																																		
59	Street Light Service Connections and Security Lighting Addition and Capital Replacement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.18	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.03	0.03	0.04	0.03	(0.00)	0.06	0.08	0.05	0.07	0.09	0.13	0.14	0.14	0.11	0.07	0.06	0.07	0.09	0.09	0.10	0.09	0.11	0.11
	389 General Plant – Land																																																		
60	Land Purchase for Slurry Placement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01	(0.00)	0.03	0.03	0.02	0.03	0.04	0.06	0.06	0.06	0.05	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.05	0.05
	390 General Plant - Structures & Improvements																																																		
61	Furniture Life Cycle Replacements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.02	0.02	0.02	0.03	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
62	North and South Service Center Building Life Cycle Replacements	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.44	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.02	0.04	0.04	0.04	0.06	0.09	0.08	0.06	0.09	0.08	(0.01)	0.14	0.19	0.13	0.16	0.22	0.31	0.34	0.34	0.26	0.17	0.15	0.17	0.22	0.22	0.24	0.22	0.25	0.26
63	Work Centre Redevelopment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02
64	**Life Cycle Total**	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.49	0.03	0.02	0.03	0.04	0.04	0.05	0.04	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.07	0.10	0.09	0.07	0.10	0.09	(0.01)	0.16	0.21	0.15	0.18	0.24	0.35	0.38	0.39	0.30	0.19	0.17	0.19	0.24	0.25	0.27	0.24	0.28	0.30
65	Service Center Consolidation Project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.16	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.02	0.03	0.03	(0.00)	0.05	0.07	0.05	0.06	0.08	0.12	0.13	0.13	0.10	0.06	0.06	0.06	0.08	0.08	0.09	0.08	0.10	0.10

Distribution Rate Base - Capital Additions
2018 F Factor - Using 2018 Forecast
($ millions)

		AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA
		1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012 A**	**2013 A**	**2014 A**	**2015 D**	**2016 F**	**2017 F**	**2018 F**	**2004-2012D Average Adds**	**% of Total Average Adds**	**Category**
	362 Station Equipment																													
1	Distribution Substation Life Cycle Replacements	0.05	0.04	0.03	0.04	0.04	0.05	0.04	0.07	0.08	0.08	0.06	0.04	0.10	0.53	0.15	0.03	0.09	0.05	0.22	0.09	0.039	0.19	0.05	0.05	0.05	0.06	0.14	0.3%	K Bar
2	**Total**	**0.05**	**0.04**	**0.03**	**0.04**	**0.04**	**0.05**	**0.04**	**0.07**	**0.08**	**0.08**	**0.06**	**0.04**	**0.10**	**0.53**	**0.15**	**0.03**	**0.09**	**0.05**	**0.22**	**0.09**	**0.04**	**0.19**	**0.05**	**0.05**	**0.05**	**0.06**	**0.14**	**0.3%**	
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices																													
3	Distribution Pole and Aerial Line Life Cycle Replacements	0.77	0.62	0.43	0.60	0.72	0.80	0.73	1.24	1.43	1.35	0.98	1.50	0.77	2.92	1.71	1.41	1.97	3.47	3.34	2.65	1.44	3.74	5.16	3.59	4.07	4.77	2.40	4.3%	K Bar
4	Capitalized Aerial System Damage	0.26	0.21	0.14	0.20	0.24	0.27	0.25	0.42	0.48	0.45	0.33	-	0.19	0.50	0.71	1.02	1.08	1.12	1.41	1.38	1.29	1.44	1.46	1.50	1.53	1.67	0.81	1.5%	K Bar
5	Remedial Pole Treatments	0.04	0.03	0.02	0.03	0.04	0.04	0.04	0.07	0.08	0.07	0.05	0.20	0.21	-	-	-	-	0.29	0.22	0.23	0.25	0.12	0.30	0.27	0.28	0.32	0.13	0.2%	K Bar
6	Lightning Arrestor Replacement	0.04	0.03	0.02	0.03	0.04	0.04	0.04	0.06	0.07	0.07	0.05	0.73	0.20	0.14	-	-	-	-	-	-	-	-	-	-	-	-	0.12	0.2%	K Bar
7	Installation of Insulators in 25 kV Supporting Guy Wires	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00		0.06	0.02	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.0%	K Bar
8	**Life Cycle Total**	**1.11**	**0.90**	**0.62**	**0.87**	**1.04**	**1.16**	**1.06**	**1.79**	**2.06**	**1.95**	**1.42**	**2.43**	**1.42**	**3.58**	**2.42**	**2.43**	**3.05**	**4.88**	**4.97**	**4.26**	**2.98**	**5.30**	**6.92**	**5.37**	**5.88**	**6.76**	**3.47**	**6.3%**	
9	Distribution System Neutral Installations	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	0.02	0.10	-	-	0.11	0.10	-	-	-	-	-	-	0.03	0.0%	K Bar
10	**Total**	**1.12**	**0.90**	**0.62**	**0.87**	**1.05**	**1.17**	**1.06**	**1.80**	**2.08**	**1.97**	**1.43**	**2.43**	**1.42**	**3.58**	**2.44**	**2.53**	**3.05**	**4.88**	**5.08**	**4.36**	**2.98**	**5.30**	**6.92**	**5.37**	**5.88**	**6.76**	**3.50**	**6.3%**	
	367 Underground Conductors & Devices																													
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	2.30	1.86	1.28	1.80	2.16	2.41	2.19	3.71	4.29	4.06	2.94	7.50	8.17	5.93	6.82	6.95	3.90	6.30	8.85	16.50	19.53	17.94	18.10	18.52	18.51	20.44	7.21	13.0%	K Bar
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	0.33	0.26	0.18	0.25	0.31	0.34	0.31	0.53	0.61	0.57	0.42	0.10	(0.31)	0.45	1.61	1.63	1.65	1.51	1.07	2.65	1.40	1.53	1.33	2.20	2.26	2.15	1.02	1.8%	K Bar
13	**Growth Total**	**2.63**	**2.12**	**1.46**	**2.05**	**2.46**	**2.75**	**2.50**	**4.24**	**4.89**	**4.63**	**3.36**	**7.61**	**7.86**	**6.38**	**8.43**	**8.58**	**5.55**	**7.81**	**9.92**	**19.15**	**20.92**	**19.47**	**19.43**	**20.72**	**20.77**	**22.59**	**8.23**	**14.9%**	
14	Switching Cubicle Life Cycle Replacement	0.24	0.19	0.13	0.18	0.22	0.25	0.22	0.38	0.44	0.42	0.30	-	0.43	0.49	0.45	0.81	0.99	0.85	1.41	0.93	0.48	0.66	0.87	1.57	1.49	1.46	0.74	1.3%	K Bar
15	Replacement of Faulted Distribution PILC Cables	0.15	0.12	0.09	0.12	0.14	0.16	0.15	0.25	0.29	0.27	0.20	0.42	0.44	0.43	0.13	0.33	0.58	0.31	1.30	0.71	0.88	2.14	1.01	1.34	1.38	1.39	0.48	0.9%	K Bar
16	Life Cycle Replacement of PILC Cable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1.08	1.70	2.22	2.25	2.29	-	0.0%	K Bar
17	Capitalized Underground System Damage	0.47	0.38	0.26	0.37	0.44	0.49	0.45	0.76	0.88	0.83	0.60	-	0.22	0.65	0.48	1.44	1.98	2.48	3.82	3.56	3.17	2.67	3.72	3.43	3.49	3.96	1.47	2.7%	K Bar
18	Life Cycle Replacement of Oil Switches – Program	0.02	0.02	0.01	0.02	0.02	0.03	0.02	0.04	0.05	0.04	0.03	-	-	-	-	-	-	0.64	-	0.49		0.23	-	-	-	-	0.08	0.1%	K Bar
19	Life Cycle Replacement and Extension of Underground Distribution Cable	1.08	0.87	0.60	0.84	1.01	1.12	1.02	1.73	2.00	1.89	1.37	0.15	-	0.71	0.36	3.35	2.56	4.07	8.50	10.17	3.21	10.36	14.50	9.87	10.16	14.99	3.37	6.1%	K Bar
20	Neighbourhood Renewal Program	0.17	0.14	0.09	0.13	0.16	0.18	0.16	0.27	0.32	0.30	0.22	-	-	-	-	-	-	1.20	2.56	1.71	1.17	0.54	2.29	-	-	-	0.53	1.0%	K Bar
21	Underground Asbestos Abatement	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	0.09	-		-	-	-	-	-	0.02	0.0%	K Bar
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.02	-	-	-	-	-	-	-	-	0.35	0.01	-	-	-	-	-	0.05	0.1%	K Bar
23	DAM - Distribution Manhole Rebuilds	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	-	-	-	-	0.19	0.12	0.02	0.34	0.11	0.20	0.24	0.03	0.1%	K Bar
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	-	-	-	-	-	-	-	-	-	0.14	0.06	0.12	0.13	0.13	0.14	0.01	0.0%	K Bar
25	**Life Cycle Total**	**2.17**	**1.75**	**1.20**	**1.69**	**2.03**	**2.27**	**2.06**	**3.49**	**4.03**	**3.82**	**2.77**	**0.56**	**1.09**	**2.28**	**1.41**	**5.93**	**6.11**	**9.55**	**17.68**	**18.10**	**9.17**	**17.76**	**24.57**	**18.68**	**19.11**	**24.48**	**6.79**	**12.3%**	
26	**Total**	**4.80**	**3.87**	**2.66**	**3.74**	**4.50**	**5.02**	**4.57**	**7.73**	**8.92**	**8.44**	**6.13**	**8.17**	**8.95**	**8.66**	**9.84**	**14.51**	**11.66**	**17.36**	**27.60**	**37.26**	**30.10**	**37.23**	**44.00**	**39.40**	**39.88**	**47.07**	**15.02**	**27.1%**	
	367 Underground Conductors & Devices - Underground Secondary Networks																													
27	Network Reconfigurations	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.05	0.06	0.06	0.04	0.04	0.24	0.26	0.07	-	-	-	-	0.00	-	-	0.66	1.63	3.53	2.57	0.10	0.2%	K Bar
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	0.14	0.12	0.08	0.11	0.13	0.15	0.14	0.23	0.27	0.25	0.18	1.08	0.89	0.28	0.04	-	-	0.29	0.45	0.78	0.56	1.15	1.25	1.20	1.23	1.37	0.45	0.81%	K Bar
29	Upgrading Protection on the Downtown Vaults and Manholes	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	-	0.18	0.12	-	-	-	-	-	-		-	-	-	-	-	0.03	0.1%	K Bar
30	Installation of Locking Mechanisms on Network Vault Lids	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	-	-	-	0.09	1.02	0.00	-	-	-	-	-	0.035	0.1%	K Bar
31	**Life Cycle Total**	**0.16**	**0.13**	**0.09**	**0.13**	**0.15**	**0.17**	**0.16**	**0.27**	**0.31**	**0.29**	**0.21**	**1.08**	**1.07**	**0.40**	**0.04**	**-**	**-**	**0.29**	**0.54**	**1.80**	**0.56**	**1.15**	**1.25**	**1.20**	**1.23**	**1.37**	**0.52**	**0.9%**	
32	Installation of Network Current Limiting Fuse Program	0.06	0.05	0.04	0.05	0.06	0.07	0.06	0.10	0.12	0.11	0.08	-	-	-	0.18	0.06	-	0.56	0.41	0.38	0.34	-	-	-	-	-	0.20	0.4%	K Bar
33	**Total**	**0.26**	**0.21**	**0.14**	**0.20**	**0.24**	**0.27**	**0.25**	**0.42**	**0.49**	**0.46**	**0.33**	**1.12**	**1.31**	**0.66**	**0.29**	**0.06**	**-**	**0.85**	**0.95**	**2.18**	**0.91**	**1.15**	**1.91**	**2.83**	**4.76**	**3.94**	**0.82**	**1.5%**	
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices																													
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	1.27	1.03	0.71	0.99	1.19	1.33	1.21	2.05	2.37	2.24	1.62	2.59	1.16	3.12	4.58	2.14	5.59	4.11	5.66	7.65	6.70	6.48	8.33	8.14	6.14	8.42	3.98	7.2%	K Bar
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	1.86	1.50	1.03	1.45	1.74	1.94	1.77	2.99	3.46	3.27	2.37	4.01	3.04	4.33	6.39	5.85	8.24	6.30	6.81	9.94	10.00	10.69	9.52	11.16	11.34	12.34	5.82	10.5%	K Bar
36	Franchise Agreement Driven Relocations and Conversions	1.07	0.87	0.60	0.84	1.01	1.12	1.02	1.73	2.00	1.89	1.37	2.62	1.89	2.63	3.48	4.26	3.18	2.05	6.25	5.34	3.25	3.10	3.77	3.08	2.97	-	3.36	6.1%	Tracker
37	New 15kV and 25kV Circuit Additions	0.50	0.41	0.28	0.39	0.47	0.52	0.48	0.81	0.93	0.88	0.64	0.20	0.26	0.92	0.02	4.11	1.50	0.30	4.39	2.69	1.55	4.55	8.43	5.45	12.41	9.74	1.57	2.8%	K Bar
38	Queen Elizabeth II Highway & 41 Avenue SW Interchange Distribution System Relocations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.50	-	-	-	-	-	-	0.0%	Tracker
39	Walterdale Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.51	4.22	-	-	-	-	0.0%	Tracker
40	W1 Circuit Extension	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.02	-	-	0.52	0.01	-	-	-	-	-	-	-	-	-	-	-	0.06	0.1%	K Bar
41	13 E Diversion and Reconductoring	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	-	0.33	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.1%	K Bar
42	Summerside Feeders	0.27	0.21	0.15	0.21	0.25	0.28	0.25	0.43	0.49	0.47	0.34	-	-	-	-	-	-	7.29	0.18	0.02	-	-	-	-	-	-	0.83	1.5%	K Bar
43	Poundmaker Feeders	0.26	0.21	0.15	0.20	0.25	0.27	0.25	0.42	0.49	0.46	0.33	-	-	-	-	-	-	-	0.15	11.09	0.23	-	-	-	-	-	0.82	1.5%	K Bar
44	NLRT Distribution System Relocations	0.63	0.51	0.35	0.49	0.59	0.66	0.60	1.02	1.18	1.12	0.81	-	-	-	-	-	-	-	17.39	1.30		-	-	-	-	-	1.98	3.6%	Tracker
45	SE & W LRT Distribution System Relocation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.22	8.65	18.02	9.31	7.70	-	-	0.0%	Tracker
46	**Growth Total**	**5.90**	**4.76**	**3.27**	**4.60**	**5.53**	**6.17**	**5.61**	**9.50**	**10.97**	**10.38**	**7.53**	**9.41**	**6.69**	**11.52**	**14.48**	**16.36**	**18.51**	**20.05**	**40.83**	**38.04**	**29.45**	**33.96**	**52.30**	**37.14**	**40.56**	**30.50**	**18.46**	**33.3%**	
47	Aerial and UG Ground Replacements	0.07	0.06	0.04	0.05	0.07	0.07	0.07	0.11	0.13	0.12	0.09	0.16	0.15	0.13	0.24	0.22	0.25	0.17	0.29	0.41	0.30	0.42	0.45	0.42	0.42	0.48	0.22	0.4%	K Bar
48	Distribution System Aerial and Underground Fault Indicators and Fusing	0.13	0.10	0.07	0.10	0.12	0.13	0.12	0.21	0.24	0.23	0.16	0.34	0.26	0.44	0.20	0.06	0.46	0.53	0.39	0.46	0.34	1.47	1.34	0.60	0.75	0.77	0.40	0.7%	K Bar
49	Installation of Automated Switches on Selected 25KV Circuits	0.29	0.24	0.16	0.23	0.27	0.30	0.28	0.47	0.54	0.51	0.37	-	-	0.02	0.01	1.61	2.06	0.78	2.32	1.53	0.34	0.27	0.89	0.71	0.92	0.94	0.91	1.6%	K Bar
50	High Load Corridor	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.05	0.06	0.06	0.04	-	-	0.27	0.62	-	-	-	-	-	-	-	-	-	-	-	0.10	0.2%	K Bar
51	**Performance Improvement Total**	**0.45**	**0.36**	**0.25**	**0.35**	**0.42**	**0.47**	**0.43**	**0.73**	**0.84**	**0.80**	**0.58**	**0.34**	**0.26**	**0.73**	**0.83**	**1.67**	**2.52**	**1.31**	**2.71**	**1.99**	**0.68**	**1.74**	**2.23**	**1.30**	**1.67**	**1.71**	**1.41**	**2.6%**	
52	**Total**	**6.42**	**5.18**	**3.56**	**5.01**	**6.01**	**6.71**	**6.11**	**10.34**	**11.94**	**11.30**	**8.20**	**9.91**	**7.09**	**12.38**	**15.55**	**18.25**	**21.28**	**21.53**	**43.82**	**40.44**	**30.43**	**36.12**	**54.98**	**38.86**	**42.65**	**32.68**	**20.09**	**36.3%**	
	368 Line Transformers																													
53	Voltage Regulator Additions	0.04	0.03	0.02	0.03	0.03	0.04	0.03	0.06	0.07	0.06	0.05	-	-	-	0.42	0.14	-	-	0.24	0.05	0.00	-	-	0.19	-	0.07	0.11	0.2%	K Bar
54	Network Transformer Lifecycle Replacement	0.22	0.17	0.12	0.17	0.20	0.23	0.21	0.35	0.40	0.38	0.28	1.70	0.15	0.85	0.36	0.46	0.65	0.58	0.61	0.44	0.54	0.96	3.96	2.16	2.57	3.22	0.68	1.2%	K Bar
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	1.11	0.90	0.62	0.87	1.04	1.16	1.06	1.79	2.07	1.96	1.42	0.35	2.00	2.50	3.62	4.60	5.15	4.21	4.12	5.30	5.19	5.24	5.18	5.50	5.62	6.03	3.48	6.3%	K Bar
56	PCB Transformer Changeouts	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.05	0.06	0.06	0.04	-	-	-	-	-	-	0.17	0.45	0.38	0.06	0.14	0.43	0.27	0.28	0.36	0.10	0.2%	K Bar
57	**Total**	**1.40**	**1.13**	**0.77**	**1.09**	**1.31**	**1.46**	**1.33**	**2.25**	**2.60**	**2.46**	**1.78**	**2.04**	**2.15**	**3.35**	**4.40**	**5.20**	**5.80**	**4.96**	**5.42**	**6.18**	**5.80**	**6.34**	**9.57**	**8.11**	**8.46**	**9.68**	**4.37**	**7.9%**	
	370 Conventional Meters & 371 Automated Meters																													
58	Customer Revenue Metering - Growth & Life Cycle Replacements	0.73	0.59	0.40	0.57	0.68	0.76	0.69	1.17	1.35	1.28	0.93	2.19	2.29	2.18	2.94	3.05	2.20	1.71	1.70	2.52	4.63	5.32	4.19	3.20	2.84	4.51	2.28	4.1%	K Bar
	373 Street Lighting and Signal Systems																													
59	Street Light Service Connections and Security Lighting Addition and Capital Replacement	0.14	0.11	0.08	0.11	0.13	0.15	0.14	0.23	0.26	0.25	0.18	0.26	0.29	0.23	0.23	0.39	0.67	0.69	0.63	0.68	0.68	0.51	0.69	0.56	0.58	0.68	0.44	0.8%	K Bar
	389 General Plant – Land																													
60	Land Purchase for Slurry Placement	0.06	0.05	0.04	0.05	0.06	0.07	0.06	0.10	0.12	0.11	0.08	-	0.91	0.43	(0.00)	-	0.01	0.23	0.14	0.21	-	-	-	-	-	-	0.20	0.4%	K Bar
	390 General Plant - Structures & Improvements																													
61	Furniture Life Cycle Replacements	0.04	0.03	0.02	0.03	0.04	0.04	0.04	0.07	0.08	0.07	0.05	0.04	-	0.14	0.13	0.14	0.13	0.17	0.18	0.42	0.15	0.18	0.18	0.19	0.19	0.21	0.13	0.2%	K Bar
62	North and South Service Center Building Life Cycle Replacements	0.34	0.27	0.19	0.26	0.32	0.35	0.32	0.54	0.63	0.60	0.43	0.77	1.06	1.56	0.65	1.11	0.93	0.84	1.88	0.67	0.38	0.49	0.16	0.17	0.18	0.19	1.06	1.9%	K Bar
63	Work Centre Redevelopment	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.03	-	-	-	-	-	-	-	-	0.34	0.03	0.15	-	38.41	20.23	-	0.07	0.1%	Tracker
64	**Life Cycle Total**	**0.38**	**0.31**	**0.21**	**0.30**	**0.36**	**0.40**	**0.36**	**0.61**	**0.71**	**0.67**	**0.48**	**0.80**	**1.06**	**1.70**	**0.78**	**1.25**	**1.06**	**1.01**	**2.05**	**1.09**	**0.53**	**0.68**	**0.34**	**0.36**	**0.37**	**0.40**	**1.19**	**2.1%**	
65	Service Center Consolidation Project	0.13	0.10	0.07	0.10	0.12	0.13	0.12	0.20	0.24	0.22	0.16	-	2.73	0.85	-	-	-	-	-	-	-	-	-	-	-	-	0.40	0.7%	K Bar

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
		1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
66	**Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.02**	**0.01**	**0.03**	**0.02**	**0.68**	**0.04**	**0.03**	**0.04**	**0.05**	**0.05**	**0.06**	**0.05**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.06**	**0.06**	**0.06**
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications																									
67	Advanced Metering Infrastructure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	391.1 General Plant – Computer hardware & voice and data network equipment																									
68	IT Hardware Lifecycle Replacements and Additions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01
	391.2 General Plant - Computer software and applications																									
69	Business Systems Upgrades	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
70	Work Management System Upgrade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01
71	GIS - Performance Improvement Project	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.44	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.02	0.04	0.04	0.04
72	OMS/DMS Life Cycle Replacement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	**Life Cycle Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.03**	**0.02**	**0.62**	**0.03**	**0.03**	**0.03**	**0.05**	**0.05**	**0.06**	**0.05**	**0.04**	**0.04**	**0.04**	**0.04**	**0.03**	**0.05**	**0.06**	**0.06**
74	Meter Reading Route Optimization	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	Automation of Off Cycle Meter Read Project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	Inventory Bar Coding Application	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	AMI Software and Applications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	Engineering and Design Software Modifications	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
79	Safety Software	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	**Performance Improvement Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.13**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
81	**Total**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.02**	**0.02**	**0.03**	**0.02**	**0.76**	**0.04**	**0.03**	**0.04**	**0.06**	**0.06**	**0.07**	**0.06**	**0.05**	**0.05**	**0.05**	**0.04**	**0.04**	**0.06**	**0.07**	**0.07**
	391.3 General Plant - Load settlement software and applications																									
82	STARS Settlement System Modifications	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83	IBPM (flow) Upgrade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Regulated Default Supply	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.02	0.60	0.03	0.03	0.03	0.04	0.04	0.06	0.04	0.04	0.04	0.04	0.04	0.03	0.05	0.05	0.06
85	Directive 52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	Tariff Bill Code Data Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	Micro Generation Records upgrade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Dropchute Replacement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Interval Meter Data Collection and Processing (MV-90 Upgrade)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	STARS Upgrade	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91	**Life Cycle Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.02**	**0.02**	**0.03**	**0.02**	**0.72**	**0.04**	**0.03**	**0.04**	**0.05**	**0.05**	**0.07**	**0.05**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.06**	**0.07**	**0.07**
	392 General Plant - Transportation, Fleet vehicles																									
92	Vehicles - Growth and Life Cycle Replacements	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.04	0.03	0.95	0.05	0.04	0.05	0.07	0.07	0.09	0.07	0.06	0.06	0.06	0.06	0.05	0.08	0.09	0.09
	394 General Plant - Tools, shop, garage, stores and laboratory equipment																									
93	Capital Tools and Instrument Purchases	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.27	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03
94	Meter Reading Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	**Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.31**	**0.02**	**0.01**	**0.02**	**0.02**	**0.02**	**0.03**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.03**	**0.03**	**0.03**
	Distribution Assets - Contributed by Transmission																									
96	Argyll to Bellamy Transmission Contingency																									
	Transmission Contribution for Distribution Assets																									
97	Bellamy Contribution																									
	Distribution Contribution for Transmission Assets																									
98	Garneau Expansion																									
99	Summerside Substation Contribution																									
100	Poundmaker Contributions (East Industrial '07-'08)																									
101	Clover Bar POD Addition Contribution																									
102	Victoria Substation MV Breaker Purchase																									
103	East Industrial Contribution																									
104	**Total**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Adjustments																									
105	Corporate Allocation for the OH 2002-2004																									
106	Capital Addition Adjustments																									
107	**Total**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Grand Total																									
108	**Grand Total**	**0.08**	**0.07**	**0.14**	**0.16**	**0.37**	**0.53**	**0.50**	**1.03**	**0.75**	**22.84**	**1.23**	**1.00**	**1.21**	**1.67**	**1.68**	**2.14**	**1.68**	**1.40**	**1.39**	**1.38**	**1.35**	**1.27**	**1.88**	**2.09**	**2.12**
109	**Total Capital Additions from DLM**	**0.08**	**0.07**	**0.14**	**0.16**	**0.37**	**0.53**	**0.50**	**1.03**	**0.75**	**22.84**	**1.23**	**1.00**	**1.21**	**1.67**	**1.68**	**2.14**	**1.68**	**1.40**	**1.39**	**1.38**	**1.35**	**1.27**	**1.88**	**2.09**	**2.12**

		Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX
		1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
66	**Total**	**0.10**	**0.15**	**0.12**	**0.10**	**0.14**	**0.12**	**(0.01)**	**0.23**	**0.29**	**0.20**	**0.25**	**0.34**	**0.49**	**0.53**	**0.54**	**0.41**	**0.26**	**0.23**	**0.26**	**0.34**	**0.34**	**0.38**	**0.34**	**0.40**	**0.41**
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications																									
67	Advanced Metering Infrastructure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	391.1 General Plant – Computer hardware & voice and data network equipment																									
68	IT Hardware Lifecycle Replacements and Additions	0.01	0.02	0.02	0.01	0.02	0.02	(0.00)	0.03	0.04	0.03	0.03	0.04	0.06	0.07	0.07	0.05	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.05	0.05
	391.2 General Plant - Computer software and applications																									
69	Business Systems Upgrades	0.01	0.02	0.02	0.01	0.02	0.02	(0.00)	0.03	0.04	0.03	0.03	0.05	0.07	0.07	0.07	0.06	0.04	0.03	0.04	0.05	0.05	0.05	0.05	0.05	0.06
70	Work Management System Upgrade	0.01	0.02	0.02	0.01	0.02	0.02	(0.00)	0.03	0.04	0.03	0.03	0.04	0.06	0.07	0.07	0.05	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.05	0.05
71	GIS - Performance Improvement Project	0.06	0.09	0.08	0.06	0.09	0.08	(0.01)	0.15	0.19	0.13	0.16	0.22	0.31	0.35	0.35	0.27	0.17	0.15	0.17	0.22	0.22	0.25	0.22	0.26	0.27
72	OMS/DMS Life Cycle Replacement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	**Life Cycle Total**	**0.09**	**0.13**	**0.11**	**0.09**	**0.13**	**0.11**	**(0.01)**	**0.21**	**0.26**	**0.19**	**0.23**	**0.31**	**0.44**	**0.49**	**0.49**	**0.38**	**0.24**	**0.21**	**0.24**	**0.31**	**0.31**	**0.35**	**0.31**	**0.36**	**0.38**
74	Meter Reading Route Optimization	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.01	0.02	0.01	0.01	0.02	0.03	0.03	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02
75	Automation of Off Cycle Meter Read Project	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
76	Inventory Bar Coding Application	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
77	AMI Software and Applications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	Engineering and Design Software Modifications	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.02	0.03	0.02	0.02	0.03	0.04	0.05	0.05	0.04	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04
79	Safety Software	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
80	**Performance Improvement Total**	**0.02**	**0.03**	**0.02**	**0.02**	**0.03**	**0.02**	**(0.00)**	**0.04**	**0.06**	**0.04**	**0.05**	**0.07**	**0.10**	**0.10**	**0.11**	**0.08**	**0.05**	**0.05**	**0.05**	**0.07**	**0.07**	**0.07**	**0.07**	**0.08**	**0.08**
81	**Total**	**0.11**	**0.16**	**0.14**	**0.11**	**0.15**	**0.13**	**(0.01)**	**0.25**	**0.32**	**0.23**	**0.28**	**0.38**	**0.54**	**0.59**	**0.60**	**0.46**	**0.29**	**0.26**	**0.29**	**0.38**	**0.38**	**0.42**	**0.38**	**0.44**	**0.46**
	391.3 General Plant - Load settlement software and applications																									
82	STARS Settlement System Modifications	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	0.01	0.02	0.01	0.01	0.02	0.03	0.03	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02
83	IBPM (flow) Upgrade	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
84	Regulated Default Supply	0.09	0.13	0.11	0.09	0.12	0.11	(0.01)	0.20	0.25	0.18	0.22	0.30	0.43	0.47	0.47	0.36	0.23	0.20	0.23	0.30	0.30	0.34	0.30	0.35	0.36
85	Directive 52	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
86	Tariff Bill Code Data Retention	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
87	Micro Generation Records upgrade	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Dropchute Replacement	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
89	Interval Meter Data Collection and Processing (MV-90 Upgrade)	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
90	STARS Upgrade	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91	**Life Cycle Total**	**0.10**	**0.15**	**0.13**	**0.10**	**0.15**	**0.13**	**(0.01)**	**0.24**	**0.31**	**0.22**	**0.27**	**0.36**	**0.51**	**0.57**	**0.57**	**0.44**	**0.27**	**0.25**	**0.28**	**0.36**	**0.36**	**0.41**	**0.36**	**0.42**	**0.44**
	392 General Plant - Transportation, Fleet vehicles																									
92	Vehicles - Growth and Life Cycle Replacements	0.14	0.20	0.17	0.14	0.19	0.17	(0.02)	0.32	0.41	0.28	0.35	0.47	0.68	0.75	0.75	0.58	0.36	0.32	0.37	0.47	0.48	0.53	0.48	0.55	0.57
	394 General Plant - Tools, shop, garage, stores and laboratory equipment																									
93	Capital Tools and Instrument Purchases	0.04	0.06	0.05	0.04	0.06	0.05	(0.01)	0.09	0.12	0.08	0.10	0.14	0.19	0.21	0.22	0.17	0.10	0.09	0.11	0.14	0.14	0.15	0.14	0.16	0.16
94	Meter Reading Equipment	0.00	0.01	0.01	0.00	0.01	0.01	(0.00)	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
95	**Total**	**0.04**	**0.07**	**0.05**	**0.04**	**0.06**	**0.05**	**(0.01)**	**0.10**	**0.13**	**0.09**	**0.11**	**0.15**	**0.22**	**0.24**	**0.24**	**0.18**	**0.12**	**0.10**	**0.12**	**0.15**	**0.15**	**0.17**	**0.15**	**0.18**	**0.18**
	Distribution Assets - Contributed by Transmission																									
96	Argyll to Bellamy Transmission Contingency																									
	Transmission Contribution for Distribution Assets																									
97	Bellamy Contribution																									
	Distribution Contribution for Transmission Assets																									
98	Garneau Expansion																									
99	Summerside Substation Contribution																									
100	Poundmaker Contributions (East Industrial '07-'08)																									
101	Clover Bar POD Addition Contribution																									
102	Victoria Substation MV Breaker Purchase																									
103	East Industrial Contribution																									
104	**Total**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Adjustments																									
105	Corporate Allocation for the OH 2002-2004																									
106	Capital Addition Adjustments																									
107	**Total**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Grand Total																									
108	**Grand Total**	**3.29**	**4.87**	**4.07**	**3.30**	**4.63**	**4.04**	**(0.43)**	**7.57**	**9.70**	**6.80**	**8.39**	**11.31**	**16.23**	**17.87**	**18.03**	**13.80**	**8.65**	**7.77**	**8.86**	**11.31**	**11.48**	**12.79**	**11.38**	**13.26**	**13.76**
109	**Total Capital Additions from DLM**	**3.29**	**4.87**	**4.07**	**3.30**	**4.63**	**4.04**	**(0.43)**	**7.57**	**9.70**	**6.80**	**8.39**	**11.31**	**16.23**	**17.87**	**18.03**	**13.80**	**8.65**	**7.77**	**8.86**	**11.31**	**11.48**	**12.79**	**11.38**	**13.26**	**13.76**

		AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA
		1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012 A**	**2013 A**	**2014 A**	**2015 D**	**2016 F**	**2017 F**	**2018 F**	**2004-2012D Average Adds**	**% of Total Average Adds**	**Category**
66	**Total**	**0.53**	**0.43**	**0.29**	**0.41**	**0.50**	**0.55**	**0.50**	**0.85**	**0.98**	**0.93**	**0.67**	**0.80**	**3.79**	**2.55**	**0.78**	**1.25**	**1.06**	**1.01**	**2.05**	**1.43**	**0.56**	**0.82**	**0.34**	**38.77**	**20.60**	**0.40**	**1.65**	**3.0%**	
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications																													
67	Advanced Metering Infrastructure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32.74	26.04	-	-	0.0%	Tracker
	391.1 General Plant – Computer hardware & voice and data network equipment																													
68	IT Hardware Lifecycle Replacements and Additions	0.07	0.05	0.04	0.05	0.06	0.07	0.06	0.11	0.12	0.12	0.09	0.16	0.16	0.15	0.30	0.17	0.18	0.31	0.20	0.25	0.31	0.29	0.32	0.97	0.41	0.63	0.21	0.4%	K Bar
	391.2 General Plant - Computer software and applications																													
69	Business Systems Upgrades	0.07	0.06	0.04	0.06	0.07	0.08	0.07	0.12	0.13	0.13	0.09	0.24	0.05	0.11	0.11	0.29	0.60	0.01	0.18	0.38	0.58	0.15	0.13	0.24	1.67	0.76	0.23	0.4%	K Bar
70	Work Management System Upgrade	0.07	0.05	0.04	0.05	0.06	0.07	0.06	0.11	0.13	0.12	0.09	0.16	0.10	0.25	-	-	-	-	-	1.50	0.41	0.37	-	0.73	1.25	0.74	0.21	0.4%	K Bar
71	GIS - Performance Improvement Project	0.34	0.28	0.19	0.27	0.32	0.36	0.33	0.55	0.64	0.60	0.44	-	-	-	-	-	-	7.92	0.91	0.64	0.00	1.44	-	-	-	-	1.07	1.9%	K Bar
72	OMS/DMS Life Cycle Replacement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	-	9.09	-	5.38	-	-	0.0%	Tracker
73	**Life Cycle Total**	**0.48**	**0.39**	**0.27**	**0.38**	**0.45**	**0.50**	**0.46**	**0.78**	**0.90**	**0.85**	**0.62**	**0.40**	**0.15**	**0.36**	**0.11**	**0.29**	**0.60**	**7.93**	**1.09**	**2.51**	**0.99**	**1.96**	**9.22**	**0.97**	**8.29**	**1.49**	**1.51**	**2.7%**	
74	Meter Reading Route Optimization	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.06	0.05	0.04	-	-	-	0.21	0.65	-	-	-	-	-	-	-	-	-	-	0.10	0.2%	K Bar
75	Automation of Off Cycle Meter Read Project	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	0.19	-	-	-	-	-	-	-	-	-	-	0.02	0.0%	K Bar
76	Inventory Bar Coding Application	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	-	-	-	0.28	-	(0.06)	-		-	-	-	-	-	-	-	0.03	0.0%	K Bar
77	AMI Software and Applications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	K Bar
78	Engineering and Design Software Modifications	0.05	0.04	0.03	0.04	0.04	0.05	0.04	0.08	0.09	0.08	0.06	0.34	0.60	0.12	0.01	-	-	-	-	0.31	0.37	0.02	-	-	0.32	0.12	0.15	0.3%	K Bar
79	Safety Software	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	-	-	-	0.04	(0.00)	-	-	-	-	-	-	0.03	0.1%	K Bar
80	**Performance Improvement Total**	**0.10**	**0.08**	**0.06**	**0.08**	**0.10**	**0.11**	**0.10**	**0.17**	**0.19**	**0.18**	**0.13**	**0.34**	**0.60**	**0.12**	**0.50**	**0.84**	**(0.06)**	**-**	**0.04**	**0.31**	**0.37**	**0.02**	**-**	**-**	**0.32**	**0.12**	**0.32**	**0.6%**	
81	**Total**	**0.59**	**0.47**	**0.33**	**0.46**	**0.55**	**0.61**	**0.56**	**0.95**	**1.09**	**1.03**	**0.75**	**0.74**	**0.75**	**0.48**	**0.61**	**1.13**	**0.54**	**7.93**	**1.13**	**2.82**	**1.37**	**1.98**	**9.22**	**0.97**	**8.61**	**1.61**	**1.84**	**3.3%**	
	391.3 General Plant - Load settlement software and applications																													
82	STARS Settlement System Modifications	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.05	0.06	0.05	0.04	-	-	-	-	-	-	0.42	0.19	0.05	0.38	0.06	-	-	-	-	0.09	0.2%	K Bar
83	IBPM (flow) Upgrade	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	0.33	-	-	-	-	-	-	-	-	-	-	0.04	0.1%	K Bar
84	Regulated Default Supply	0.46	0.38	0.26	0.36	0.44	0.49	0.44	0.75	0.86	0.82	0.59	(0.01)	-	11.91	-	1.19	-	-	-	-	-	-	-	-	-	-	1.45	2.6%	K Bar
85	Directive 52	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.02	-	-	-	-	0.46	-	-	-	-	-	-	-	-	-	-	0.05	0.1%	K Bar
86	Tariff Bill Code Data Retention	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	0.22	-	-	-	-	-	-	-	-	-	-	0.02	0.0%	K Bar
87	Micro Generation Records upgrade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	-	-	-	-	0.11	-	-	-	-	-	-	-	-	-	-	0.01	0.0%	K Bar
88	Dropchute Replacement	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.02	-	-	-	-	-	-	-	-	0.16	-	-	-	-	-	-	0.05	0.1%	K Bar
89	Interval Meter Data Collection and Processing (MV-90 Upgrade)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.05	-	-	0.27	(0.06)	-	-	-	-	-	2.57	-	-	-	-	0.03	0.1%	Tracker
90	STARS Upgrade	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.27	-	-	-	-	-	-	0.0%	K Bar
91	**Life Cycle Total**	**0.56**	**0.45**	**0.31**	**0.44**	**0.53**	**0.59**	**0.53**	**0.90**	**1.04**	**0.99**	**0.72**	**0.04**	**-**	**11.91**	**0.27**	**2.25**	**-**	**0.42**	**0.19**	**0.21**	**0.65**	**2.63**	**-**	**-**	**-**	**-**	**1.76**	**3.2%**	
	392 General Plant - Transportation, Fleet vehicles																													
92	Vehicles - Growth and Life Cycle Replacements	0.74	0.60	0.41	0.58	0.69	0.77	0.70	1.19	1.37	1.30	0.94	1.48	5.49	1.14	2.35	1.76	0.99	1.23	2.12	3.89	1.36	1.86	2.60	4.95	3.99	4.27	2.31	4.2%	K Bar
	394 General Plant - Tools, shop, garage, stores and laboratory equipment																													
93	Capital Tools and Instrument Purchases	0.21	0.17	0.12	0.17	0.20	0.22	0.20	0.34	0.39	0.37	0.27	0.33	0.41	0.34	0.67	0.57	0.44	1.19	0.86	1.12	0.98	0.90	0.87	1.18	0.58	0.97	0.66	1.2%	K Bar
94	Meter Reading Equipment	0.03	0.02	0.01	0.02	0.02	0.03	0.02	0.04	0.05	0.04	0.03	-	0.04	0.08	0.28	0.25	-	0.06	-	-	-	0.23	0.20	-	-	0.07	0.08	0.1%	K Bar
95	**Total**	**0.24**	**0.19**	**0.13**	**0.19**	**0.22**	**0.25**	**0.23**	**0.38**	**0.44**	**0.42**	**0.30**	**0.33**	**0.44**	**0.42**	**0.95**	**0.82**	**0.44**	**1.25**	**0.86**	**1.12**	**0.98**	**1.14**	**1.06**	**1.18**	**0.58**	**1.05**	**0.74**	**1.3%**	
	Distribution Assets - Contributed by Transmission																													
96	Argyll to Bellamy Transmission Contingency												-	-	0.79	-	-	-	-	-	-	-	-	-	-	-	-			K Bar
	Transmission Contribution for Distribution Assets																													
97	Bellamy Contribution												-	-	(0.79)	-	-	-	-	-	-	-	-	-	-	-	-			K Bar
	Distribution Contribution for Transmission Assets																													
98	Garneau Expansion												-	-	-	-	-	-	-	-	-	-	-	-	-	47.94	-			Tracker
99	Summerside Substation Contribution												-	-	-	-	-	-	13.87	(0.48)	-	-	-	-	-	-	-			Tracker
100	Poundmaker Contributions (East Industrial '07-'08)												-	-	-	(0.13)	-	-	-	-	14.17	(2.17)	-	-	-	-	-			Tracker
101	Clover Bar POD Addition Contribution												-	-	-	-	3.12	1.49	-	-	-	-	-	-	-	-	-			Tracker
102	Victoria Substation MV Breaker Purchase												-	-	-	-	-	-	-	0.09	-	-	-	-	-	-	-			Tracker
103	East Industrial Contribution												-	-	4.82	-	-	-	-	-	-	-	-	-	-	-	-			Tracker
104	**Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**4.82**	**(0.13)**	**3.12**	**1.49**	**13.87**	**(0.38)**	**14.17**	**(2.17)**	**-**	**-**	**-**	**47.94**	**-**			
	Adjustments																													
105	Corporate Allocation for the OH 2002-2004												-	1.37	-	-	-	-	-	-	-	-	-	-	-	-	-			K Bar
106	Capital Addition Adjustments												(0.06)	(0.04)	0.01	-	-	-	-	-	-	-	-	-	-	-	-			K Bar
107	**Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**(0.06)**	**1.33**	**0.01**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**			
	Grand Total																													
108	**Grand Total**	**17.69**	**14.28**	**9.81**	**13.80**	**16.57**	**18.49**	**16.84**	**28.49**	**32.90**	**31.13**	**22.58**	**29.67**	**36.48**	**53.48**	**40.98**	**54.52**	**49.46**	**78.28**	**91.73**	**117.80**	**78.61**	**100.87**	**135.87**	**177.96**	**213.27**	**113.34**	**55.37**	**100.0%**	
109	**Total Capital Additions from DLM**	**17.69**	**14.28**	**9.81**	**13.80**	**16.57**	**18.49**	**16.84**	**28.49**	**32.90**	**31.13**	**22.58**																		

Distribution Revenue Requirement Incurred
2018 F Factor - Using 2018 Forecast
($ millions)

2018 Model Year

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV
		Asset Age in 2018	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7
		Indicative Service Life	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
	362 Station Equipment																																																
1	Distribution Substation Life Cycle Replacements	48						0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.04	0.01	0.00	0.01	0.00	0.02
2	**Total**		-	-	-	-	-	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.04	0.01	0.00	0.01	0.00	0.02
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices																																																
3	Distribution Pole and Aerial Line Life Cycle Replacements	45									0.00	(0.00)	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.03	0.02	0.03	0.04	0.05	0.04	0.08	0.09	0.09	0.06	0.10	0.05	0.20	0.12	0.10	0.15	0.26	0.26
4	Capitalized Aerial System Damage	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.03	0.03	0.02	-	0.01	0.03	0.05	0.07	0.08	0.08	0.11
5	Remedial Pole Treatments	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	-	-	-	-	0.02	0.02
6	Lightning Arrestor Replacement	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.01	0.01	-	-	-	-	-
7	Installation of Insulators in 25 kV Supporting Guy Wires	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	-	-	-	-	-
8	**Life Cycle Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.01	0.02	0.01	0.02	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.04	0.04	0.06	0.05	0.03	0.05	0.06	0.07	0.06	0.11	0.13	0.13	0.09	0.16	0.10	0.25	0.17	0.18	0.23	0.37	0.38
9	Distribution System Neutral Installations	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	0.00	0.01	-	-	0.01
10	**Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.01	0.02	0.01	0.02	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.04	0.04	0.06	0.05	0.03	0.05	0.06	0.07	0.06	0.11	0.13	0.13	0.09	0.16	0.10	0.25	0.17	0.18	0.23	0.37	0.39
	367 Underground Conductors & Devices																																																
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	40														0.01	0.04	0.06	0.07	0.07	0.06	0.04	0.04	0.04	0.06	0.06	0.07	0.07	0.08	0.09	0.11	0.09	0.07	0.10	0.12	0.14	0.13	0.23	0.27	0.26	0.19	0.50	0.56	0.42	0.49	0.51	0.29	0.49	0.70
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	40														0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.04	0.03	0.01	####	0.03	0.12	0.12	0.12	0.12	0.08
13	**Growth Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.04	0.07	0.08	0.08	0.07	0.04	0.04	0.05	0.07	0.07	0.08	0.08	0.09	0.10	0.13	0.11	0.08	0.11	0.14	0.16	0.15	0.26	0.31	0.30	0.22	0.51	0.54	0.45	0.61	0.63	0.42	0.60	0.78
14	Switching Cubicle Life Cycle Replacement	40														0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.03	0.02	-	0.03	0.03	0.03	0.06	0.07	0.07	0.11
15	Replacement of Faulted Distribution PILC Cables	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.03	0.03	0.03	0.01	0.02	0.04	0.02	0.10
16	Life Cycle Replacement of PILC Cable	40														-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	Capitalized Underground System Damage	40														0.00	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.03	0.05	0.05	0.05	0.04	-	0.02	0.05	0.03	0.11	0.15	0.19	0.30
18	Life Cycle Replacement of Oil Switches – Program	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	0.05	-
19	Life Cycle Replacement and Extension of Underground Distribution Cable	40														0.01	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.03	0.05	0.06	0.06	0.06	0.11	0.12	0.12	0.09	0.01	-	0.05	0.03	0.25	0.19	0.31	0.67
20	Neighbourhood Renewal Program	40														0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	-	-	0.09	0.20
21	Underground Asbestos Abatement	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	0.01
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-
23	DAM - Distribution Manhole Rebuilds	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	40														0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-
25	**Life Cycle Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.04	0.06	0.07	0.07	0.06	0.04	0.03	0.04	0.05	0.06	0.07	0.06	0.07	0.08	0.11	0.09	0.06	0.09	0.11	0.13	0.12	0.21	0.25	0.24	0.18	0.04	0.08	0.16	0.10	0.44	0.46	0.74	1.39
26	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	0.08	0.12	0.14	0.15	0.12	0.08	0.08	0.09	0.12	0.13	0.15	0.14	0.17	0.18	0.24	0.20	0.14	0.20	0.25	0.29	0.27	0.47	0.56	0.54	0.40	0.55	0.62	0.61	0.71	1.07	0.88	1.34	2.17
	367 Underground Conductors & Devices - Underground Secondary Networks																																																
27	Network Reconfigurations	35																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	-	-	-	-
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	50				0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.07	0.06	0.02	0.00	-	-	0.02	0.03
29	Upgrading Protection on the Downtown Vaults and Manholes	42												0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.01	0.01	-	-	-	-	-
30	Installation of Locking Mechanisms on Network Vault Lids	42												0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	0.01
31	**Life Cycle Total**		-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.07	0.07	0.03	0.00	-	-	0.02	0.04
32	Installation of Network Current Limiting Fuse Program	35																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	-	-	-	0.01	0.00	-	0.04	0.03
33	**Total**		-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.03	0.03	0.02	0.07	0.09	0.05	0.02	0.00	-	0.07	0.07
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices																																																
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	43											0.01	0.02	0.01	0.02	0.02	0.04	0.04	0.04	0.04	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.06	0.05	0.04	0.05	0.07	0.08	0.07	0.13	0.15	0.14	0.11	0.17	0.08	0.22	0.33	0.16	0.42	0.31	0.44
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	43											0.01	0.03	0.02	0.02	0.03	0.05	0.06	0.06	0.05	0.03	0.03	0.04	0.05	0.05	0.06	0.05	0.07	0.07	0.09	0.08	0.06	0.08	0.10	0.11	0.11	0.18	0.22	0.21	0.16	0.27	0.21	0.30	0.46	0.43	0.62	0.48	0.53
36	Franchise Agreement Driven Relocations and Conversions	43											0.01	0.01	0.01	0.01	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.03	0.05	0.06	0.07	0.06	0.11	0.12	0.12	0.09	0.18	0.13	0.18	0.25	0.31	0.24	0.16	0.49
37	New 15kV and 25kV Circuit Additions	43											0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.03	0.02	0.01	0.02	0.03	0.03	0.03	0.05	0.06	0.06	0.04	0.01	0.02	0.06	0.00	0.30	0.11	0.02	0.34
38	QE II Highway & 41 Ave SW	43											-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	Walterdale Bridge	43											-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	W1 Circuit Extension	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.04	0.00	-	-	-	-
41	13 E Diversion and Reconductoring	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.02	-	-	-	-	-	-
42	Summerside Feeders	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.02	-	-	-	-	-	-	0.55	0.01
43	Poundmaker Feeders	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.03	0.03	0.02	-	-	-	-	-	-	-	0.01
44	NLRT Distribution System Relocations	45									0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.03	0.03	0.04	0.04	0.06	0.07	0.07	0.05	-	-	-	-	-	-	-	1.34
45	SE & W LRT Distribution System Relocation	44										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	**Growth Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.04	0.08	0.06	0.08	0.11	0.17	0.19	0.21	0.16	0.11	0.10	0.12	0.16	0.17	0.19	0.17	0.21	0.23	0.30	0.25	0.18	0.25	0.31	0.36	0.33	0.58	0.69	0.67	0.49	0.63	0.46	0.81	1.04	1.20	1.38	1.52	3.16
47	Aerial and UG Ground Replacements	43										(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.02
48	Distribution System Aerial and Underground Fault Indicators and Fusing	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.03	0.01	0.00	0.03	0.04	0.03
49	Installation of Automated Switches on Selected 25KV Circuits	44										(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.02	-	-	0.00	0.00	0.12	0.15	0.06	0.18
50	High Load Corridor	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.02	0.04	-	-	-	-
51	**Performance Improvement Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.00	0.01	0.00	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.04	0.02	0.02	0.05	0.06	0.12	0.19	0.10	0.21
52	**Total**		-	-	-	-	-	-	-	-	0.00	(0.00)	0.04	0.09	0.07	0.09	0.12	0.18	0.21	0.22	0.18	0.12	0.11	0.13	0.17	0.18	0.21	0.19	0.23	0.25	0.33	0.27	0.19	0.28	0.34	0.39	0.36	0.63	0.75	0.72	0.54	0.66	0.49	0.87	1.11	1.33	1.59	1.64	3.39
	368 Line Transformers																																																
53	Voltage Regulator Additions	35																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	0.03	0.01	-	-	0.02
54	Network Transformer Lifecycle Replacement	35																			0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.11	0.01	0.06	0.03	0.03	0.05	0.05	0.05
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	35																			0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.03	0.05	0.06	0.07	0.06	0.11	0.13	0.12	0.09	0.02	0.14	0.18	0.26	0.35	0.40	0.33	0.33
56	PCB Transformer Changeouts	35																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	0.01	0.04
57	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.07	0.06	0.04	0.06	0.07	0.08	0.08	0.14	0.16	0.16	0.12	0.14	0.15	0.24	0.32	0.39	0.45	0.39	0.44
	370 Conventional Meters & 371 Automated Meters																																																
58	Customer Revenue Metering - Growth & Life Cycle Replacements	15																																							0.03	0.16	0.17	0.17	0.25	0.27	0.20	0.17	0.17
59	Meter Depreciation	3																																															
60	**Customer Revenue Metering Subtotal**																																							-	0.03	0.16	0.17	0.17	0.25	0.27	0.20	0.17	0.17
	373 Street Lighting and Signal Systems																																																

Distribution Revenue Requirement Incurred
2018 F Factor - Using 2018 Forecast
($ millions)

		AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF
		6	5	4	3	2	1	0			
		2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2018 Total RR Incurred Before Adjustment**	**2018 Additional Allocated RR**	**2018 RR Incurred Total**
	362 Station Equipment										
1	Distribution Substation Life Cycle Replacements	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.18	-	0.18
2	**Total**	**0.01**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.18**	**-**	**0.18**
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices										
3	Distribution Pole and Aerial Line Life Cycle Replacements	0.21	0.11	0.30	0.43	0.30	0.35	0.21	4.09	-	4.09
4	Capitalized Aerial System Damage	0.11	0.10	0.12	0.12	0.13	0.13	0.07	1.53	-	1.53
5	Remedial Pole Treatments	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.25	-	0.25
6	Lightning Arrestor Replacement	-	-	-	-	-	-	-	0.12	-	0.12
7	Installation of Insulators in 25 kV Supporting Guy Wires	-	-	-	-	-	-	-	0.01	-	0.01
8	**Life Cycle Total**	**0.33**	**0.24**	**0.43**	**0.57**	**0.45**	**0.50**	**0.29**	**6.00**	**-**	**6.00**
9	Distribution System Neutral Installations	0.01	-	-	-	-	-	-	0.03	-	0.03
10	**Total**	**0.34**	**0.24**	**0.43**	**0.57**	**0.45**	**0.50**	**0.29**	**6.03**	**-**	**6.03**
	367 Underground Conductors & Devices										
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	1.32	1.60	1.50	1.54	1.61	1.64	0.91	16.65	-	16.65
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	0.21	0.11	0.13	0.11	0.19	0.20	0.10	2.00	-	2.00
13	**Growth Total**	**1.54**	**1.71**	**1.63**	**1.65**	**1.80**	**1.84**	**1.01**	**18.64**	**-**	**18.64**
14	Switching Cubicle Life Cycle Replacement	0.07	0.04	0.06	0.07	0.14	0.13	0.07	1.25	-	1.25
15	Replacement of Faulted Distribution PILC Cables	0.06	0.07	0.18	0.09	0.12	0.12	0.06	1.16	-	1.16
16	Life Cycle Replacement of PILC Cable	-	-	0.09	0.14	0.19	0.20	0.10	0.73	-	0.73
17	Capitalized Underground System Damage	0.29	0.26	0.22	0.32	0.30	0.31	0.18	3.23	-	3.23
18	Life Cycle Replacement of Oil Switches – Program	0.04	-	0.02	-	-	-	-	0.14	-	0.14
19	Life Cycle Replacement and Extension of Underground Distribution Cable	0.82	0.26	0.87	1.23	0.86	0.90	0.67	8.31	-	8.31
20	Neighbourhood Renewal Program	0.14	0.10	0.05	0.20	-	-	-	0.96	-	0.96
21	Underground Asbestos Abatement	-	-	-	-	-	-	-	0.01	-	0.01
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	0.03	0.00	-	-	-	-	-	0.05	-	0.05
23	DAM - Distribution Manhole Rebuilds	0.02	0.01	0.00	0.03	0.01	0.02	0.01	0.11	-	0.11
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	-	0.01	0.01	0.01	0.01	0.01	0.01	0.06	-	0.06
25	**Life Cycle Total**	**1.45**	**0.75**	**1.48**	**2.09**	**1.62**	**1.69**	**1.09**	**15.99**	**-**	**15.99**
26	**Total**	**2.99**	**2.46**	**3.11**	**3.75**	**3.42**	**3.52**	**2.10**	**34.63**	**-**	**34.63**
	367 Underground Conductors & Devices - Underground Secondary Networks										
27	Network Reconfigurations	0.00	-	-	0.06	0.15	0.32	0.12	0.72	-	0.72
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	0.06	0.04	0.09	0.10	0.10	0.10	0.06	0.95	-	0.95
29	Upgrading Protection on the Downtown Vaults and Manholes	-	-	-	-	-	-	-	0.03	-	0.03
30	Installation of Locking Mechanisms on Network Vault Lids	0.08	0.00	-	-	-	-	-	0.10	-	0.10
31	**Life Cycle Total**	**0.14**	**0.04**	**0.09**	**0.10**	**0.10**	**0.10**	**0.06**	**1.08**	**-**	**1.08**
32	Installation of Network Current Limiting Fuse Program	0.03	0.03	-	-	-	-	-	0.21	-	0.21
33	**Total**	**0.17**	**0.07**	**0.09**	**0.16**	**0.25**	**0.43**	**0.18**	**2.02**	**-**	**2.02**
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices										
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	0.61	0.54	0.53	0.70	0.69	0.53	0.37	7.59	-	7.59
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	0.79	0.81	0.88	0.80	0.95	0.98	0.54	11.22	-	11.22
36	Franchise Agreement Driven Relocations and Conversions	0.42	0.26	0.25	0.32	0.26	0.26	-	4.97	-	4.97
37	New 15kV and 25kV Circuit Additions	0.21	0.12	0.37	0.71	0.46	1.08	0.43	4.85	-	4.85
38	QE II Highway & 41 Ave SW	-	0.20	-	-	-	-	-	0.20	-	0.20
39	Walterdale Bridge	-	-	0.04	0.35	-	-	-	0.39	-	0.39
40	W1 Circuit Extension	-	-	-	-	-	-	-	0.06	-	0.06
41	13 E Diversion and Reconductoring	-	-	-	-	-	-	-	0.04	-	0.04
42	Summerside Feeders	0.00	-	-	-	-	-	-	0.89	-	0.89
43	Poundmaker Feeders	0.87	0.02	-	-	-	-	-	1.21	-	1.21
44	NLRT Distribution System Relocations	0.10	-	-	-	-	-	-	2.20	-	2.20
45	SE & W LRT Distribution System Relocation	-	0.42	0.71	1.50	0.79	0.66	-	4.08	-	4.08
46	**Growth Total**	**3.00**	**2.37**	**2.79**	**4.37**	**3.16**	**3.51**	**1.33**	**37.70**	**-**	**37.70**
47	Aerial and UG Ground Replacements	0.03	0.02	0.03	0.04	0.04	0.04	0.02	0.42	-	0.42
48	Distribution System Aerial and Underground Fault Indicators and Fusing	0.04	0.03	0.12	0.11	0.05	0.06	0.03	0.79	-	0.79
49	Installation of Automated Switches on Selected 25KV Circuits	0.12	0.03	0.02	0.07	0.06	0.08	0.04	1.28	-	1.28
50	High Load Corridor	-	-	-	-	-	-	-	0.10	-	0.10
51	**Performance Improvement Total**	**0.16**	**0.05**	**0.14**	**0.19**	**0.11**	**0.14**	**0.07**	**2.17**	**-**	**2.17**
52	**Total**	**3.19**	**2.45**	**2.97**	**4.59**	**3.31**	**3.69**	**1.43**	**40.30**	**-**	**40.30**
	368 Line Transformers										
53	Voltage Regulator Additions	0.00	0.00	-	-	0.02	-	0.00	0.12	-	0.12
54	Network Transformer Lifecycle Replacement	0.04	0.05	0.08	0.35	0.19	0.24	0.15	1.69	-	1.69
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	0.44	0.44	0.45	0.46	0.49	0.52	0.28	6.15	-	6.15
56	PCB Transformer Changeouts	0.03	0.00	0.01	0.04	0.02	0.03	0.02	0.23	-	0.23
57	**Total**	**0.51**	**0.49**	**0.55**	**0.84**	**0.73**	**0.78**	**0.45**	**8.19**	**-**	**8.19**
	370 Conventional Meters & 371 Automated Meters										
58	Customer Revenue Metering - Growth & Life Cycle Replacements	0.27	0.51	0.61	0.50	0.39	0.36	0.29	4.52	-	4.52
59	Meter Depreciation								-	-	-
60	**Customer Revenue Metering Subtotal**	**0.27**	**0.51**	**0.61**	**0.50**	**0.39**	**0.36**	**0.29**	**4.52**	**-**	**4.52**
	373 Street Lighting and Signal Systems										

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV
		Asset Age in 2018	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7
		Indicative Service Life	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
61	Street Light Service Connections and Security Lighting Addition and Capital Replacement	20																																		0.00	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.06	0.06	0.06
	389 General Plant – Land																																																
62	Land Purchase for Slurry Placement	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	-	0.06	0.03	(0.00)	-	0.00	0.02	0.01
	390 General Plant - Structures & Improvements																																																
63	Furniture Life Cycle Replacements	8																																														0.01	0.02
64	North and South Service Center Building Life Cycle Replacements	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.04	0.03	0.05	0.07	0.11	0.05	0.08	0.07	0.06	0.14
65	Work Centre Redevelopment	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-
66	**Life Cycle Total**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.00**	**(0.00)**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.03**	**0.04**	**0.04**	**0.03**	**0.05**	**0.07**	**0.11**	**0.05**	**0.08**	**0.07**	**0.07**	**0.17**
67	Service Center Consolidation Project	45									0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	0.19	0.06	-	-	-	-	-
68	**Total**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.00**	**(0.00)**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**	**0.02**	**0.02**	**0.02**	**0.02**	**0.01**	**0.02**	**0.03**	**0.03**	**0.03**	**0.05**	**0.06**	**0.05**	**0.04**	**0.05**	**0.26**	**0.17**	**0.05**	**0.08**	**0.07**	**0.07**	**0.17**
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications																																																
69	Advanced Metering Infrastructure	15																																							-	-	-	-	-	-	-	-	-
	391.1 General Plant – Computer hardware & voice and data network equipment																																																
70	IT Hardware Lifecycle Replacements and Additions	4																																															
	391.2 General Plant - Computer software and applications																																																
71	Business Systems Upgrades	10																																												0.01	0.06	0.00	0.02
72	Work Management System Upgrade	10																																												-	-	-	-
73	GIS - Performance Improvement Project	10																																												-	-	0.89	0.11
74	OMS/DMS Life Cycle Replacement	10																																												-	-	-	-
75	**Life Cycle Total**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.01**	**0.06**	**0.90**	**0.13**
76	Meter Reading Route Optimization	10																																												0.03	-	-	-
77	Automation of Off Cycle Meter Read Project	10																																												0.01	-	-	-
78	Inventory Bar Coding Application	10																																												-	(0.01)	-	-
79	AMI Software and Applications	10																																												-	-	-	-
80	Engineering and Design Software Modifications	10																																												-	-	-	-
81	Safety Software	10																																												-	-	-	0.01
82	**Performance Improvement Total**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.04**	**(0.01)**	**-**	**0.01**
83	**Total**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.06**	**0.06**	**0.90**	**0.14**
	391.3 General Plant - Load settlement software and applications																																																
84	STARS Settlement System Modifications	10																																												-	-	0.05	0.02
85	IBPM (flow) Upgrade	10																																												0.02	-	-	-
86	Regulated Default Supply	10																																												0.06	-	-	-
87	Directive 52	10																																												0.02	-	-	-
88	Tariff Bill Code Data Retention	10																																												0.01	-	-	-
89	Micro Generation Records upgrade	10																																												0.01	-	-	-
90	Dropchute Replacement	10																																												-	-	-	-
91	Interval Meter Data Collection (MV-90 Upgrade)	10																																												(0.00)	-	-	-
92	STARS Upgrade	10																																												-	-	-	-
93	**Life Cycle Total**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.12**	**-**	**0.05**	**0.02**
	392 General Plant - Transportation, Fleet vehicles																																																
94	Vehicles - Growth and Life Cycle Replacements	11																																											0.00	0.01	0.01	0.02	0.05
	394 General Plant - Tools, shop, garage, stores and laboratory equipment																																																
95	Capital Tools and Instrument Purchases	10																																												0.03	0.05	0.13	0.10
96	Meter Reading Equipment	10																																												0.01	-	0.01	-
97	**Total**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.04**	**0.05**	**0.14**	**0.10**
	Distribution Assets - Contributed by Transmission																																																
98	Argyll to Bellamy Transmission Contingency	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06	-	-	-	-	-
	Transmission Contribution for Distribution Assets																																																
99	Bellamy Contribution	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	####	-	-	-	-	-
	Distribution Contribution for Transmission Assets																																																
100	Garneau Expansion	45									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
101	Summerside Substation Contribution	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.09	(0.04)
102	Poundmaker Contributions (East Industrial '07-'08)	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(0.01)	-	-	-	-
103	Clover Bar POD Addition Contribution	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.23	0.11	-	-
104	Victoria Substation MV Breaker Purchase	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
105	East Industrial Contribution	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.34	-	-	-	-	-
106	**Total**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.34**	**(0.01)**	**0.23**	**0.11**	**1.09**	**(0.03)**
	Adjustments																																																
107	Corporate Allocation for the OH 2002-2004	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	-	-	-	-	-
108	Capital Addition Adjustments	35																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(0.00)	####	0.00	-	-	-	-	-
	Grand Total																																																
109	**Grand Total**		**-**	**-**	**-**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**(0.00)**	**0.06**	**0.12**	**0.09**	**0.14**	**0.24**	**0.36**	**0.42**	**0.45**	**0.37**	**0.26**	**0.24**	**0.28**	**0.38**	**0.40**	**0.46**	**0.42**	**0.51**	**0.55**	**0.73**	**0.61**	**0.43**	**0.62**	**0.77**	**0.88**	**0.83**	**1.44**	**1.71**	**1.66**	**1.27**	**1.81**	**2.05**	**2.78**	**2.66**	**3.83**	**3.71**	**6.32**	**7.17**
110																																																	
111																																																	
112																																																	
113																																																	
114																																																	
115																																																	
116																																															2018 WACC	

		AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF
		6	5	4	3	2	1	0			
		2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2018 Total RR Incurred Before Adjustment**	**2018 Additional Allocated RR**	**2018 RR Incurred Total**
61	Street Light Service Connections and Security Lighting Addition and Capital Replacement	0.07	0.07	0.05	0.07	0.06	0.06	0.04	0.77	-	0.77
	389 General Plant – Land										
62	Land Purchase for Slurry Placement	0.02	-	-	-	-	-	-	0.21	-	0.21
	390 General Plant - Structures & Improvements										
63	Furniture Life Cycle Replacements	0.06	0.02	0.03	0.03	0.03	0.03	0.02	0.26	-	0.26
64	North and South Service Center Building Life Cycle Replacements	0.05	0.03	0.04	0.01	0.01	0.02	0.01	1.22	-	1.22
65	Work Centre Redevelopment	0.03	0.00	0.01	-	3.24	1.74	-	5.04	-	5.04
66	**Life Cycle Total**	**0.11**	**0.05**	**0.07**	**0.04**	**0.05**	**0.05**	**0.03**	**1.48**	**-**	**1.48**
67	Service Center Consolidation Project	-	-	-	-	-	-	-	0.40	-	0.40
68	**Total**	**0.14**	**0.06**	**0.08**	**0.04**	**3.29**	**1.79**	**0.03**	**6.92**	**-**	**6.92**
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications										
69	Advanced Metering Infrastructure	-	-	-	-	4.03	3.32	-	7.34	-	7.34
	391.1 General Plant – Computer hardware & voice and data network equipment										
70	IT Hardware Lifecycle Replacements and Additions			0.04	0.09	0.27	0.12	0.10	0.62	-	0.62
	391.2 General Plant - Computer software and applications										
71	Business Systems Upgrades	0.05	0.08	0.02	0.02	0.04	0.26	0.06	0.63	-	0.63
72	Work Management System Upgrade	0.19	0.05	0.05	-	0.11	0.20	0.06	0.66	-	0.66
73	GIS - Performance Improvement Project	0.08	0.00	0.20	-	-	-	-	1.28	-	1.28
74	OMS/DMS Life Cycle Replacement	0.00	-	-	1.32	-	0.85	-	2.18	-	2.18
75	**Life Cycle Total**	**0.32**	**0.13**	**0.27**	**1.34**	**0.15**	**1.31**	**0.12**	**4.75**	**-**	**4.75**
76	Meter Reading Route Optimization	-	-	-	-	-	-	-	0.03	-	0.03
77	Automation of Off Cycle Meter Read Project	-	-	-	-	-	-	-	0.01	-	0.01
78	Inventory Bar Coding Application	-	-	-	-	-	-	-	(0.01)	-	(0.01)
79	AMI Software and Applications	-	-	-	-	-	-	-	-	-	-
80	Engineering and Design Software Modifications	0.04	0.05	0.00	-	-	0.05	0.01	0.15	-	0.15
81	Safety Software	(0.00)	-	-	-	-	-	-	0.00	-	0.00
82	**Performance Improvement Total**	**0.04**	**0.05**	**0.00**	**-**	**-**	**0.05**	**0.01**	**0.19**	**-**	**0.19**
83	**Total**	**0.36**	**0.18**	**0.27**	**1.34**	**0.15**	**1.37**	**0.13**	**4.94**	**-**	**4.94**
	391.3 General Plant - Load settlement software and applications										
84	STARS Settlement System Modifications	0.01	0.05	0.01	-	-	-	-	0.13	-	0.13
85	IBPM (flow) Upgrade	-	-	-	-	-	-	-	0.02	-	0.02
86	Regulated Default Supply	-	-	-	-	-	-	-	0.06	-	0.06
87	Directive 52	-	-	-	-	-	-	-	0.02	-	0.02
88	Tariff Bill Code Data Retention	-	-	-	-	-	-	-	0.01	-	0.01
89	Micro Generation Records upgrade	-	-	-	-	-	-	-	0.01	-	0.01
90	Dropchute Replacement	0.02	-	-	-	-	-	-	0.02	-	0.02
91	Interval Meter Data Collection (MV-90 Upgrade)	-	-	0.36	-	-	-	-	0.35	-	0.35
92	STARS Upgrade	-	0.04	-	-	-	-	-	0.04	-	0.04
93	**Life Cycle Total**	**0.03**	**0.09**	**0.37**	**-**	**-**	**-**	**-**	**0.66**	**-**	**0.66**
	392 General Plant - Transportation, Fleet vehicles										
94	Vehicles - Growth and Life Cycle Replacements	0.11	0.05	0.08	0.12	0.26	0.24	0.13	1.09	-	1.09
	394 General Plant - Tools, shop, garage, stores and laboratory equipment										
95	Capital Tools and Instrument Purchases	0.14	0.13	0.13	0.13	0.18	0.09	0.08	1.19	-	1.19
96	Meter Reading Equipment	-	-	0.03	0.03	-	-	0.01	0.09	-	0.09
97	**Total**	**0.14**	**0.13**	**0.16**	**0.15**	**0.18**	**0.09**	**0.08**	**1.27**	**-**	**1.27**
	Distribution Assets - Contributed by Transmission										
98	Argyll to Bellamy Transmission Contingency	-	-	-	-	-	-	-	0.06	-	0.06
	Transmission Contribution for Distribution Assets										
99	Bellamy Contribution	-	-	-	-	-	-	-	(0.06)	-	(0.06)
	Distribution Contribution for Transmission Assets										
100	Garneau Expansion	-	-	-	-	-	4.11	-	4.11	-	4.11
101	Summerside Substation Contribution	-	-	-	-	-	-	-	1.05	-	1.05
102	Poundmaker Contributions (East Industrial '07-'08)	1.17	(0.18)	-	-	-	-	-	0.98	-	0.98
103	Clover Bar POD Addition Contribution	-	-	-	-	-	-	-	0.35	-	0.35
104	Victoria Substation MV Breaker Purchase	-	-	-	-	-	-	-	0.01	-	0.01
105	East Industrial Contribution	-	-	-	-	-	-	-	0.34	-	0.34
106	**Total**	**1.17**	**(0.18)**	**-**	**-**	**-**	**4.11**	**-**	**6.84**	**-**	**6.84**
	Adjustments										
107	Corporate Allocation for the OH 2002-2004	-	-	-	-	-	-	-	0.10	-	0.10
108	Capital Addition Adjustments	-	-	-	-	-	-	-	(0.01)	-	(0.01)
	Grand Total										
109	**Grand Total**	**9.51**	**6.61**	**8.81**	**12.24**	**16.79**	**20.38**	**5.25**	**126.65**	**-**	**126.65**
110											
111											
112									**2018 F**		
113											
114								Total 2018 RR for Capital	**126.65**		
115								Difference	-		
116		6.50%							0.00%	DLM Difference	

Distribution Incurred RR vs PBR Recovered RR
2018 F Factor - Using 2018 Forecast
($ millions)

F Factor Total **2.62**

		A	B	C	D	E	F
Notes	**Project**	**2018 RR Incurred (per tab 2 2018 RR)**	**2018 PBR Recovered (Per tab 4)**	**2018 Variance Incurred Vs. Recovered**	**Adjustment[1]**	**Capital Shortfall After Revenue Adjustments**	**Category**
				A - B		**C + D**	**Note 2**
	362 Station Equipment						
1	Distribution Substation Life Cycle Replacements	0.18	0.19	(0.01)		(0.01)	K Bar
2	**Total**	**0.18**	**0.19**	**(0.01)**		(0.01)	
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices						
3	Distribution Pole and Aerial Line Life Cycle Replacements	4.09	3.99	0.10		0.10	K Bar
4	Capitalized Aerial System Damage	1.53	1.50	0.03		0.03	K Bar
5	Remedial Pole Treatments	0.25	0.24	0.01		0.01	K Bar
6	Lightning Arrestor Replacement	0.12	0.13	(0.01)		(0.01)	K Bar
7	Installation of Insulators in 25 kV Supporting Guy Wires	0.01	0.01	(0.00)		(0.00)	K Bar
8	**Life Cycle Total**	**6.00**	**5.87**	**0.13**		0.13	
9	Distribution System Neutral Installations	0.03	0.04	(0.00)		(0.00)	K Bar
10	**Total**	**6.03**	**5.91**	**0.12**		0.12	
	367 Underground Conductors & Devices						
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	16.65	16.09	0.56		0.56	K Bar
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	2.00	1.94	0.05		0.05	K Bar
13	**Growth Total**	**18.64**	**18.03**	**0.61**		**0.61**	
14	Switching Cubicle Life Cycle Replacement	1.25	1.20	0.04		0.04	K Bar
15	Replacement of Faulted Distribution PILC Cables	1.16	1.12	0.04		0.04	K Bar
16	Life Cycle Replacement of PILC Cable	0.73	0.56	0.16		0.16	K Bar
17	Capitalized Underground System Damage	3.23	3.13	0.10		0.10	K Bar
18	Life Cycle Replacement of Oil Switches – Program	0.14	0.15	(0.01)		(0.01)	K Bar
19	Life Cycle Replacement and Extension of Underground Distribution Cable	8.31	7.75	0.56		0.56	K Bar
20	Neighbourhood Renewal Program	0.96	1.03	(0.08)		(0.08)	K Bar
21	Underground Asbestos Abatement	0.01	0.01	(0.00)		(0.00)	K Bar
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	0.05	0.05	(0.00)		(0.00)	K Bar
23	DAM - Distribution Manhole Rebuilds	0.11	0.09	0.01		0.01	K Bar
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	0.06	0.05	0.01		0.01	K Bar
25	**Life Cycle Total**	**15.99**	**15.15**	**0.84**		**0.84**	
26	**Total**	**34.63**	**33.19**	**1.45**		**1.45**	
	367 Underground Conductors & Devices - Underground Secondary Networks						
27	Network Reconfigurations	0.72	0.47	0.25		0.25	K Bar
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	0.95	0.90	0.05		0.05	K Bar
29	Upgrading Protection on the Downtown Vaults and Manholes	0.03	0.04	(0.00)		(0.00)	K Bar
30	Installation of Locking Mechanisms on Network Vault Lids	0.10	0.11	(0.01)		(0.01)	K Bar
31	**Life Cycle Total**	**1.08**	**1.05**	**0.04**		**0.04**	
32	Installation of Network Current Limiting Fuse Program	0.21	0.23	(0.02)		(0.02)	K Bar
33	**Total**	**2.02**	**1.75**	**0.27**		**0.27**	
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices						
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	7.59	7.49	0.10		0.10	K Bar
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	11.22	10.97	0.25		0.25	K Bar
36	Franchise Agreement Driven Relocations and Conversions	4.97	5.22	(0.25)		(0.25)	Tracker
37	New 15kV and 25kV Circuit Additions	4.85	4.17	0.67		0.67	K Bar
38	Queen Elizabeth II Highway & 41 Avenue SW Interchange Distribution System Relocations	0.20	0.22	(0.01)		(0.01)	Tracker
39	Walterdale Bridge	0.39	0.42	(0.03)		(0.03)	Tracker
40	W1 Circuit Extension	0.06	0.06	(0.00)		(0.00)	K Bar
41	13 E Diversion and Reconductoring	0.04	0.04	(0.00)		(0.00)	K Bar
42	Summerside Feeders	0.89	0.96	(0.07)		(0.07)	K Bar
43	Poundmaker Feeders	1.21	1.31	(0.09)		(0.09)	K Bar
44	NLRT Distribution System Relocations	2.20	2.38	(0.17)		(0.17)	Tracker
45	SE & W LRT Distribution System Relocation	4.08	4.02	0.06		0.06	Tracker
46	**Growth Total**	**37.70**	**37.26**	**0.45**		**0.45**	
47	Aerial and UG Ground Replacements	0.42	0.41	0.01		0.00	K Bar
48	Distribution System Aerial and Underground Fault Indicators and Fusing	0.79	0.78	0.01		0.01	K Bar
49	Installation of Automated Switches on Selected 25KV Circuits	1.28	1.30	(0.01)		(0.01)	K Bar
50	High Load Corridor	0.10	0.11	(0.01)		(0.01)	K Bar
51	**Performance Improvement Total**	**2.17**	**2.18**	**(0.01)**		**(0.01)**	
52	**Total**	**40.30**	**39.85**	**0.45**		**0.45**	
	368 Line Transformers						
53	Voltage Regulator Additions	0.12	0.13	(0.01)		(0.01)	K Bar
54	Network Transformer Lifecycle Replacement	1.69	1.54	0.15		0.15	K Bar
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	6.15	6.09	0.06		0.06	K Bar
56	PCB Transformer Changeouts	0.23	0.22	0.01		0.01	K Bar
57	**Total**	**8.19**	**7.97**	**0.21**		**0.21**	
	370 Conventional Meters & 371 Automated Meters						
58	Customer Revenue Metering - Growth & Life Cycle Replacements	4.52	4.52	(0.00)		(0.00)	
58a	Meter Depreciation	-	-	-		-	

		A	B	C	D	E	F
Notes	**Project**	**2018 RR Incurred (per tab 2 2018 RR)**	**2018 PBR Recovered (Per tab 4)**	**2018 Variance Incurred Vs. Recovered**	**Adjustment[1]**	**Capital Shortfall After Revenue Adjustments**	**Category**
58b	**Customer Revenue Metering Subtotal**	**4.52**	**4.52**	**(0.00)**		**(0.00)**	K Bar
	373 Street Lighting and Signal Systems						
59	Street Light Service Connections and Security Lighting Addition and Capital Replacement	0.77	0.77	(0.00)		(0.00)	K Bar
	389 General Plant – Land						
60	Land Purchase for Slurry Placement	0.21	0.23	(0.02)		(0.02)	K Bar
	390 General Plant - Structures & Improvements						
61	Furniture Life Cycle Replacements	0.26	0.27	(0.01)		(0.01)	K Bar
62	North and South Service Center Building Life Cycle Replacements	1.22	1.30	(0.08)		(0.08)	K Bar
63	Work Centre Redevelopment	5.04	4.47	0.58		0.58	Tracker
64	**Life Cycle Total**	**1.48**	**1.57**	**(0.09)**		**(0.09)**	
65	Service Center Consolidation Project	0.40	0.43	(0.03)		(0.03)	K Bar
66	**Total**	**6.92**	**6.46**	**0.46**		**0.46**	
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications						
67	Advanced Metering Infrastructure	7.34	6.17	1.17		1.17	Tracker
	391.1 General Plant – Computer hardware & voice and data network equipment						
68	IT Hardware Lifecycle Replacements and Additions	0.62	0.59	0.03		0.03	K Bar
	391.2 General Plant - Computer software and applications						
69	Business Systems Upgrades	0.63	0.50	0.13		0.13	K Bar
70	Work Management System Upgrade	0.66	0.55	0.11		0.11	K Bar
71	GIS - Performance Improvement Project	1.28	1.43	(0.14)		(0.14)	K Bar
72	OMS/DMS Life Cycle Replacement	2.18	1.91	0.26		0.26	Tracker
73	**Life Cycle Total**	**4.75**	**4.39**	**0.36**		**0.36**	
74	Meter Reading Route Optimization	0.03	0.08	(0.05)		(0.05)	K Bar
75	Automation of Off Cycle Meter Read Project	0.01	0.02	(0.01)		(0.01)	K Bar
76	Inventory Bar Coding Application	(0.01)	0.01	(0.01)		(0.01)	K Bar
77	AMI Software and Applications	-	-	-		-	K Bar
78	Engineering and Design Software Modifications	0.15	0.13	0.02		0.02	K Bar
79	Safety Software	0.00	0.01	(0.00)		(0.00)	K Bar
80	**Performance Improvement Total**	**0.19**	**0.25**	**(0.05)**		**(0.05)**	
81	**Total**	**4.94**	**4.64**	**0.30**		**0.30**	
	391.3 General Plant - Load settlement software and applications						
82	STARS Settlement System Modifications	0.13	0.15	(0.01)		(0.01)	K Bar
83	IBPM (flow) Upgrade	0.02	0.04	(0.02)		(0.02)	K Bar
84	Regulated Default Supply	0.06	0.13	(0.07)		(0.07)	K Bar
85	Directive 52	0.02	0.05	(0.03)		(0.03)	K Bar
86	Tariff Bill Code Data Retention	0.01	0.02	(0.01)		(0.01)	K Bar
87	Micro Generation Records upgrade	0.01	0.01	(0.01)		(0.01)	K Bar
88	Dropchute Replacement	0.02	0.02	(0.00)		(0.00)	K Bar
89	Interval Meter Data Collection and Processing (MV-90 Upgrade)	0.35	0.40	(0.05)		(0.05)	Tracker
90	STARS Upgrade	0.04	0.04	(0.00)		(0.00)	K Bar
91	**Life Cycle Total**	**0.66**	**0.87**	**(0.21)**		**(0.21)**	
	392 General Plant - Transportation, Fleet vehicles						
92	Vehicles - Growth and Life Cycle Replacements	1.09	1.04	0.06		0.06	K Bar
	394 General Plant - Tools, shop, garage, stores and laboratory equipment						
93	Capital Tools and Instrument Purchases	1.19	1.24	(0.05)		(0.05)	K Bar
94	Meter Reading Equipment	0.09	0.12	(0.03)		(0.03)	K Bar
95	**Total**	**1.27**	**1.36**	**(0.09)**		**(0.09)**	
	Distribution Assets - Contributed by Transmission						
96	Argyll to Bellamy Transmission Contingency	0.06	0.06	(0.00)		(0.00)	K Bar
	Transmission Contribution for Distribution Assets						
97	Bellamy Contribution	(0.06)	(0.06)	0.00		0.00	K Bar
	Distribution Contribution for Transmission Assets						
98	Garneau Expansion	4.11	2.18	1.93		1.93	Tracker
99	Summerside Substation Contribution	1.05	1.14	(0.08)		(0.08)	Tracker
100	Poundmaker Contributions (East Industrial '07-'08)	0.98	1.05	(0.08)		(0.08)	Tracker
101	Clover Bar POD Addition Contribution	0.35	0.38	(0.03)		(0.03)	Tracker
102	Victoria Substation MV Breaker Purchase	0.01	0.01	(0.00)		(0.00)	Tracker
103	East Industrial Contribution	0.34	0.37	(0.03)		(0.03)	Tracker
104	**Total**	**6.84**	**5.13**	**1.71**		**1.71**	
	Adjustments						
105	Corporate Allocation for the OH 2002-2004	0.10	0.10	(0.01)		(0.01)	K Bar
106	Capital Addition Adjustments	(0.01)	(0.01)	0.00		0.00	K Bar
107	**Grand Total All Projects**	**126.65**	**120.75**	**5.89**		**5.89**	
108	**Grand Total of K Bar (F Factor) Projects Only**	**93.04**	**90.42**	**2.62**	-	**2.62**	K Bar Total

Notes

[1] *Adjustments are used in cases such as Asset Usage Fees where EDTI Distribution has received funding from other sources on behalf of capital assets, but the funds received do not draw down the capital additions. In order to avoid double recovery where this is the case, the Revenue Requirement is reduced in this column. This adjustment is only required for new projects where the asset usage fee would not have been included in Going-In Rates.*

[2] *Capital Tracker Projects do not Qualify for F Factor Status.*

Distribution 2018 Revenue Requirement Recovered | **2017 Model Year**
2018 F Factor - Using 2018 Forecast
($ millions)

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
		Asset Age in 2017	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20
		Indicative Service Life	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**
	362 Station Equipment																																		
1	Distribution Substation Life Cycle Replacements	48					0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	**Total**		-	-	-	-	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**(0.00)**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices																																		
3	Distribution Pole and Aerial Line Life Cycle Replacements	45								0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.03	0.02	0.03	0.04
4	Capitalized Aerial System Damage	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
5	Remedial Pole Treatments	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Lightning Arrestor Replacement	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Installation of Insulators in 25 kV Supporting Guy Wires	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	**Life Cycle Total**		-	-	-	-	-	-	-	**0.00**	**0.01**	**(0.00)**	**0.01**	**0.02**	**0.01**	**0.02**	**0.02**	**0.03**	**0.04**	**0.04**	**0.03**	**0.02**	**0.02**	**0.02**	**0.03**	**0.03**	**0.04**	**0.03**	**0.04**	**0.04**	**0.06**	**0.05**	**0.03**	**0.05**	**0.06**
9	Distribution System Neutral Installations	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	**Total**		-	-	-	-	-	-	-	**0.00**	**0.01**	**(0.00)**	**0.01**	**0.02**	**0.01**	**0.02**	**0.02**	**0.03**	**0.04**	**0.04**	**0.03**	**0.02**	**0.02**	**0.02**	**0.03**	**0.03**	**0.04**	**0.03**	**0.04**	**0.04**	**0.06**	**0.05**	**0.03**	**0.05**	**0.06**
	367 Underground Conductors & Devices																																		
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	40													0.01	0.03	0.04	0.06	0.07	0.08	0.06	0.04	0.04	0.05	0.06	0.06	0.07	0.07	0.08	0.09	0.12	0.10	0.07	0.10	0.12
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	40													0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02
13	**Growth Total**		-	-	-	-	-	-	-	-	-	-	-	-	**0.01**	**0.03**	**0.05**	**0.07**	**0.08**	**0.09**	**0.07**	**0.05**	**0.04**	**0.05**	**0.07**	**0.07**	**0.08**	**0.08**	**0.09**	**0.10**	**0.13**	**0.11**	**0.08**	**0.11**	**0.14**
14	Switching Cubicle Life Cycle Replacement	40													0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
15	Replacement of Faulted Distribution PILC Cables	40													0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01
16	Life Cycle Replacement of PILC Cable	40													-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	Capitalized Underground System Damage	40													0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.03
18	Life Cycle Replacement of Oil Switches – Program	40													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Life Cycle Replacement and Extension of Underground Distribution Cable	40													0.01	0.01	0.02	0.03	0.03	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.03	0.05	0.06
20	Neighbourhood Renewal Program	40													0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
21	Underground Asbestos Abatement	40													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	40													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	DAM - Distribution Manhole Rebuilds	40													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	40													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	**Life Cycle Total**		-	-	-	-	-	-	-	-	-	-	-	-	**0.01**	**0.03**	**0.04**	**0.06**	**0.07**	**0.07**	**0.06**	**0.04**	**0.04**	**0.04**	**0.06**	**0.06**	**0.07**	**0.06**	**0.08**	**0.08**	**0.11**	**0.09**	**0.07**	**0.09**	**0.12**
26	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	**0.02**	**0.06**	**0.09**	**0.13**	**0.15**	**0.16**	**0.13**	**0.09**	**0.08**	**0.10**	**0.13**	**0.13**	**0.15**	**0.14**	**0.17**	**0.18**	**0.24**	**0.20**	**0.14**	**0.21**	**0.26**
	367 Underground Conductors & Devices - Underground Secondary Networks																																		
27	Network Reconfigurations	35																		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	50			0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01
29	Upgrading Protection on the Downtown Vaults and Manholes	42											0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	Installation of Locking Mechanisms on Network Vault Lids	42											0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	**Life Cycle Total**		-	-	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**(0.00)**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
32	Installation of Network Current Limiting Fuse Program	35																		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	**Total**		-	-	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**(0.00)**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices																																		
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	43										(0.00)	0.01	0.02	0.01	0.02	0.03	0.04	0.04	0.05	0.04	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.07	0.05	0.04	0.06	0.07
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	43										(0.00)	0.02	0.03	0.02	0.03	0.04	0.06	0.06	0.07	0.05	0.03	0.03	0.04	0.05	0.05	0.06	0.06	0.07	0.07	0.10	0.08	0.06	0.08	0.10
36	Franchise Agreement Driven Relocations and Conversions	43										(0.00)	0.01	0.02	0.01	0.01	0.02	0.03	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.04	0.04	0.06	0.05	0.03	0.05	0.06
37	New 15kV and 25kV Circuit Additions	43										(0.00)	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.03
38	OE II Highway & 41 Ave SW	43										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	Walterdale Bridge	43										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	W1 Circuit Extension	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	13 E Diversion and Reconductoring	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42	Summerside Feeders	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
43	Poundmaker Feeders	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
44	NLRT Distribution System Relocations	45								0.00	0.00	(0.00)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.03
45	SE & W LRT Distribution System Relocation	44									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	**Growth Total**		-	-	-	-	-	-	-	**0.00**	**0.01**	**(0.00)**	**0.06**	**0.09**	**0.06**	**0.08**	**0.12**	**0.18**	**0.20**	**0.21**	**0.17**	**0.11**	**0.10**	**0.12**	**0.16**	**0.17**	**0.20**	**0.18**	**0.22**	**0.23**	**0.31**	**0.26**	**0.18**	**0.26**	**0.32**
47	Aerial and UG Ground Replacements	43										(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48	Distribution System Aerial and Underground Fault Indicators and Fusing	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01
49	Installation of Automated Switches on Selected 25KV Circuits	44									0.00	(0.00)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02
50	High Load Corridor	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	**Performance Improvement Total**		-	-	-	-	-	-	-	**0.00**	**0.00**	**(0.00)**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**	**0.02**	**0.02**	**0.02**	**0.02**	**0.01**	**0.02**	**0.02**
52	**Total**		-	-	-	-	-	-	-	**0.00**	**0.01**	**(0.00)**	**0.07**	**0.09**	**0.07**	**0.09**	**0.13**	**0.19**	**0.22**	**0.23**	**0.19**	**0.12**	**0.11**	**0.13**	**0.18**	**0.19**	**0.21**	**0.20**	**0.24**	**0.25**	**0.33**	**0.28**	**0.20**	**0.28**	**0.35**
	368 Line Transformers																																		
53	Voltage Regulator Additions	35																		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
54	Network Transformer Lifecycle Replacement	35																		0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	35																		0.02	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.03	0.05	0.06
56	PCB Transformer Changeouts	35																		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
57	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.02**	**0.03**	**0.02**	**0.02**	**0.03**	**0.03**	**0.04**	**0.04**	**0.04**	**0.05**	**0.05**	**0.07**	**0.06**	**0.04**	**0.06**	**0.07**
	370 Conventional Meters & 371 Automated Meters																																		
58	Customer Revenue Metering - Growth & Life Cycle Replacements	15																																	
59	Meter Depreciation	3																																	
60	**Customer Revenue Metering Subtotal**																																		
	373 Street Lighting and Signal Systems																																		
61	Street Light Service Connections and Security Lighting Addition and Capital Replacement	20																																	0.00
	389 General Plant – Land																																		
62	Land Purchase for Slurry Placement	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Distribution 2018 Revenue Requirement Recovered
2018 F Factor - Using 2018 Forecast
($ millions)

		AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF
		19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0				
		1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2017 Total RR Incurred Before Adjustment**	**2017 Additional Allocated RR Incurred**	**2017 RR Incurred Total**	**2018 PBR Recovered (col. BE x (I-X) x Q)**
	362 Station Equipment																								
1	Distribution Substation Life Cycle Replacements	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.04	0.01	0.00	0.01	0.00	0.02	0.01	0.00	0.02	0.00	0.00	0.00	0.18	-	0.18	0.19
2	**Total**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.01**	**0.04**	**0.01**	**0.00**	**0.01**	**0.00**	**0.02**	**0.01**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.18**	**-**	**0.18**	**0.19**
	364 Poles Towers & Fixtures & 365 Overhead Conductors and Devices																								
3	Distribution Pole and Aerial Line Life Cycle Replacements	0.05	0.04	0.08	0.09	0.09	0.07	0.10	0.05	0.21	0.12	0.10	0.15	0.27	0.26	0.21	0.12	0.31	0.44	0.31	0.18	3.79	-	3.79	3.99
4	Capitalized Aerial System Damage	0.02	0.02	0.03	0.03	0.03	0.02	-	0.01	0.04	0.05	0.08	0.08	0.09	0.11	0.11	0.11	0.12	0.12	0.13	0.07	1.43	-	1.43	1.50
5	Remedial Pole Treatments	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.01	-	-	-	-	0.02	0.02	0.02	0.02	0.01	0.03	0.02	0.01	0.23	-	0.23	0.24
6	Lightning Arrestor Replacement	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	0.12	-	0.12	0.13
7	Installation of Insulators in 25 kV Supporting Guy Wires	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	0.01	-	0.01	0.01
8	**Life Cycle Total**	**0.07**	**0.06**	**0.11**	**0.13**	**0.13**	**0.09**	**0.17**	**0.10**	**0.26**	**0.18**	**0.18**	**0.23**	**0.38**	**0.39**	**0.34**	**0.24**	**0.44**	**0.58**	**0.46**	**0.25**	**5.57**	**-**	**5.57**	**5.87**
9	Distribution System Neutral Installations	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	0.00	0.01	-	-	0.01	0.01	-	-	-	-	-	0.04	-	0.04	0.04
10	**Total**	**0.07**	**0.07**	**0.11**	**0.13**	**0.13**	**0.10**	**0.17**	**0.10**	**0.26**	**0.18**	**0.19**	**0.23**	**0.38**	**0.40**	**0.35**	**0.24**	**0.44**	**0.58**	**0.46**	**0.25**	**5.61**	**-**	**5.61**	**5.91**
	367 Underground Conductors & Devices																								
11	Underground Residential Distribution (URD) Servicing - Rebates, Acceptance Inspections & Terminations	0.14	0.13	0.23	0.27	0.27	0.20	0.52	0.58	0.43	0.50	0.52	0.30	0.50	0.71	1.35	1.63	1.53	1.57	1.64	0.83	15.27	-	15.27	16.09
12	Underground Industrial Distribution (UID) Servicing - Rebates, Acceptance Inspections & Terminations	0.02	0.02	0.03	0.04	0.04	0.03	0.01	(0.02)	0.03	0.12	0.12	0.13	0.12	0.09	0.22	0.12	0.13	0.12	0.19	0.10	1.84	-	1.84	1.94
13	**Growth Total**	**0.16**	**0.15**	**0.26**	**0.31**	**0.30**	**0.23**	**0.52**	**0.55**	**0.46**	**0.62**	**0.65**	**0.43**	**0.61**	**0.80**	**1.57**	**1.75**	**1.66**	**1.69**	**1.83**	**0.93**	**17.12**	**-**	**17.12**	**18.03**
14	Switching Cubicle Life Cycle Replacement	0.01	0.01	0.02	0.03	0.03	0.02	-	0.03	0.04	0.03	0.06	0.08	0.07	0.11	0.08	0.04	0.06	0.08	0.14	0.07	1.14	-	1.14	1.20
15	Replacement of Faulted Distribution PILC Cables	0.01	0.01	0.02	0.02	0.02	0.01	0.03	0.03	0.03	0.01	0.02	0.04	0.02	0.10	0.06	0.07	0.18	0.09	0.12	0.06	1.06	-	1.06	1.12
16	Life Cycle Replacement of PILC Cable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09	0.15	0.20	0.10	0.54	-	0.54	0.56
17	Capitalized Underground System Damage	0.03	0.03	0.05	0.06	0.05	0.04	-	0.02	0.05	0.04	0.11	0.15	0.19	0.31	0.29	0.26	0.23	0.32	0.30	0.16	2.97	-	2.97	3.13
18	Life Cycle Replacement of Oil Switches – Program	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	0.05	-	0.04	-	0.02	-	-	-	0.14	-	0.14	0.15
19	Life Cycle Replacement and Extension of Underground Distribution Cable	0.07	0.06	0.11	0.13	0.12	0.09	0.01	-	0.05	0.03	0.25	0.20	0.32	0.68	0.83	0.27	0.88	1.26	0.87	0.45	7.36	-	7.36	7.75
20	Neighbourhood Renewal Program	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	-	-	0.09	0.21	0.14	0.10	0.05	0.20	-	-	0.98	-	0.98	1.03
21	Underground Asbestos Abatement	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	0.01	-	0.01	0.01
22	Life Cycle Replacement of UG Switching Cubicles with Remote Controlled Switches	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	0.03	0.00	-	-	-	-	0.05	-	0.05	0.05
23	DAM - Distribution Manhole Rebuilds	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	0.02	0.01	0.00	0.03	0.01	0.01	0.09	-	0.09	0.09
24	DAM - Interior Vault Life Cycle Replacement Conversion Program	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	0.05	-	0.05	0.05
25	**Life Cycle Total**	**0.13**	**0.13**	**0.22**	**0.26**	**0.25**	**0.19**	**0.04**	**0.08**	**0.16**	**0.10**	**0.45**	**0.47**	**0.75**	**1.42**	**1.48**	**0.77**	**1.51**	**2.13**	**1.65**	**0.85**	**14.38**	**-**	**14.38**	**15.15**
26	**Total**	**0.30**	**0.28**	**0.48**	**0.57**	**0.55**	**0.41**	**0.56**	**0.63**	**0.62**	**0.73**	**1.09**	**0.90**	**1.36**	**2.21**	**3.05**	**2.51**	**3.17**	**3.82**	**3.48**	**1.78**	**31.50**	**-**	**31.50**	**33.19**
	367 Underground Conductors & Devices - Underground Secondary Networks																								
27	Network Reconfigurations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	-	-	-	-	0.00	-	-	0.06	0.15	0.16	0.45	-	0.45	0.47
28	Rebuild and/or Replace Civil Work for Downtown Vaults and Manholes	0.01	0.01	0.01	0.02	0.02	0.01	0.07	0.06	0.02	0.00	-	-	0.02	0.03	0.06	0.04	0.09	0.10	0.10	0.05	0.86	-	0.86	0.90
29	Upgrading Protection on the Downtown Vaults and Manholes	0.00	0.00	0.00	0.00	0.00	0.00	-	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	0.03	-	0.03	0.04
30	Installation of Locking Mechanisms on Network Vault Lids	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	0.01	0.08	0.00	-	-	-	-	0.10	-	0.10	0.11
31	**Life Cycle Total**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.01**	**0.07**	**0.07**	**0.03**	**0.00**	**-**	**-**	**0.02**	**0.04**	**0.14**	**0.05**	**0.09**	**0.10**	**0.10**	**0.05**	**0.99**	**-**	**0.99**	**1.05**
32	Installation of Network Current Limiting Fuse Program	0.00	0.00	0.01	0.01	0.01	0.01	-	-	-	0.01	0.00	-	0.05	0.03	0.03	0.03	-	-	-	-	0.22	-	0.22	0.23
33	**Total**	**0.02**	**0.02**	**0.03**	**0.03**	**0.03**	**0.02**	**0.08**	**0.09**	**0.05**	**0.02**	**0.00**	**-**	**0.07**	**0.08**	**0.18**	**0.07**	**0.09**	**0.16**	**0.25**	**0.22**	**1.67**	**-**	**1.67**	**1.75**
	Projects involving 364 Poles Towers & Fixtures, 365 Overhead lines and devices & 367 Underground lines and devices																								
34	New UG Cable and Aerial Line Reconfigurations and Extensions to Meet Customer Growth	0.08	0.07	0.13	0.15	0.15	0.11	0.18	0.08	0.22	0.33	0.16	0.43	0.32	0.45	0.62	0.55	0.54	0.71	0.71	0.27	7.11	-	7.11	7.49
35	New Underground and Aerial Service Connections for Commercial, Industrial, Multifamily and Misc. Customers	0.12	0.11	0.19	0.22	0.21	0.16	0.28	0.21	0.31	0.47	0.44	0.63	0.49	0.54	0.80	0.82	0.89	0.81	0.97	0.50	10.41	-	10.41	10.97
36	Franchise Agreement Driven Relocations and Conversions	0.07	0.06	0.11	0.13	0.12	0.09	0.18	0.13	0.19	0.25	0.32	0.24	0.16	0.50	0.43	0.27	0.26	0.32	0.27	0.13	4.95	-	4.95	5.22
37	New 15kV and 25kV Circuit Additions	0.03	0.03	0.05	0.06	0.06	0.04	0.01	0.02	0.07	0.00	0.31	0.11	0.02	0.35	0.22	0.13	0.38	0.72	0.47	0.54	3.96	-	3.96	4.17
38	QE II Highway & 41 Ave SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.21	-	-	-	-	0.21	-	0.21	0.22
39	Walterdale Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.36	-	-	0.40	-	0.40	0.42
40	W1 Circuit Extension	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.04	0.00	-	-	-	-	-	-	-	-	-	-	0.06	-	0.06	0.06
41	13 E Diversion and Reconductoring	0.00	0.00	0.00	0.00	0.00	0.00	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	0.04	0.04
42	Summerside Feeders	0.02	0.02	0.03	0.03	0.03	0.02	-	-	-	-	-	-	0.56	0.01	0.00	-	-	-	-	-	0.91	-	0.91	0.96
43	Poundmaker Feeders	0.02	0.02	0.03	0.03	0.03	0.02	-	-	-	-	-	-	-	0.01	0.89	0.02	-	-	-	-	1.24	-	1.24	1.31
44	NLRT Distribution System Relocations	0.04	0.04	0.06	0.08	0.07	0.05	-	-	-	-	-	-	-	1.37	0.10	-	-	-	-	-	2.26	-	2.26	2.38
45	SE & W LRT Distribution System Relocation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.43	0.72	1.53	0.80	0.33	3.81	-	3.81	4.02
46	**Growth Total**	**0.37**	**0.34**	**0.59**	**0.70**	**0.68**	**0.51**	**0.65**	**0.47**	**0.83**	**1.06**	**1.22**	**1.41**	**1.55**	**3.22**	**3.06**	**2.42**	**2.84**	**4.45**	**3.22**	**1.77**	**35.36**	**-**	**35.36**	**37.26**
47	Aerial and UG Ground Replacements	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.02	0.03	0.02	0.04	0.04	0.04	0.02	0.39	-	0.39	0.41
48	Distribution System Aerial and Underground Fault Indicators and Fusing	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.03	0.01	0.00	0.03	0.04	0.03	0.04	0.03	0.12	0.11	0.05	0.03	0.74	-	0.74	0.78
49	Installation of Automated Switches on Selected 25KV Circuits	0.02	0.02	0.03	0.03	0.03	0.02	-	-	0.00	0.00	0.12	0.16	0.06	0.18	0.12	0.03	0.02	0.08	0.06	0.04	1.23	-	1.23	1.30
50	High Load Corridor	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.02	0.05	-	-	-	-	-	-	-	-	-	-	0.10	-	0.10	0.11
51	**Performance Improvement Total**	**0.03**	**0.03**	**0.05**	**0.05**	**0.05**	**0.04**	**0.02**	**0.02**	**0.05**	**0.06**	**0.12**	**0.19**	**0.10**	**0.21**	**0.16**	**0.06**	**0.14**	**0.19**	**0.11**	**0.07**	**2.07**	**-**	**2.07**	**2.18**
52	**Total**	**0.40**	**0.37**	**0.65**	**0.77**	**0.74**	**0.55**	**0.68**	**0.50**	**0.89**	**1.14**	**1.36**	**1.62**	**1.67**	**3.46**	**3.25**	**2.50**	**3.02**	**4.68**	**3.37**	**1.86**	**37.83**	**-**	**37.83**	**39.85**
	368 Line Transformers																								
53	Voltage Regulator Additions	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	0.03	0.01	-	-	0.02	0.00	0.00	-	-	0.02	-	0.12	-	0.12	0.13
54	Network Transformer Lifecycle Replacement	0.01	0.01	0.02	0.03	0.03	0.02	0.12	0.01	0.06	0.03	0.04	0.05	0.05	0.05	0.04	0.05	0.08	0.36	0.20	0.12	1.46	-	1.46	1.54
55	Aerial and Underground Distribution Transformers - New Services and Life Cycle Replacement	0.07	0.06	0.11	0.13	0.13	0.10	0.02	0.14	0.18	0.27	0.35	0.41	0.34	0.34	0.45	0.45	0.46	0.47	0.50	0.26	5.78	-	5.78	6.09
56	PCB Transformer Changeouts	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	0.01	0.04	0.03	0.00	0.01	0.04	0.02	0.01	0.21	-	0.21	0.22
57	**Total**	**0.09**	**0.08**	**0.14**	**0.17**	**0.16**	**0.12**	**0.14**	**0.15**	**0.24**	**0.33**	**0.40**	**0.46**	**0.40**	**0.45**	**0.52**	**0.50**	**0.56**	**0.86**	**0.74**	**0.39**	**7.57**	**-**	**7.57**	**7.97**
	370 Conventional Meters & 371 Automated Meters																								
58	Customer Revenue Metering - Growth & Life Cycle Replacements					0.04	0.07	0.16	0.18	0.18	0.26	0.28	0.21	0.17	0.18	0.28	0.53	0.63	0.52	0.41	0.18	4.29	-	4.29	4.52
59	Meter Depreciation																					-	-	-	-
60	**Customer Revenue Metering Subtotal**					**0.04**	**0.07**	**0.16**	**0.18**	**0.18**	**0.26**	**0.28**	**0.21**	**0.17**	**0.18**	**0.28**	**0.53**	**0.63**	**0.52**	**0.41**	**0.18**	**4.29**	**-**	**4.29**	**4.52**
	373 Street Lighting and Signal Systems																								
61	Street Light Service Connections and Security Lighting Addition and Capital Replacement	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.06	0.06	0.06	0.07	0.07	0.05	0.08	0.06	0.03	0.74	-	0.74	0.77
	389 General Plant – Land																								
62	Land Purchase for Slurry Placement	0.00	0.00	0.01	0.01	0.01	0.01	-	0.06	0.03	(0.00)	-	0.00	0.02	0.01	0.02	-	-	-	-	-	0.22	-	0.22	0.23

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
		Asset Age in 2017	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20
		Indicative Service Life	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**
	390 General Plant - Structures & Improvements																																		
63	Furniture Life Cycle Replacements	8																																	
64	North and South Service Center Building Life Cycle Replacements	45								0.00	0.00	(0.00)	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.02
65	Work Centre Redevelopment	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
66	**Life Cycle Total**		-	-	-	-	-	-	-	**0.00**	**0.00**	**(0.00)**	**0.00**	**0.01**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**	**0.01**	**0.02**	**0.02**
67	Service Center Consolidation Project	45								0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01
68	**Total**		-	-	-	-	-	-	-	**0.00**	**0.00**	**(0.00)**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.02**	**0.03**	**0.02**	**0.01**	**0.02**	**0.03**
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications																																		
69	Advanced Metering Infrastructure	15																																	
	391.1 General Plant – Computer hardware & voice and data network equipment																																		
70	IT Hardware Lifecycle Replacements and Additions	4																																	
	391.2 General Plant - Computer software and applications																																		
71	Business Systems Upgrades	10																																	
72	Work Management System Upgrade	10																																	
73	GIS - Performance Improvement Project	10																																	
74	OMS/DMS Life Cycle Replacement	10																																	
75	**Life Cycle Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
76	Meter Reading Route Optimization	10																																	
77	Automation of Off Cycle Meter Read Project	10																																	
78	Inventory Bar Coding Application	10																																	
79	AMI Software and Applications	10																																	
80	Engineering and Design Software Modifications	10																																	
81	Safety Software	10																																	
82	**Performance Improvement Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	391.3 General Plant - Load settlement software and applications																																		
84	STARS Settlement System Modifications	10																																	
85	IBPM (flow) Upgrade	10																																	
86	Regulated Default Supply	10																																	
87	Directive 52	10																																	
88	Tariff Bill Code Data Retention	10																																	
89	Micro Generation Records upgrade	10																																	
90	Dropchute Replacement	10																																	
91	Interval Meter Data Collection (MV-90 Upgrade)	10																																	
92	STARS Upgrade	10																																	
93	**Life Cycle Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	392 General Plant - Transportation, Fleet vehicles																																		
94	Vehicles - Growth and Life Cycle Replacements	11																																	
	394 General Plant - Tools, shop, garage, stores and laboratory equipment																																		
95	Capital Tools and Instrument Purchases	10																																	
96	Meter Reading Equipment	10																																	
97	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Distribution Assets - Contributed by Transmission																																		
98	Argyll to Bellamy Transmission Contingency	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Transmission Contribution for Distribution Assets																																		
99	Bellamy Contribution	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Distribution Contribution for Transmission Assets																																		
100	Garneau Expansion	45								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
101	Summerside Substation Contribution	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
102	Poundmaker Contributions (East Industrial '07-'08)	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
103	Clover Bar POD Addition Contribution	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
104	Victoria Substation MV Breaker Purchase	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
105	East Industrial Contribution	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
106	**Total**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Adjustments																																		
107	Corporate Allocation for the OH 2002-2004	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
108	Capital Addition Adjustments	35																		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Grand Total																																		
109	**Grand Total**		-	-	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.02**	**(0.00)**	**0.09**	**0.12**	**0.11**	**0.18**	**0.25**	**0.38**	**0.44**	**0.49**	**0.41**	**0.27**	**0.25**	**0.30**	**0.39**	**0.41**	**0.48**	**0.44**	**0.53**	**0.57**	**0.75**	**0.62**	**0.44**	**0.64**	**0.79**
110																																			
111																																			
112																																			
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116																																			
117	**Grand Total**																																		
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		AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF
		19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0				
		1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2017 Total RR Incurred Before Adjustment**	**2017 Additional Allocated RR Incurred**	**2017 RR Incurred Total**	**2018 PBR Recovered (col. BE x (I-X) x Q)**
	390 General Plant - Structures & Improvements																								
63	Furniture Life Cycle Replacements												0.01	0.02	0.02	0.06	0.02	0.03	0.03	0.03	0.02	0.26	-	0.26	0.27
64	North and South Service Center Building Life Cycle Replacements	0.02	0.02	0.03	0.04	0.04	0.03	0.05	0.07	0.11	0.05	0.08	0.07	0.06	0.15	0.05	0.03	0.04	0.01	0.01	0.01	1.23	-	1.23	1.30
65	Work Centre Redevelopment	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	0.03	0.00	0.01	-	3.29	0.88	4.24	-	4.24	4.47
66	**Life Cycle Total**	**0.02**	**0.02**	**0.03**	**0.04**	**0.04**	**0.03**	**0.05**	**0.07**	**0.11**	**0.05**	**0.08**	**0.08**	**0.09**	**0.17**	**0.12**	**0.05**	**0.07**	**0.05**	**0.05**	**0.03**	**1.49**	**-**	**1.49**	**1.57**
67	Service Center Consolidation Project	0.01	0.01	0.01	0.02	0.01	0.01	-	0.19	0.06	-	-	-	-	-	-	-	-	-	-	-	0.41	-	0.41	0.43
68	**Total**	**0.03**	**0.03**	**0.05**	**0.06**	**0.06**	**0.04**	**0.05**	**0.26**	**0.17**	**0.05**	**0.08**	**0.08**	**0.09**	**0.17**	**0.14**	**0.06**	**0.08**	**0.05**	**3.34**	**0.90**	**6.13**	**-**	**6.13**	**6.46**
	Projects involving 371 Automated Meters, 391.1General Plant Computer Hardware voice and data network equipment and 391.2 Computer software and applications																								
69	Advanced Metering Infrastructure					-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.17	1.69	5.85	-	5.85	6.17
	391.1 General Plant – Computer hardware & voice and data network equipment																								
70	IT Hardware Lifecycle Replacements and Additions																0.04	0.08	0.09	0.29	0.06	0.56	-	0.56	0.59
	391.2 General Plant - Computer software and applications																								
71	Business Systems Upgrades										0.01	0.03	0.07	0.00	0.02	0.05	0.08	0.02	0.02	0.04	0.13	0.47	-	0.47	0.50
72	Work Management System Upgrade										-	-	-	-	-	0.20	0.06	0.05	-	0.12	0.10	0.53	-	0.53	0.55
73	GIS - Performance Improvement Project										-	-	-	0.95	0.11	0.08	0.00	0.21	-	-	-	1.36	-	1.36	1.43
74	OMS/DMS Life Cycle Replacement										-	-	-	-	-	0.00	-	-	1.38	-	0.44	1.82	-	1.82	1.91
75	**Life Cycle Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.01**	**0.03**	**0.07**	**0.95**	**0.14**	**0.33**	**0.14**	**0.28**	**1.40**	**0.15**	**0.67**	**4.17**	**-**	**4.17**	**4.39**
76	Meter Reading Route Optimization										0.01	0.07	-	-	-	-	-	-	-	-	-	0.08	-	0.08	0.08
77	Automation of Off Cycle Meter Read Project										-	0.02	-	-	-	-	-	-	-	-	-	0.02	-	0.02	0.02
78	Inventory Bar Coding Application										0.01	-	(0.01)	-	-	-	-	-	-	-	-	0.01	-	0.01	0.01
79	AMI Software and Applications										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80	Engineering and Design Software Modifications										0.00	-	-	-	-	0.04	0.05	0.00	-	-	0.03	0.12	-	0.12	0.13
81	Safety Software										-	-	-	-	0.01	(0.00)	-	-	-	-	-	0.01	-	0.01	0.01
82	**Performance Improvement Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.03**	**0.09**	**(0.01)**	**-**	**0.01**	**0.04**	**0.05**	**0.00**	**-**	**-**	**0.03**	**0.24**	**-**	**0.24**	**0.25**
83	**Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.03**	**0.12**	**0.06**	**0.95**	**0.14**	**0.37**	**0.19**	**0.29**	**1.40**	**0.15**	**0.70**	**4.41**	**-**	**4.41**	**4.64**
	391.3 General Plant - Load settlement software and applications																								
84	STARS Settlement System Modifications										-	-	-	0.05	0.02	0.01	0.05	0.01	-	-	-	0.14	-	0.14	0.15
85	IBPM (flow) Upgrade										-	0.04	-	-	-	-	-	-	-	-	-	0.04	-	0.04	0.04
86	Regulated Default Supply										-	0.13	-	-	-	-	-	-	-	-	-	0.13	-	0.13	0.13
87	Directive 52										-	0.05	-	-	-	-	-	-	-	-	-	0.05	-	0.05	0.05
88	Tariff Bill Code Data Retention										-	0.02	-	-	-	-	-	-	-	-	-	0.02	-	0.02	0.02
89	Micro Generation Records upgrade										-	0.01	-	-	-	-	-	-	-	-	-	0.01	-	0.01	0.01
90	Dropchute Replacement										-	-	-	-	-	0.02	-	-	-	-	-	0.02	-	0.02	0.02
91	Interval Meter Data Collection (MV-90 Upgrade)										0.01	(0.01)	-	-	-	-	-	0.37	-	-	-	0.38	-	0.38	0.40
92	STARS Upgrade										-	-	-	-	-	-	0.04	-	-	-	-	0.04	-	0.04	0.04
93	**Life Cycle Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.01**	**0.24**	**-**	**0.05**	**0.02**	**0.03**	**0.09**	**0.38**	**-**	**-**	**-**	**0.83**	**-**	**0.83**	**0.87**
	392 General Plant - Transportation, Fleet vehicles																								
94	Vehicles - Growth and Life Cycle Replacements									0.00	0.01	0.02	0.02	0.03	0.06	0.14	0.06	0.09	0.14	0.29	0.12	0.98	-	0.98	1.04
	394 General Plant - Tools, shop, garage, stores and laboratory equipment																								
95	Capital Tools and Instrument Purchases										0.03	0.06	0.05	0.14	0.11	0.15	0.14	0.13	0.13	0.19	0.05	1.18	-	1.18	1.24
96	Meter Reading Equipment										0.01	0.03	-	0.01	-	-	-	0.03	0.03	-	-	0.11	-	0.11	0.12
97	**Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.05**	**0.09**	**0.05**	**0.15**	**0.11**	**0.15**	**0.14**	**0.17**	**0.16**	**0.19**	**0.05**	**1.29**	**-**	**1.29**	**1.36**
	Distribution Assets - Contributed by Transmission																								
98	Argyll to Bellamy Transmission Contingency	-	-	-	-	-	-	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	0.06	-	0.06	0.06
	Transmission Contribution for Distribution Assets																								
99	Bellamy Contribution	-	-	-	-	-	-	-	-	(0.06)	-	-	-	-	-	-	-	-	-	-	-	(0.06)	-	(0.06)	(0.06)
	Distribution Contribution for Transmission Assets																								
100	Garneau Expansion	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.07	2.07	-	2.07	2.18
101	Summerside Substation Contribution	-	-	-	-	-	-	-	-	-	-	-	-	1.12	(0.04)	-	-	-	-	-	-	1.08	-	1.08	1.14
102	Poundmaker Contributions (East Industrial '07-'08)	-	-	-	-	-	-	-	-	-	(0.01)	-	-	-	-	1.19	(0.19)	-	-	-	-	1.00	-	1.00	1.05
103	Clover Bar POD Addition Contribution	-	-	-	-	-	-	-	-	-	-	0.24	0.12	-	-	-	-	-	-	-	-	0.36	-	0.36	0.38
104	Victoria Substation MV Breaker Purchase	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	0.01	-	0.01	0.01
105	East Industrial Contribution	-	-	-	-	-	-	-	-	0.35	-	-	-	-	-	-	-	-	-	-	-	0.35	-	0.35	0.37
106	**Total**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.35**	**(0.01)**	**0.24**	**0.12**	**1.12**	**(0.03)**	**1.19**	**(0.19)**	**-**	**-**	**-**	**2.07**	**4.87**	**-**	**4.87**	**5.13**
	Adjustments																								
107	Corporate Allocation for the OH 2002-2004	-	-	-	-	-	-	-	0.10	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	0.10	0.10
108	Capital Addition Adjustments	-	-	-	-	-	-	(0.00)	(0.00)	0.00	-	-	-	-	-	-	-	-	-	-	-	(0.01)	-	(0.01)	(0.01)
	Grand Total																								
109	**Grand Total**	**0.91**	**0.85**	**1.48**	**1.75**	**1.74**	**1.33**	**1.86**	**2.11**	**2.86**	**2.83**	**4.16**	**3.81**	**6.52**	**7.34**	**9.74**	**6.81**	**9.06**	**12.53**	**17.21**	**10.31**	**114.62**	**-**	**114.62**	**120.75**
110																									
111																									
112																									
113																						**2017 F**			
114																					Total 2017 RR for Capital	**114.62**			
115																					Difference	-			
116															2017 WACC	6.50%						0.00%	DLM Difference		
117	**Grand Total**																								

Factors

	Year	I Rate	X Rate	I - X Rate	Growth Rate (Q)	Threshold $
118						
119	**2013**	2.87%	1.16%	1.71%	1.46%	101,710
120	**2014**	2.75%	1.16%	1.59%	1.96%	103,327
121	**2015**	2.65%	1.16%	1.49%	0.85%	104,867
122	**2016**	2.06%	1.16%	0.90%	3.20%	105,811
123	**2017**	0.95%	1.16%	-0.21%	2.15%	105,588
124	**2018**	2.26%	-1.11%	3.37%	1.92%	109,142
125	**2019**	2.13%	-1.11%	3.24%	2.02%	112,682
126	**2020**	2.01%	-1.11%	3.12%	2.03%	116,198
127	**2021**	1.88%	-1.11%	2.99%	2.26%	119,674
128	**2022**	1.85%	-1.11%	2.96%	2.08%	123,212
129	**2023**	2.03%	-1.11%	3.14%	2.06%	127,075