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VIA RESS

May 19, 2015

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
PO Box 2319
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

Dear Ms. Walli:

Re: Toronto Hydro-Electric System Limited, Custom Incentive Rate-setting Application for 2014-2019 Electricity Distribution Rates and Charges - Undertaking Responses of the Carriers, OEB File No. EB-2014-0116

In accordance with Procedural Order No. 10 (as amended at the Technical Conference on May 6, 2015), please find enclosed responses to the undertakings of Rogers Communications Partnership, Allstream Inc., Cogeco Cable Inc. on behalf of itself and its affiliates, including Cogeco Cable Canada LP and Cogeco Data Services Inc. and TELUS Communications Company and its affiliates (collectively, the Carriers).

Information relating to rates and time estimates has been abridged in Appendix B to Response to Undertaking No. JTC3.13. The Carriers submit that this information is not relevant to the issues in this proceeding including, in particular, the issue of the wireline pole attachment rate. In the alternative, the Carriers request confidential treatment of this information pursuant to the OEB's Rules of Practice and Procedure and Practice Direction on Confidential Filings. The Carriers understand that this information is consistently treated as being confidential by Ms. Blackwell and that disclosure of this information would harm her in her negotiations with clients and in her ability to compete.

Yours truly,

Leslie J. Milton

LJM/crc

UNDERTAKING NO. JTC3.12

Provide a copy of the retainer agreement between the Carriers and Dr. Ware.

RESPONSE:

See Appendix "A".

APPENDIX "A"

ANALYSIS GROUP
ECONOMIC, FINANCIAL and STRATEGY CONSULTANTS

Main 1 514 394 4460 Fax 1 514 394 4461 www.analysisgroup.com

1000 De La Gauchetiere West Suite 1200 Montreal, QC H3B 4W5

March 23, 2015

Ms. Pam Dinsmore
Vice President, Regulatory
Broadband & Video Distribution
Rogers Communications Partnership
333 Bloor Street East, 9th Floor
Toronto, ON M4W 1G9

Re: Ontario Energy Board File Number EB-2014-0116, Toronto Hydro-Electric System Limited Application for 2015 Distribution Rate (Wireline Pole Attachment Rate)

Dear Ms. Dinsmore:

We are very pleased that Rogers Communications Partnership ("Rogers") has decided to engage Analysis Group, Inc. ("AGI") in the above-referenced matter, and we look forward to working with you. The purpose of this letter is to confirm and set forth the terms of the engagement.

Roger Ware, Professor of Economics at Queen's University, is being retained to prepare an expert report for submission by Rogers in the above-referenced proceeding and to attend the oral hearing and provide testimony in respect of his expert report. Subject to the prior approval of Rogers, AGI staff will support Roger Ware in the preparation of his report.

Our work will be performed on a time and materials basis. Roger Ware's billing rate is $600 per hour. The hourly rates for the staff who may work on this matter range from approximately $225 to $300 per hour. These rates are periodically reviewed on a firm-wide basis and therefore may be subject to increase during the course of our work with you.

Our monthly invoices, which are payable upon receipt, will show our professional services charges and will provide details concerning the nature of the work performed, by whom, and the time incurred. The invoices will show, separately, our expense charges for such items as travel, communications, purchase of data, report production, and other similar costs. Total expenses are typically about 10-15% of the invoice amount. Any invoice that remains unpaid more than forty-five (45) days after receipt will, at our option, accrue interest at the rate of one percent (1%) per month, and Rogers will be responsible for all costs of collection (including attorneys' fees) as may be allowed by law. AGI, without liability, may withhold delivery of services and may suspend performance of its obligations pending payment of all charges that are due and unpaid.

Rogers is responsible for payment of AGI's fees and our fees are in no way contingent on the nature of our findings or presentation of these findings in testimony.

You agree that AGI's aggregate liability to Rogers, whether in tort, contract, or otherwise, shall be limited to the amount paid by Rogers for the services set forth in this engagement letter.

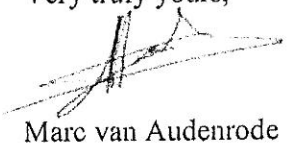
AGI is not restricted from working on specific engagements, including unrelated engagements involving the parties in this matter; however, all confidential information gained in this matter will be kept confidential.

Unless you instruct otherwise, documentation produced or used by AGI in the course of this engagement will be maintained in accordance with our established document retention practices.

This agreement is deemed to be made under and shall be interpreted in accordance with the laws of the Province of Ontario, excluding its conflict of laws provisions.

Please acknowledge your agreement with this letter by signing and returning a copy of it to me. Do not hesitate to contact me at any point throughout the engagement with any questions you may have. We look forward to working with you.

Very truly yours,



Marc van Audenrode
Managing Principal

Accepted and agreed:

Pamela Dinsmore

By: _____
Pamela Dinsmore
For: Rogers Communications Partnership

Date: March 30, 2015

Analysis Group, Inc. is an Equal Opportunity Employer. It abides by the applicable requirements of 41 CFR 60-300.5(a) and 60-741.5(a) which prohibit discrimination against qualified individuals on the basis of protected status or disability, and require affirmative action to employ and advance in employment qualified protected veterans and individuals with disabilities.

UNDERTAKING NO. JTC3.13

File whatever follow-up there was in writing with respect to the scope of the project for which Ms. Blackwell was retained.

RESPONSE:

See Appendix "B".

APPENDIX "B"

GIGANOMICS CONSULTING INC.

To: Pam Dinsmore
Vice-President, Regulatory - Cable
Rogers Communications Partners

February 24, 2015

From: Suzanne Blackwell
Giganomics Consulting Inc.

Re: **Consulting Services re Toronto Hydro Application for Pole Attachment Fee (EB-2014-0116)**

Consulting Services:

Analysis of the proposal by Toronto Hydro to increase the fee for pole attachments from $22.35 to $92.53, including the preparation of questions regarding the Toronto Hydro proposal, evidence on a counter proposal, based on analysis of the costs and related inputs, and participation at the hearing, as indicated in the table below.

The consulting services may be undertaken for a group of intervenors including Rogers and telecommunications carriers, in which case, my fees will be split on a basis to be agreed upon by the group.

Estimates of Hours and Fees*

	Task	**Dates (estimated)**	**Hours**
(1)	Draft questions for Toronto Hydro	02/24/2015 to 03/05/2015	
(2)	Prepare evidence	03/02/2015 to 03/26/2015	
(3)	Review responses, analyse data	03/12/2015 to 03/18/2015	
(4)	Draft second questions to parties	03/19/2015 to 03/27/2015	
	UNAVAILABLE	***03/28/2015 to 04/05/2015***	
(5)	Respond to questions on evidence	04/06/2015 to 04/13/2015	
(6)	Prepare for hearing	04/06/2015 to 04/15/2015	
(7)	Review responses to questions	04/14/2015 to 04/15/2015	
(8)	Attend hearing	04/16/2015 to 04/17/2015	
	TOTAL		

Hourly rate: plus HST

Estimate of total fees: $ plus HST

**Estimates are preliminary based on understanding of the scope and nature of the projects as of February 24, 2105.*

Suite 456, 1568 Merivale Rd.
Nepean, Ontario
K2G 5Y7

(613) 228-7456
blackwell@giganomics.ca

UNDERTAKING NO. JTC3.14

File the expert reports of both Dr. Ware and Ms. Blackwell that were filed in the recent New Brunswick Power proceeding.

RESPONSE:

A copy of Ms. Blackwell's expert report filed May 4, 2015 in New Brunswick Energy & Utilities Board Matter No. 272 is attached as Appendix "C".

A copy of Dr. Ware's expert report filed May 4, 2015 in New Brunswick Energy & Utilities Board Matter No. 272 is attached as Appendix "D".

APPENDIX "C"

Board Matter No. 272

IN THE MATTER of an application by New Brunswick Power Corporation ("**NB Power**") pursuant to Section 103(1) of the *Electricity Act*, S.N.B. 2013, c.7. for approval of the schedules of the rates for fiscal year commencing April 1, 2015

EVIDENCE OF SUZANNE BLACKWELL

ROGERS COMMUNICATIONS PARTNERSHIP

May 4, 2015

PART I - INTRODUCTION & EXECUTIVE SUMMARY

1. I have been retained by Rogers Communications Partnership ("**Rogers**") to provide expert evidence on the methodology for establishing the pole attachment rate to be charged by New Brunswick Power ("**NB Power**").

2. I am a consultant in the field of regulatory economics, specializing in the telecommunications and broadcasting sectors. I have participated in several regulatory proceedings respecting the establishment of the rates, terms and conditions for pole attachments during the past 15 years. I have a Master's Degree in Economics from Dalhousie University. Details of my work experience and education are provided in Appendix A.

3. This evidence addresses issues related to the annual rate NB Power proposes to charge third parties to attach equipment to the poles it owns and maintains (the "**Pole Rate**"). The Pole Rate was last reviewed by the predecessor of the New Brunswick Energy & Utilities Board ("**NB EUB**") in a 2005 proceeding (the "**2005 Rate Case**").

4. Rogers and NB Power previously reached agreement on many of the inputs used to determine the Pole Rate. The areas of agreement were set out in a report by NB Power, "Pole attachments, Report to the Board," filed September 30, 2008 (the "**2008 Report**") pursuant to the decision of the NB EUB issued June 19, 2006 in respect of the 2005 Rate Case.[1] My evidence does not take issue with my understanding of the matters to which the parties agreed in the 2008 Report.

5. I do however take issue with revisions to the methodology and inputs contained in NB Power's current evidence. Specifically, I believe that the following adjustments should be made to the inputs to NB Power's Total Pole Costs:

   (a) The value of Secondary & Neutral assets added to the Embedded and Net Embedded Costs should be substantially reduced, if not eliminated entirely.

   (b) The financial data used to estimate Maintenance Costs needs to be adjusted with respect to storm-related and other costs.

   (c) The overhead on labour and equipment included in the loss of productivity hourly costs should be reduced to 30%.

1 NB Power Exhibit 5.06, Attachment B (PI IR-01 and UM IR-6g).

6. These adjustments reduce the Total Pole Costs from $89.77[2] per pole to $78.68.

7. I also believe that Administration Costs must be properly allocated among all communications attachers that contribute to these costs. This results in a minor reduction ($0.02) in the Administration Costs.

8. Finally, I believe NB Power's proposal to allocate 37.2% of Total Pole Costs to each communications attacher is not reasonable. The allocation methodology was not agreed to in the 2008 Report. Part III of my evidence addresses the following specific points respecting the allocation factor for Total Pole Costs:

   (a) The allocation should be based on the communications attachers' proportional use of the dedicated space on the pole.

   (b) The number of communications attachers per pole should be increased to at least 2.

   (c) The relative spaces on a typical NB Power pole should mirror those found on poles owned by Bell Aliant.

9. Applying these adjustments, the allocation factor becomes 33.1% (to all communications attachers) and 16.6% to each such attacher.

10. In the result, I believe a reasonable Pole Rate is $13.68. Table 1 below summarizes the inputs and calculations used to determine this rate, while Appendix B provides a more complete summary of each of the adjustments addressed in my evidence.

2 As filed by NB Power in its evidence, Appendix 9, Exhibit 1.19, before revisions it introduced in subsequent responses to interrogatories. See Appendix B of my evidence.

Table 1 - Adjustments to the Pole Rate

	Component		Calculation
A	Average Embedded Cost per Pole	$766.21	See Section II (A) for adjustments
B	Net Embedded Cost per Pole	$353.62	See Section II (A) for adjustments
C	Depreciation Cost	$19.73	A x 2.575%
D	Capital Carrying Cost	$18.14	B x 5.13%
E	Utility Tax	$6.56	$1.856 per $100 of B
F	Maintenance Cost	$28.83	See Section II (C) for adjustments
G	Loss in Productivity	$5.42	See Section II (D) for adjustments
H	Total Annual Costs	**$78.68**	C + D + E + F + G
I	Allocation based on Proportional Use and 3 attachers	16.6%	See Section III for calculations
J	Allocated Cost	$13.06	H x I
K	Administration Cost	$0.62	See Section II (E) for adjustments
L	Pole Rate	**$13.68**	J + K

11. In addition to the adjustments noted above, I also question the validity of other cost inputs and, while I do not recommend any specific adjustments, I believe that the costs used to calculate a Pole Rate of $13.68 may still be overstated.

PART II - COST INPUTS TO THE POLE RATE

12. In essence, there are seven elements that contribute to the costs of poles and hence the Pole Rate:

    (a) Embedded and Net Embedded Costs;

    (b) Depreciation Cost;

    (c) Capital Carrying Cost;

    (d) Utility Tax;

    (e) Maintenance Cost;

    (f) Loss in Productivity; and

    (g) Administration Cost.

13. Depreciation Cost, Capital Carrying Cost, Utility Tax, Maintenance Cost and Loss in Productivity (collectively, "**Total Pole Costs**") are all costs that are shared, in varying degrees, by the users of the pole, including NB Power. How much of these costs are attributed to the communications attachers is based on the relevant allocation factor that is applied. The allocation factor is discussed in Part III.D of my evidence.

A. Embedded and Net Embedded Costs

14. The Embedded and Net Embedded Costs are based on costs recorded in the following accounts of NB Power for the assets associated with its Distribution network of poles:

Table 2 – NB Power Account Codes[3]

Asset Type	Account Code
Poles	130
Fixtures	150
Secondary & Neutral	230 for overhead 280 for underground
Easements	005
Clearing	020

15. Some of these costs relate to power-specific fixtures that are solely for the distribution of electricity and therefore must be removed from costs attributable to the Pole Rate. Rogers and NB Power agreed in the 2008 Report to apply a factor of 15% to remove power-specific costs from the accounts for Poles and Fixtures (the "**15% Power-specific Deduction**").

16. My primary concern is the addition of Secondary & Neutral asset costs to the Embedded and Net Embedded Costs.

17. NB Power did not include the costs of Secondary & Neutral assets in its determination of Embedded and Net Embedded Costs in the 2005 Rate Case or the 2008 Report. It now states that these costs were "inadvertently omitted".[4] NB Power indicated that, according to CSA standards, communications attachers are required to bond to ground and this is done by connecting to Neutral.[5] This requirement appears to form the sole basis for its proposal to include Secondary & Neutral costs.

3 NBP(Rogers) IR-4 (i), and IR-19, February 9, 2015; and NBP(Rogers) IR-34, March 27, 2015.

4 NBP(Rogers) IR 19 iii), February 9, 2015.

5 NBP(Rogers) IR-35, March 27, 2015.

18. NB Power defines “Neutral” as follows:

> ”Neutral” (as installed on primary poles for the purpose of providing a bond to ground). Defined for the purpose if [sic] a power system as the bare conductor required to complete a single phase power circuit and for connection of circuits requiring a bond to ground. Typically consists of the following components: bare ACSR wire bonded to ground; pole attachment hardware.[6]

19. It defines the “Secondary” component as follows:

> ”Secondary” (as installed on primary poles for the purpose of providing a bond to ground). Defined for the purpose of a power system as the collection of wires required to provide the voltage levels necessary to service customers typically consisting of insulated power conductors supported on a bare ACSR messenger wire which doubles as the required neutral connect. Typically consists of the following components: triplex wire (two insulated conductors and one uninsulated wire or message bonded to ground); pole attachment hardware.[7]

20. NB Power does not maintain separate accounts for the Secondary and the Neutral assets.[8] It only maintains separate accounts for overhead (230) and underground (280) Secondary & Neutral.[9]

21. NB Power has provided no rationale as to why communications attachers would use any of the Secondary & Neutral assets other than the bare ACSR messenger wire, which is used to bond to ground. Yet, it has included 85% of the value of all Secondary & Neutral assets in its Embedded and Net Embedded Costs. Further, in the 2008 Report, there is no evidence that NB Power and Rogers reached any agreement on including any amount for the Secondary & Neutral assets; either at 85% or any other level.

22. The 2008 Report does provide that agreement was reached on the 15% Power-specific Deduction. This adjustment is consistent with the practice of other electrical utilities. In the RP-2003-0249 proceeding before the Ontario Energy Board (OEB), the Electricity Distributors Association (EDA) also proposed reducing the value of its Poles and Fixtures by 15%.

6 *Ibid.*

7 *Ibid.*

8 NBP(Rogers) IR-34, March 27, 2015.

9 *Ibid.*

> Based on analysis of a number of utility accounts, it is reasonable to deem the **cost or value of bare poles to be 85% of the cost or value of poles and fixtures** combined. This 85% figure is consistent with the APPA in the United States which has a similar FERC account and has determined that 85% of this account can be attributable to poles.[10] (emphasis in original)

23. The regulated members of EDA use a Uniform System of Accounts that is very similar to that used by the U.S. Federal Energy Regulatory Commission (FERC). The 15% Power-specific Deduction is applied by the EDA to the assets in Account 1830, "Poles, Towers, and Fixtures". This is the only account that is used in the calculation of Embedded and Net Embedded Costs per pole, as indicated by the quote from the EDA submission noted above. [11] The EDA did not add an amount for Secondary and Neutral assets.

24. NB Power's proposal to add 85% of the Secondary & Neutral to the Embedded and Net Embedded Costs is inconsistent with the methodology applied by the EDA. While NB Power does not appear to have the same system of accounts as members of the EDA, this does not justify "topping-up" the Embedded and Net Embedded Costs by adding the Secondary and Neutral assets.[12] In addition, there is no basis for assuming that the 15% Power-specific Deduction for Poles and Fixtures should apply equally to Secondary & Neutral, which are completely different types of assets.

25. Compared to the 40-plus years of data it provided for all the other components of the Embedded and Net Embedded Costs, NB Power provided only limited historical information on the costs of Secondary & Neutral. NB Power was requested to provide an updated version of a table it filed in the 2005 Rate Case showing the costs of each of the components. The table it provided in response contains no data for Secondary & Neutral for years prior to 2006.[13] Therefore, it is not possible to compare longer-term trends in the value of these assets relative to the other components of Embedded and Net Embedded Costs.

10 Electricity Distributors Association, Evidence, Appendix 2, "Model Agreement", Section E: Financials; OEB RP-2003-0249, August, 2004, pages 6-7.

11 In the United States, the comparable account is 364, "Poles, towers and fixtures".

12 The New Brunswick Board of Commissioners of Public Utilities noted that a USOA was being developed for members of the Canadian Electrical Association, and concluded that DISCO should implement a USOA, according to the Board's decision of June 19, 2006, at page 35, in the matter of DISCO's application for changes to its charges, rates and tolls. The New Brunswick Energy and Utilities Board issued a follow-up decision in which it stated that it expects NB Power and the EUB will continue to consult on the implementation of a USOA; May 31, 2007, page 19.

13 NBP(Rogers) IR-38 (Additional Information), April 13, 2015.

26. The few years of data that have been provided show that Secondary & Neutral assets have increased in value on a per pole basis at a faster rate than either Poles or Fixtures. The compound annual growth rate of Secondary & Neutral is 15% between 2006 and 2014, compared to only 8% for Poles and 11% for Fixtures.[14]

27. The data also demonstrates that Secondary & Neutral assets represent a significant proportion of Embedded and Net Embedded Costs ($138.27 or 16% of Embedded Cost and $66.94 or 16% of Net Embedded Cost).[15] Moreover, the addition of Secondary & Neutral assets is responsible for most of the increase in the Embedded and Net Embedded Cost since 2005.[16]

28. It does not seem reasonable that the requirement of communications attachers to connect to the bare messenger wire of the Neutral should add $138 to the Embedded Cost of a bare pole. I base this conclusion on the Evidence of Clinton Lawrence (the "**Lawrence Evidence**") with respect to Secondary & Neutral.

29. If an amount attributable to the Neutral should be added, it would be much less than the 85% of the Secondary and Neutral proposed by NB Power.

30. NB Power stated in its evidence in this proceeding that it could not isolate the costs of Neutral.[17] However, there is information in the 2008 Report that provides some insight on the relative value of Neutral. Specifically, NB Power provided information on costs attributable to Neutral in discussing an alternative methodology for removing power-specific fixture costs from its Pole and Fixtures Costs. In this regard, NB Power estimated that power-specific fixtures represented 27.8% of the value of its Fixtures account (assuming that the Neutral was power-specific) and that if the Neutral was not considered to be power-specific, that percentage should be reduced to 25%.[18] The impact on the Embedded and Net Embedded Costs filed in the 2008 Report is shown in Table 3.

14 Based on the compound annual growth rate between 2006 and 2014 for each of the installed costs of poles, fixtures and secondary/neutral, as filed in NBP(Rogers) IR-38 (Additional Information), April 13, 2015.

15 NB Power Evidence, Exhibit 1.03, page 68, and NBP(Rogers) IR-4 i), Attachment I (Exhibit NPB5.13).

16 NBP(Rogers) IR-56 (Additional information), April 13, 2015. This is based on applying the same 15% adjustment to remove power-specific costs from each of the poles and fixtures accounts.

17 NBP(Rogers) IR-34 vi), March 27, 2015.

18 2008 Report, Appendix B, Item 3.

Table 3 – Embedded and Net Embedded Cost per pole (2005)
Adjustment for power-specific costs and Neutral

	Net Embedded Cost	Embedded Cost
Poles, fixtures, easements, clearing, minus 27.8% of fixtures as power-specific	$395.71	$679.50
Poles, fixtures, easements, clearing, minus 25% of fixtures as power-specific; adding back Neutral	$403.25	$692.24
Dollar difference = cost of Neutral per pole	$7.54	$12.74
Percentage difference	2%	2%

31. In my view, therefore, if any amount is to be added to Embedded or Net Embedded Costs for Neutral and Secondary (and assuming this is not precluded by the agreement in the 2008 Report) a reasonable approach for determining the value of the Neutral would be to add 2% to the Embedded and Net Embedded cost of a pole (after the 15% Power-specific Deduction has been made). The results are shown in Table 4.

Table 4 – Embedded and Net Embedded Cost per pole (2015)[19]
Adjustment for power-specific costs and Neutral

		Net Embedded Cost	Average Embedded
A	Poles, fixtures, easements, clearing, minus 15% of Poles and Fixtures	$121.9M	$264.2M
B	Number of poles	351,656	351,656
C	Cost per pole (A/B)	$346.69	$751.19
D	Add 2% of costs per pole for Neutral	$6.93	$15.02
E	Cost per pole including Neutral (C+D)	$353.62	$766.21

19 Based on information filed in NBP(Rogers) IR-32 iii), March 27, 2015.

B. Depreciation Cost, Capital Carrying Cost and Utility Tax

32. Since the Depreciation Cost, Capital Carrying Cost and Utility Tax are based on the Embedded and Net Embedded Costs, the adjustment indicated in Table 4 impacts these inputs. Table 5 provides the adjusted amounts for these inputs.

Table 5 – Adjustments to Embedded and Net Embedded Costs and Related Inputs

		NB Power	Adjusted
A	Embedded Cost per pole	$889.95	$766.21
B	Net Embedded Cost per pole	$413.62	$353.62
C	Depreciation Cost (2.575% of A) [20]	$22.90	$19.73
D	Capital Carrying Cost (5.13% of B)	$21.22	$18.14
E	Utility Tax (1.856% of B)	$7.68	$6.56

33. I note that NB Power's estimates of Embedded and Net Embedded Costs appear to be based on cumulative totals for the period 1974 to 2014. This is a period of 41 years, which exceeds the expected life of poles of 38 years and 10 months.[21] By using a longer period than the life expectancy of its poles, NB Power has likely over-stated the Embedded and Net Embedded Costs which, in turn, results in an over-statement of the Depreciation Cost, the Capital Carrying Cost and the Utility Tax.

34. I also note that the actual Depreciation Cost that has been added to the accounts during the past several years is significantly lower than the $20 to $23 per pole indicated in Table 5.[22] The discrepancy could occur if the cumulative total Embedded Cost includes the value of assets that have been fully depreciated, and/or retired from use. As a result, a more accurate measure of the annual depreciation cost per pole is likely to be less than the adjusted amount shown in Table 5. However, as the 2008 Report indicated that agreement was reached on the method for estimating Depreciation Cost, no adjustment is proposed.

20 The amount of depreciation cost per pole indicated in Table 4 is derived based on the same methodology as proposed by NB Power. This takes 2.575% of the Embedded Cost per pole, where 2.575% equates to the annual depreciation expense assuming straight-line depreciation over the 38 year and 10 month expected life of the pole. The methodology is conceptually the same as applied in the 2005 Rate Case. NB Power Evidence, Exhibit 1.03, November 21, 2014, page 69.

21 NB Power Evidence, Exhibit 1.03, page 69.

22 Based on analysis of the net additions in NBP(Rogers) IR-32 iii), March 27, 2015; and NBP(Rogers) IR-56 iii) (Additional Information), April 13, 2015.

35. Based on these considerations, the amount shown in Table 5 likely overstates the actual costs incurred by NB Power.

C. Maintenance Cost

36. The Maintenance Cost has two components: (1) the costs of vegetation management around the poles ("**Vegetation Costs**") and (2) pole and anchor-specific maintenance ("**Pole Maintenance Costs**"). The 2008 Report noted that the parties had agreed in the 2005 Rate Case to calculate these components as follows:

    (a) Vegetation Costs will be based on historical expenditures and spread across all poles; and

    (b) Pole Maintenance Costs will be based on historical expenditures and spread across all NB Power poles.[23]

37. The approach taken by NB Power in this proceeding departs from the calculations used previously that were accepted by Rogers in the 2005 Rate Case,[24] and I have serious concerns with some of the inputs used by NB Power to estimate these costs.

1. <u>Vegetation Costs</u>

38. NB Power estimates its Vegetation Costs as the sum of:

    (a) planned vegetation management ("**Planned Vegetation Costs**"); and

    (b) vegetation management related to major storm activity ("**Storm Vegetation Costs**").[25]

a) Planned Vegetation Costs

39. NB Power's estimate of Planned Vegetation Costs of $6.2M is based on a five-year average of budgeted expenses.[26] In the 2005 Rate Case, NB Power relied on an average of actual expenses, rather than the budgeted expenses claimed in this proceeding. NB Power has also not provided the five years of budgeted

23 2008 Report, Executive Summary, page 1.

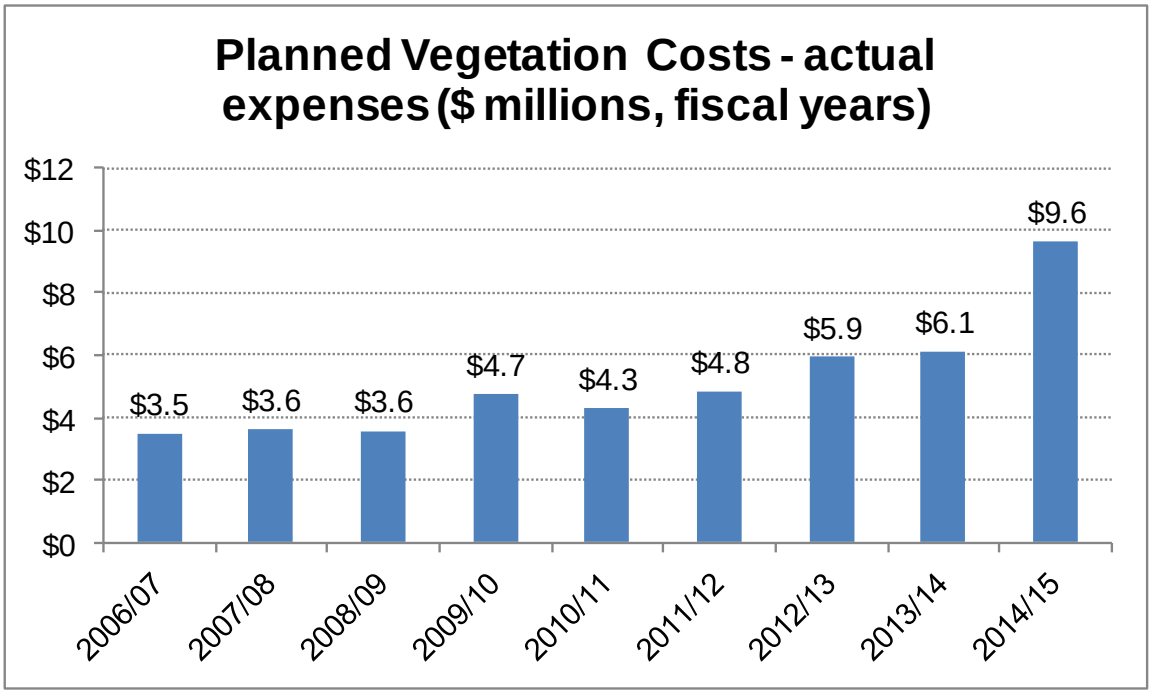
24 NBP(Rogers) IR-47 iii), March 27, 2015; and the referenced supporting evidence.

25 NB Power Evidence, Exhibit 1.19, Appendix 9, November 21, 2014; NBP(Rogers) IR-18 and IR-19, February 9, 2015; and NBP(Rogers) IR-43 and IR-44, March 27, 2015.

26 According to NB Power, this figure is "based on historical trends and increases in preventative maintenance activities." NBP(Rogers) IR-18 ii), February 9, 2015.

expenses that supports its estimate of $6.2M for Planned Vegetation Costs. Therefore, I have relied on NB Power's actual expenses. These are shown in Figure 1.

Figure 1[27]



40. As shown in Figure 1, actual expenses have increased at an accelerated rate in recent years. Notably, actual expenses climbed by almost 60% in the fiscal year 2014/15, compared to the level in previous years. The increase in Planned Vegetation Costs was triggered by a review of vegetation maintenance practices following major storm events.[28] This resulted in an acceleration of vegetation work, as noted in a press release issued by NB Power.[29]

41. After completing an accelerated program of vegetation management in one year, there should be fewer trees requiring attention and NB Power should experience some reduction in program expenditures going forward.

27 NBP(NBEUB) IR-19 d), February 6, 2015. The data for the fiscal year 2014/15 is based on actual expenses for nine months and forecasts for the remaining three months.

28 NBP(NBEUB) IR-19, Attachment G, February 6, 2015, pages 1-2, and the referenced report "Lessons Learned", cited therein.

29 NB Power, "NB Power invests extra $5.1M in tree trimming in 2014-15 to improve reliability, deal with impact of Arthur," 05 December 2014. A copy of the press release is provided in Appendix C.

42. Furthermore, the calculations used in the 2005 Rate Case, to which Rogers agreed, relied on historical actual expenses for all vegetation costs (planned and storm), and averaged each of these over the same number of years. Keeping with this approach, I recommend using a ten-year average based on actual expenditures for Planned Vegetation Costs.[30]

43. A 10-year average for the fiscal years 2005/06 to 2014/15 yields an average cost of $4.9M.[31] The average over the longer period demonstrates that NB Power's estimate of $6.2M for Planned Vegetation Costs is overstated and inconsistent with the agreed upon method.

44. Accordingly, I recommend that $4.9M be used for Planned Vegetation Costs.

b) Storm Vegetation Costs

45. NB Power proposes to include as Storm Vegetation Costs the 10-year average of 70% of all of its expenditures related to major storm activity ("**Total Storm Costs**").[32] On this basis, NB Power claims $2.2M for the Storm Vegetation Costs, which is 70% of 3.1M.

46. In the 2005 Rate Case, NB Power stated that 70% of its $2.4M in Total Storm Costs covered both Storm Vegetation Costs and Storm Pole Repair Costs.[33] 30% of the total, or $0.7M, was unrelated to vegetation and work on poles and anchors, and therefore was removed from the calculations. That left $1.7M, which was split 70/30 between Storm Vegetation Costs and storm-related repairs to the pole and its components ("**Storm Repair Costs**"). Under this method, 49% of the Total Storm Costs was recovered in the Storm Vegetation Costs and 21% in Storm Repair.

47. In this proceeding, NB Power has not deducted the 30% of Total Storm Costs which are not attributable to poles, contrary to its approach in the 2005 Rate Case to which Rogers agreed.[34] NB Power's revised method recovers more than

30 As discussed below, NB Power has estimated its Storm Vegetation Costs based on a 10 year average of actual expenses. Accordingly, I propose the same approach for Planned Vegetation Costs.

31 NBP(NBEUB) IR-19 d), February 6, 2015 for the fiscal years 2006/07 to 2014/15; and the press release provided in Appendix C for the fiscal year 2005/06.

32 For the fiscal years 2004/05 to 2013/14. NBP(Rogers) IR-43 v), March 27, 2015.

33 See NBP(Rogers) IR-47 i), Attachment, March 27, 2015, which referred to DISCO(Rogers) IR-14, December 16, 2005, and Appendix S, "Pole-specific Maintenance, Vegetation Management and Storm Costs Summary", "Storm Costs Summary". This states that "70% of storm costs are vegetation, pole, anchor and guying related".

34 NBP(Rogers) IR-47, March 27, 2015, and the referenced supporting documents in the Attachment.

77% of Total Storm Costs overall, compared to only 70% in the 2005 Rate Case.[35]

48. Storm Vegetation Costs should be calculated after deducting 30% from Total Storm Costs for unrelated expenditures. Storm Vegetation Costs should account for 70% of the remaining related expenditures.

49. I accept NB Power's proposal in this proceeding to estimate the value for Total Storm Costs of $3.1M, which is based on the 10-year average of the actual costs. I propose to apply the adjustment to remove 30% of the unrelated costs from this total and assign 70% of the remainder to Storm Vegetation Costs.

c) Summary of adjustments to Vegetation Costs

50. Table 6 summarizes the adjustments to the two components of Vegetation Costs.

(a) Planned Vegetation Costs have been adjusted to reflect a ten-year average of actual expenditures for the fiscal years 2005/06 to 2014/15.

(b) For Storm Vegetation Costs, the 30% of unrelated storm expenditures have been deducted before assigning 70% of the remainder to Storm Vegetation Costs, based on NB Power's estimate of Total Storm Costs of $3.1M.

Table 6 – Adjustments to Vegetation Costs

		NB Power	Adjusted
A	Planned Vegetation Costs, adjusted to a 10-year average	$6,186,314	$4,947,220
B	Storm Vegetation Costs, 10-year average	$2,195,521	$1,536,864
C	Total Vegetation Costs (A+B)	$8,8381,835	$6,484,085
D	Number of Poles (NB Power and Bell Aliant)	590,581	590,581
E	Cost per pole (C/D)	$14.19	$10.98

35 I calculate this by adding 18.5% and 5.9%, multiplying by 30% for Storm Pole Repair, which is equal to 7.3%, and then adding this to 70% for Storm Vegetation Costs.

2. Pole Maintenance Costs

51. NB Power has identified the following Pole Maintenance Costs:

(a) the costs of routine maintenance for poles and anchors ("**P&A Maintenance Costs**");

(b) Storm Repair Costs, which are made up of (i) the costs of repairing poles and anchors damaged as a result of storm activity ("**Storm P&A Repair Costs**") and (ii) the costs of repairing the Neutral damaged as a result of storm activity ("**Storm Neutral Repair Costs**").

52. I have no issue with the way NB Power has calculated the P&A Maintenance Costs and do not propose any adjustments to these inputs.

53. However, the Storm P&A Repair Costs and Storm Neutral Repair Costs should be adjusted to mirror the adjustment to Total Storm Costs discussed in the previous section. The first step is to deduct 30% from Total Storm Costs for unrelated expenditures. Storm Repair Costs account for 30% of the remaining related expenditures; in other words 21% of the Total Storm Costs. It is not necessary to determine Storm P&A Repair Costs and Storm Neutral Repair Costs separately, as this was not part of NB Power's calculations in the 2005 Rate Case.

54. I do not believe it is necessary to include a separate amount for Storm Neutral Repair Costs, based on the adjustment to Secondary & Neutral costs discussed in Section III.A of my evidence. Based on the adjustments discussed there, and as summarized in Table 4, I have demonstrated that Neutral represents approximately 0.5% of the total Distribution system costs.[36] I believe that this is an insignificant cost that is more than adequately recovered using the method I propose above, which is the same as that used by NB Power in the 2005 Rate Case.

55. In addition, I believe that the number of poles used to calculate the costs per pole should be adjusted. NB Power used the number of poles it owns (351,656). While this may be appropriate for its Pole Maintenance Costs, it is not appropriate for Storm Repair Costs.

56. NB Power's Storm Repair Costs are incurred for all poles, whether owned by NB Power or Bell Aliant.[37] In addition, Storm Repair Costs are based on total expenditures and are not net of revenues NB Power received for the work done.

36 See Table 4. The value of Neutral per pole of $15.02, multiplied by 351,656 poles, results in $5.3M in total. This is 0.5% of the $975.7M of total Distribution system costs.

This is in contrast to the expenditures for power line technicians which are net of revenues, thus excluding work done on poles owned by Bell Aliant. The appropriate count of poles to use to calculate the per pole cost for Storm Repair Costs is the total of all poles owned by NB Power and Bell Aliant or 590,581.

57. Table 7 summarizes the adjustments to the Storm Repair Costs noted above:

(a) For Storm Repair Costs, the 30% of Total Storm Costs have been deducted first, 30% of the 70% remaining is assigned to Storm Repair Costs, based on NB Power's estimate of Total Storm Costs of $3.1M; and

(b) divide Storm Repair Costs by the total of all NB Power and Bell Aliant poles.

Table 7 – Adjustments to Pole and Anchor Maintenance and Repair Costs

		NB Power	Adjusted
A	O&M Power Line Technicians	$31,805,793	$31,805,793
B	Pole Maintenance (18.5% of A)	$5,884,072	$5,884,072
C	Poles (NB Power)	351,656	351,656
D	Cost per pole (B/C)	$16.73	$16.73
E	Total Storm Costs	$3,136,459	$3,136,459
F	Storm Repair Costs share	30%	21%
G	Storm Neutral repair (ExFx5.9%)	$55,515	
H	Storm Pole and anchor repair (ExFx18.5%)	$174,073[38]	
I	Storm Repair Costs (G+H); adjusted (ExF)	$229,588	$658,656
J	Number of Poles	351,656	590,581
K	Cost per pole (I/J)	$0.65	$1.12
L	Maintenance Cost (D+K)	**$17.39**	**$17.85**

58. The total Maintenance Cost per pole, including the adjustments to Vegetation Costs, Pole Maintenance Costs and Storm Repair Costs is $28.83. This is the appropriate amount to include in the Total Pole Costs used for setting the Pole Rate.

38 As corrected in the Attachment filed in response to NBP(Rogers) IR-52, March 27, 2015.

D. Loss in Productivity Costs

59. NB Power has estimated the costs for Loss in Productivity in two parts:

    (a) NB Power's costs of responding to call-outs for issues related to communications facilities[39] ("**Call-out Costs**");

    (b) the time lost when NB Power crews must work around the communications attachments on the poles ("**Work-around Costs**").

60. Call-out Costs are based on a count of all call-outs tracked in NB Power's Outage Management System ("**OMS**") multiplied by the cost of two hours of labour and vehicle use. In addition, 76% of the call-outs are assumed to occur after normal working hours when labour rates are incurred at double time.[40] The call-outs tracked in the OMS include both NB Power and Bell Aliant poles.

61. Workaround Costs are based on the total number of poles worked on multiplied by the labour and vehicle costs (during normal working hours) associated with 12 minutes of additional time required to work on each pole.[41] The poles worked on include only NB Power poles.[42]

62. The 2008 Report indicates that NB Power and Rogers reached agreement on the method and inputs described above.

63. In this proceeding, NB Power has updated the hourly rates for labour and vehicle use, as well as the count of call-outs, poles worked on and total number of poles. NB Power has also applied a 55% overhead factor to the hourly crew rate.[43]

64. NB Power has estimated its Call-out Costs at $1.8M or $3.36 per pole.[44] It has also estimated its Workaround Costs at $1.1M or $3.11 per pole.[45]

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39 Call-outs are assumed to be associated with communications facilities when it is observed that the lights are on in the house. NB Power Evidence, Appendix 9, Exhibit 1.19, November 21, 2014.

40 NB Power Evidence, Exhibit 1.03, November 21, 2014, page 68.

41 NB Power Evidence, Exhibit 1.03, November 21, 2014, page 68.

42 NB Power Evidence, Appendix 9, Exhibit 1.19, November 21, 2014.

43 NBP(Rogers) IR-49, March 27, 2015.

44 NB Power uses an hourly crew rate of $282.80 during normal working hours and $411.43 during after hours, inclusive of 55% in overhead costs. There were 2,350 call-outs lasting two hours each, of which 76% were after hours. NB Power Evidence, Appendix 9, Exhibit 1.19, November 21, 2014; and NBP(Rogers) IR-20, February 9, 2015, which corrected the count of total joint-use poles.

45 There were 19,322 poles worked on with an average of 12 minutes of additional crew time for each pole. NB Power Evidence, Appendix 9, Exhibit 1.19, November 21, 2014.

65. While I accept that NB Power has provided supporting evidence for the hourly crew rate, I take issue with the way this rate has been applied in the calculations.

a) Internal employees versus Hired Services and the impact on hourly costs of crew

66. The labour and benefits rate used for the hourly crew rate assume that the work is performed entirely by NB Power employees. However, the cost details provided by NB Power for its maintenance expenses demonstrate that a significant proportion of maintenance work is done by contractors or outside workers (i.e., referred to as "Hired Services").[46] It is reasonable to expect that Hired Services are less expensive than internal employees.

67. Given that NB Power actually uses a mix of internal employees and Hired Services, I believe that it has overstated the actual costs it incurs for these services by calculating its Loss in Productivity Costs using its own employees' wages and benefits.

68. There is insufficient information on the record to determine the relative mix of NB Power employees versus Hired Services for this type of work. Moreover, the cost per hour of Hired Services for such work is not available. Therefore, I am not able to recommend an actual adjustment and caution that the costs estimated by NB Power should be viewed as being at the upper limit of what might be incurred.

b) Work activities when "no pole involved" and impact on costs caused by the presence of third party attachments

69. NB Power states that its Workaround Costs are based on a total of 19,322 poles that were worked on. However, according to subsequent data provided[47], NB Power advises that it worked on 21,560 call-outs of which 14,779 were labeled as having "no pole involved".[48]

70. This suggests that work where a pole was involved occurred in less than one-third of the cases. NB Power has not demonstrated why it would incur Workaround Costs where there was no pole involved. Accordingly, these cases should be excluded from the calculation of Loss in Productivity Costs unless NB Power can provide supporting evidence, including details on the nature of the activities involved and how the presence of third party attachments results in additional time spent when there is "no pole involved".

46 NBP(Rogers) IR-45 ii), March 27, 2015.

47 From its field engineering software used to track work done on distribution lines, including poles. NBP(Rogers) IR-21 (Additional Information), February 20, 2015.

48 *Ibid.*; and NBP(Rogers) IR-54, March 27, 2015.

c) Overhead applied to the hourly cost of crew

71. NB Power applied an overhead factor of 55% to the hourly crew rate. It also stated that an overhead factor of 50% was used in the 2005 Rate Case.[49]

72. A review of the responses to interrogatories and transcripts from the 2005 Rate Case does not support the claim that an overhead factor was applied.[50] In that proceeding, NB Power's calculations indicated an hourly crew rate of $130.95 for normal working hours and double that after hours. If a 50% overhead factor had been applied, the actual cost per hour for crew (including all labour, benefits and vehicle costs) would have been a mere $87.30; less than one-half of the current rate of $182.46. It is unreasonable to expect that a crew rate would more than double in ten years.[51] On this basis, I conclude that the NB Power crew rate used in the 2005 Rate Case did not include overhead.

73. Further, the 2008 Report does not discuss applying overhead to the hourly crew rate. NB Power's proposal to apply a 55% overhead factor adds more than $100 to the hourly cost of crew, and increases the overall Loss in Productivity Costs by $2.30 per pole.

74. NB Power also stated that the overhead factor of 55% is based on the study, "NB Power Corporation, Review and Update of Overhead Capitalization Rate and Corporate Services Cost Allocation," prepared by KPMG (the "**KPMG Report**").[52]

75. The KPMG Report sets out the method for allocating Corporate and Shared Services costs between Capital Support Costs (which are attributable to capital projects) and Operations Support Costs (which are attributable to operations, maintenance and administration). These costs are further allocated among four divisions within NB Power, including Distribution.

76. In this proceeding, NB Power adopted the Capitalized Overhead Rate (the "**COR**") for its Distribution division as set out in the KPMG Report.[53] The COR represents the portion of Corporate and Shared Services costs that is allocated

49 NBP(Rogers) IR-20 v), February 9, 2015; and NBP(Rogers) IR-49 iii), March 27, 2015.

50 DISCO(Rogers) IR-17, December 16, 2005; 2005 Rate Case Hearing Transcripts for January 24 to 26, 2006.

51 This is based on the annual escalation of wages during the period 2007 to 2012, and the fact that wages have been frozen since December 31, 2012, as indicated in NBP(Rogers) IR-48 ii) and iii), and Attachments.

52 NBP(Rogers) IR-20 iv), February 9, 2015; and NBP(Rogers) IR-49, March 27, 2015, and NBP(Rogers) IR-49 (Additional Information), April 13, 2015.

53 The Report ultimately established 56.1% as the appropriate rate. NBP(Rogers) IR-49 (Additional Information), April 13, 2015.

to capital projects within the Distribution division. In essence, it is the overhead that is applied to budgeted capital expenditures for the Distribution division.

77. Based on NB Power's current information, the COR allocates $11.8M to the budgeted capital expenditures for the Distribution division.[54] This means that these costs have been incorporated in NB Power's average Embedded Cost for its poles. They should not now be included as part of the Loss in Productivity Costs as this would result in double-counting.

78. Therefore, I believe that the COR is entirely inappropriate as an overhead factor for the operational and maintenance expenditures that are included in the Loss in Productivity Costs. Based on other information in the KPMG Report, I believe that 30% is a more appropriate overhead adjustment to be added to labour and vehicle costs.[55] This is based on the allocation of Corporate and Shared Services costs for Operational activities in the Distribution division. It is in line with the expectation that the work performed as part of the Loss in Productivity Costs is more closely related to operations and maintenance, rather than capital projects.

79. Table 8 summarizes the adjustments to the Loss in Productivity Costs, applying a 30% overhead factor to the hourly crew rate.

54 KPMG Report, pages 15, 17.

55 KPMG Report, pages 21-31. It recommends allocating a portion of Corporate and Shared Services costs to each division's operations and maintenance budgets based on the divisions' respective share of total operations and maintenance expenditures. The Distribution division was allocated approximately 30% overall, where most cost elements were allocated between 21% and 30% of overhead costs.

Table 8 – Adjustments to Loss in Productivity Costs

		NB Power	Adjusted
A	Total Responses to Communications	2,350	2,350
B	Total labour per hour	$91.83	$91.83
C	Avg Material Handler/Digger Derrick	$90.63	$90.63
D	Overhead @ 55% NB Power; adjusted to 30%	$100.35	$54.74
E	Total Crew Cost per hour (B+C) x (1+D)	$282.81	$237.20
F	Overtime Rate [(B x 2) + C] x (1+D)	$425.15[56]	$356.58
G	Total cost (A x 24% x E x 2) + (A x 76% x F x 2)	$1,837,641	$1,541,248
H	Number of Jt-Use Poles (NB Power + Bell Aliant)	547,172	547,172
I	Cost per pole (G/H)	$3.36	$2.82
J	Total poles worked on	19,322	19,322
K	Crew Cost per hour (same as E)	$282.81	$237.20
L	Total cost (J x 0.2 x K)	$1,092,900	$916,626
M	Number of Poles (NB Power)	351,656	351,656
N	Cost per pole (L/M)	$3.11	$2.61
O	Loss in Productivity (I + N)	**$6.47**	**$5.42**

80. At this time, I do not propose any other adjustments. However, as discussed above, the hourly labour costs and the benefits rate are based on NB Power's internal employees rather than hired services, and the Workaround Costs include work activities labeled as "no pole involved", neither of which have been fully justified. Absent adjustments to address these concerns, the cost per pole of $5.42 provided in table 8 should be viewed as as being at the upper limit of what might be incurred.

E. Administration Costs

81. Administration Costs are caused by the presence of third party attachments on a pole. These are the costs that would not be incurred by the pole owner if there were no third party attachments on a pole. The term "causal costs" is also used to describe such costs because they are "caused by" the presence of third party attachments and would not exist but for their presence. Because these costs are caused only by the presence of the third party attachments, the costs are recovered solely from the third party attachers and not the pole owners.

82. The applicable Administration Costs are recurring costs related to managing third party attachments, including record-keeping and billing. There are other costs caused by third party attachments that are incurred only in certain circumstances

56 The response to NBP(Rogers) IR-50, March 27, 2015 provided the overtime rate corrected to apply overhead at 55% instead of 50% NB Power had applied in its evidence.

and are considered non-recurring. An example of non-recurring costs is "make-ready costs" which are required, on a case-by-case basis, to modify a pole in order to make it ready to accommodate third party attachments. Make-ready costs can include the full replacement of the pole. These non-recurring costs are generally recovered through separate fees, known as make-ready charges. NB Power retains ownership of the pole regardless of the modifications to, or replacement of, the pole.

83. There are also permit fees that recover the costs of processing an application for a third party attachment, as well as charges for the cost of field inspections on poles after attachments have been added.[57] It is important that the Administration Costs included in the Pole Rate charged on a recurring basis do not include any of the costs of non-recurring activities that are recovered through separate fees or charges. I am satisfied that NB Power's estimate of its Administration Costs does not result in a double-recovery of the costs recovered from its permit fee.[58]

84. I have also reviewed the hourly labour rates that NB Power used for the Administration Costs.[59] The labour rates for the three staff positions correspond to those that are at the top, or very near the top, of the range of rates. This implies that all of the administration work is performed by very senior employees within those classifications, even though some positions could be filled by employees at lower levels. For example, NB Power used an hourly rate of $28.37 for the staff position ASR III/V, which is the top of the range for an ASR III/IV, compared to the lowest wage of $17.97. The top of the pay scale was used for the two other staff positions included in the Administration Costs. As a result, I believe that the Administration Costs have been overstated.

85. NB Power has also stated that the total costs for administration of communications attachments should be divided by 166,063 poles, not 150,000 as was used when it filed its evidence.[60]

86. However, a further correction is required to address the increase in the number of poles with three or more communications attachers, as well as the poles that have four or more attachers. The Administration Costs that are used as an input to the Pole Rate will be recovered from all communications attachers other than Bell Aliant. Therefore, the denominator should not be simply the sum of poles

57 NBP(Rogers) IR-41 iv), March 27, 2015.

58 NBP(Rogers) IR-22, February 9, 2015; NBP(Rogers) IR-41 (iv), and NBP(Rogers) IR-51, March 27, 2015.

59 NBP(Rogers) IR-22, February 9, 2015; and NBP(Rogers) IR-48 ii) G – Dist and CS Agreement 2008-2012 Appendix A, Revised September 2011, NB Power Exhibit 7.43.

60 Response to NBP(Rogers) IR-22, February 9, 2015.

with three or more attachers, but rather the total number of attachers on those poles (excluding Bell Aliant).

87. NB Power advised that there were 166,656 poles with three or more communications attachers, of which 4,188 poles had four attachers, and 48 had five attachers.[61] This equates to 170,988 communications attachers on the poles, other than Bell Aliant. Applying this number, the Administration Cost per communications attacher falls to $0.62. However, this amount does not include an adjustment for hourly rates, as discussed, and therefore likely continues to be overstated.

PART III - ALLOCATION OF TOTAL POLE COSTS

88. The allocation factor is used to determine the proportion of the Total Pole Costs that should be allocated to communications attachers.

89. Different approaches have been used by regulators for allocating the Total Pole Costs among the pole owner, communications attachers and other third party attachers. These approaches are discussed further in the evidence of Dr. Roger Ware. My evidence discusses the application of these approaches to NB Power.

90. Generally, the various allocation approaches are based on two inputs: (1) the average number of attachers on a typical pole with third party communications attachers and (2) the relative use of space on a typical pole by these attachers.

91. These inputs and derivation of an appropriate allocation factor are discussed below.

A. Average Number of Attachers

92. The poles owned by NB Power have different types of third party attachments. Some of these attachments are wires and strands used to deliver telecommunications and broadcasting services placed by the telephone and cable companies. A growing number of other communications companies have entered the market for communications services and, as part of building their networks, have placed attachments on the poles of NB Power.

93. Poles can also accommodate a range of attachments, such as street lights, traffic lights, signs for traffic and parking and decorative banners, lights and fixtures (e.g., brackets for flower baskets). NB Power stated that it does not apply

61 Response to NBP(Rogers) IR-9, February 6, 2015.

charges for the rental of pole space to lights,[62] and likely does not apply such charges to other types of non-communications related attachments.[63]

94. The average number of communications attachers per pole will tend towards two or more since the telephone and cable companies generally serve the same areas and accordingly have attachments on the same poles. Poles that do not have any communications attachers should not be counted when calculating the average number of communications attachers per pole. Otherwise, communications attachers would be required to contribute to the recovery of the Total Pole Costs of poles to which they do not attach.

95. The calculation of the number of communications attachers per pole should also exclude poles where the only communications attacher is an entity, such as Bell Aliant, that does not pay the Pole Rate. NB Power and Bell Aliant share poles through a joint-ownership arrangement under which each of them owns a portion of the joint-use poles and grants the other party access to its poles. Each party benefits from these arrangements and the terms of use are negotiated in a manner that reflects the benefits of joint-ownership.

96. NB Power is compensated for the costs of Bell Aliant's attachments by virtue of the reciprocal access privileges it has to the joint-use poles owned by Bell Aliant.[64] In any event, other communications attachers that pay the Pole Rate should not be required to contribute to the Total Pole Costs of poles that do not host their attachments and only host attachments of NB Power and Bell Aliant (for which NB Power is already compensated).

97. NB Power calculated the average number of attachers per pole based on the following inputs provided in Table 9:

62 NBP(F6) IR-13, March 27, 2015.

63 If an Equal Share methodology (as discussed below) is adopted to allocate Total Pole Costs, these other attachers should also be recognized as equal bearers of the costs of the shared portions of a pole regardless of whether or not NB Power chooses to levy fees from these attachers.

64 NB Power and Bell Aliant are not charged a fee for attaching to the other party's joint-use poles.

Table 9[65]

Type of pole	# of poles	# of attachments
1 attacher (NB Power)	40,228	40,228
2 attachers (NB Power and Bell Aliant)	145,365	290,730
3 attachers (NB Power, Bell Aliant and a third party)	166,063	498,189
Total	**351,656**	**829,147**

98. Based on the above data, NB Power divided 829,147 total attachers by the total 351,656 poles to come up with an average of 2.4 attachers per pole (including NB Power) and 1.4 communications attachers per pole.

99. I recommend that the average number of attachers be adjusted by:

(a) applying more precise data on the number of poles and poles with multiple communications attachers;

(b) excluding poles that are not jointly-used and thus are not used by communications attachers who are paying the Pole Rate; and

(c) excluding poles that have Bell Aliant as the only third party attacher and thus are not used by communications attachers who are paying the Pole Rate.

1. <u>Revised data on the number of poles and attachers</u>

100. NB Power's evidence states that the total number of poles it owns is 351,656, which corresponds to data filed November 21, 2014.[66] However, information filed in responses to interrogatories suggests the count of poles, and specifically poles with multiple communications attachers, has increased. For example, the number of poles with multiple communications attachers has increased from 166,063[67] to 166,656.[68]

101. Table 10 provides the count of poles based on the different sets of data presented by NB Power in its evidence and responses to interrogatories.

65 NB Power Evidence, Appendix 9, Exhibit 1.19, November 21, 2014.

66 NB Power Evidence, Exhibit 1.03, November 21, 2014, page 67. NBP(Rogers) IR-32 (iii) indicates that 351,656 is 2,792 more poles than recorded as of March 31, 2014.

67 NB Power Evidence, Appendix 9, Exhibit 1.19, November 21, 2014.

68 NBP(Rogers) IR-9 iv), February 9, 2015; and NBP(Rogers) IR-58 i), March 27, 2015.

Table 10 – Poles with communications attachers

Number of communications attachers	NB Power Evidence (Appendix 9)	NB Power (Rogers) IR-09
0 communications attachers	40,228	40,228
1 communications attacher	145,365	145,365
2 communications attachers	166,063	162,468
3 communications attachers		4,188
4 communications attachers		48
Total number of poles	**351,656**	**352,297**

102. NB Power also filed additional details indicating an even greater number of poles with three and four communications attachers; rising to more than 6,300 and 270, respectively.[69] The new and more precise data results in a slight increase in the average number of communications attachers per pole.

103. The number of poles with three or more communications attachers is likely to be higher still by year-end. Information filed by NB Power indicates that F6 has attachments on almost 4,700 poles.[70] F6 is the third largest user of NB Power's poles in the province, after Bell Aliant and Rogers, and is expanding its network from 300 kilometres to 1,500 kilometres.[71] F6 Networks is an active participant in this proceeding and may be able to provide further evidence on future growth in its attachments to NB Power's poles.

104. A five-fold increase in the number of poles where F6 is attached would increase the number of poles with three or more communications attachers to more than 25,000.[72] This would increase the average number of communications attachers per pole.

2. <u>Poles that are not jointly-used or used by communications attachers that pay the Pole Rate</u>

105. NB Power owns 40,228 poles that are not jointly-used and have no communications attacher. The only attacher is NB Power itself. As discussed above, these poles should not be included in the calculation of the average number of communications attachers per pole. To do so would artificially inflate

69 NBP(F6) IR-10 c), March 27, 2015.

70 NBP(F6) IR-10 a) (Additional Information), April 13, 2015.

71 F6 Networks, speech by Tom Rivington, CEO, April 7, 2014; and company information; available at www.f6networks.ca

72 Based on 4,700 times five, plus 1,500 poles with three or more communications attachers other than F6.

the average number of communications attachers per pole and have the effect of requiring attachers that pay the Pole Rate to contribute to the costs of poles they do not use.

106. Poles that are not jointly-used are not included in the Joint Use Agreement between NB Power and Bell Aliant.[73] Bell Aliant does not contribute to the recovery of the costs of these poles, and neither should other communications attachers.

107. Accordingly, as a first step, I recommend removing the 40,228 poles that are not jointly-used by any communications attachers from the calculation of the average number of communications attachers per pole.

108. In addition, NB Power owns 145,365 poles on which Bell Aliant is the only communications attacher. The Pole Rate does not apply to Bell Aliant. Therefore, as a second step, I recommend removing these poles from the calculations used to determine the average number of communications attachers per pole.

109. Combining steps one and two removes all poles that are not used by communications attachers that pay the Pole Rate and, which should not be subject to cost recovery from these attachers; that is, it removes poles that are not jointly-used and have Bell Aliant as the only third party attacher. The adjusted average number of communications attachers per pole is 2.

110. Based on the above analysis, I recommend that the average number of attachers be increased to 2 for communications attachers and 3 in total including NB Power. These figures are conservative estimates because they do not reflect the growth in F6's network discussed above.

B. Pole Space

111. The allocation of Total Pole Costs to communications attachers generally considers the relative use of space on a typical 40 foot pole by the different types of attachers.

112. Figure 2 indicates the different spaces found on a typical pole, comprising the following:

(a) the buried portion (the "**Buried Space**");

(b) clearance between the ground and the first wire (the "**Clearance Space**");

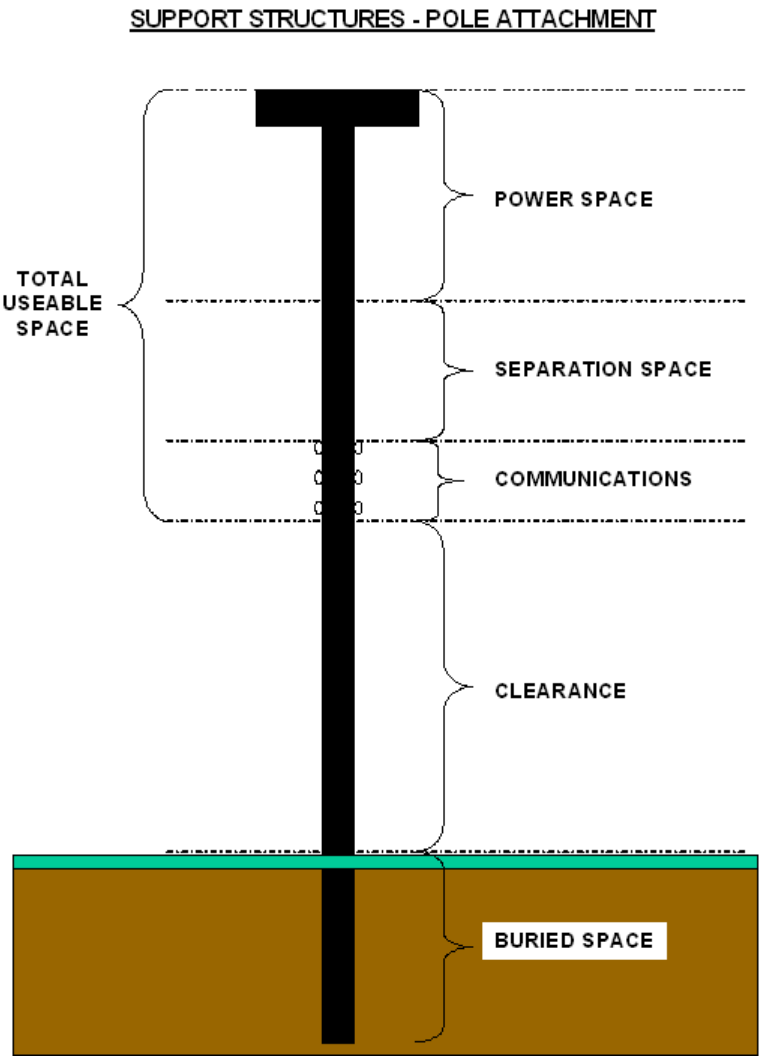
(c) space for communications attachments (the "**Communications Space**"):

73 NBP(Rogers) IR-57 ii), March 27, 2015.

(d) separation between the communications and power attachments (the "**Separation Space**"); and

(e) at the top of the pole, the space for power attachments (the "**Power Space**").

Figure 2



113. The Communications Space is dedicated for communications attachments, just as the Power Space is dedicated for power attachments. The buried and Clearance Space are required by all attachers and, as such, form part of what is referred to as the "shared space" on the pole. The Separation Space is shared space or dedicated space depending on the allocation methodology and its underlying assumptions.

114. NB Power and Bell Aliant have adopted different space allocations on 40 foot poles that they each own and are jointly-used by the other party. This is indicated in Table 11.

Table 11

Space on pole	Length in ft. NB Power[74]	Length in ft. Bell Aliant[75]
Buried portion	6.0	6.0
Clearance Space	19.0	18.0
Communications Space	2.0	2.0
Separation Space	4.0	3.3
Power Space	9.0	10.7
Total length	**40.0**	**40.0**

115. According to the terms in their Joint Use Agreement, NB Power and Bell Aliant jointly use one another's poles. NB Power stated that there are no standard differences between how space is used on the joint-use poles owned by either company.[76] Thus the standard space allocations identified by Bell Aliant should be valid for all joint-use poles in New Brunswick with communications attachments. The Lawrence Evidence also endorses the pole space allocations of Bell Aliant.

C. Ownership versus tenancy

116. As noted, the allocation factor establishes the share of Total Pole Costs borne by communications attachers that pay the Pole Rate. Because the Total Pole Costs do not vary based on whether there are any communications attachers present, there are no direct means of measuring the proportion of these costs attributable to communications attachers.

117. In my view, the allocation factor should recognize that communications attachers that pay the Pole Rate do not receive the same benefits in their use of a pole as the pole owner. The benefits of pole ownership include control over the design, planning and placement of poles, which ensure the poles can always accommodate the pole owner's attachments. The owner also has complete information on availability of space on the poles, including any changes forthcoming as part of the planning process. This is in contrast to the situation of tenants, as noted in the Lawrence Evidence.

74 NB Power Evidence, Exhibit 1.03, November 21, 2014, page 71.

75 Bell Aliant(CRTC)1Mar10-12 TNC 2009-432, response to part (b), page 5. A copy of this document is provided in Appendix D.

76 NBP(Rogers) IR-13, February 9, 2015.

118. It is important to note that Bell Aliant enjoys benefits of joint-ownership of poles with NB Power that are not available to other third party attachers. Under the terms of the Joint Use Agreement, Bell Aliant manages the Communications Space on NB Power's poles, and is solely responsible for determining whether the Communications Space can accommodate additional attachments besides its own.[77] Bell Aliant is assured access to the Communications Space and does not participate in NB Power's permit process, or have its attachments inspected by NB Power and pay the associated external and internal costs, as do the other third party attachers.[78]

119. Other communications attachers such as Rogers must adapt to the pole in the form in which it is made available. If no capacity is available, either they will be denied access or required to pay one-time make-ready fees to cover the cost of modifying (or replacing) the pole to allow for the attachment. Rogers and other third party attachers have paid substantial make-ready charges to modify and replace poles so as to create extra capacity.[79] NB Power benefits by gaining an opportunity to earn revenues from Pole Rates that would not otherwise have been available to it. The additional revenue opportunity is created at no cost to NB Power because the costs are recovered from the make-ready charges.

120. I also do not agree with the expert evidence of Dr. Bridger Mitchell that NB Power faces a vacancy risk in constructing poles with two feet of Communications Space.[80] Virtually all of the poles owned by NB Power that could be jointly-used have at least one communications attacher, that being Bell Aliant.

121. In this regard, NB Power indicates that 89% of all of the poles it owns are jointly-used and that Bell Aliant is present on all of them.[81] Poles are constructed to have two feet of space for communications attachments. This space is included on the pole to accommodate the attachments of Bell Aliant, as part of the Joint Use Agreement. There is no evidence that poles would be constructed with less

77 NBP(Rogers) IR-16, February 9, 2015; and NBP(Rogers) IR-41, March 27, 2015.

78 *Ibid.* See also the response to NBP(Rogers) IR-33 and IR-36 (Additional Information), April 13, 2015, which suggests Bell Aliant attaches to newly constructed poles a "brief period of time" after construction is completed.

79 NBP(Rogers) IR-25 (i), February 9, 2015 and NBP(Rogers) IR-41 iii), March 27, 2015. Third parties paid nearly $1.4M in make-ready charges to NB Power during the period 2006/07 to 2013/14. This accounted for 80% of the make-ready payments received by NB Power, with the balance paid by Bell Aliant.

80 NB Power Evidence, Exhibit 1.18, Appendix 8, page 18.

81 NB Power Evidence, Exhibit 1.19, Appendix 9, November 21, 2014; NBP(Rogers) IR-33 and IR-36 (Additional Information), April 13, 2015; and NBP(Rogers) IR-40 iii) and IR-41 ii) (Additional Information), April 13, 2015.

Communications Space if Bell Aliant was the only party that made use of the that space.[82]

122. The information provided by NB Power demonstrates that the two feet of Communications Space is occupied by at least one communications attacher (i.e., Bell Aliant) wherever the poles are installed to accommodate communications attachers. NB Power benefits from the presence of Bell Aliant on these poles by virtue of the Joint Use Agreement. Thus there is no risk of vacancy on the joint-use poles that would diminish the benefits of ownership.

D. Methodologies for Allocation Factors

123. I am aware of three methodologies that have been proposed and/or used for the allocation factor for electrical utility poles: (i) Proportional Use, (ii) Equal Share; and (iii) Stand-Alone. This section of my evidence describes these methodologies, calculates the resulting allocation factor using the evidence in this proceeding on the average number of attachers and pole space allocations, and sets out my opinion on the appropriate allocation methodology for establishing the Pole Rate.

124. For purposes of calculating the allocation factors, for the reasons discussed earlier, I use the pole space allocations adopted by Bell Aliant (Buried Space - 6 feet, Clearance Space - 18 feet, Communications Space - 2 feet, Separation Space - 3.3 feet, Power Space - 10.7 feet), 2 communications attachers per pole, and a total of 3 attachers per pole (including NB Power).

1. Proportional Use Methodology

125. The Proportional Use methodology establishes an allocation factor that is based on the proportionate use by communications attachers of the total dedicated space on a pole. As communications attachers require less of the dedicated space on the pole for attachments relative to the electrical utility, the allocation of space to communications attachers is lower, in proportion to their relative use. The approach also recognizes that there are benefits to ownership and therefore the pole owner (and a joint user such as Bell Aliant) should bear a higher allocation of Total Pole Costs than third party communications attachers that pay the Pole Rate.

126. The Proportional Use methodology assumes that communications users are incremental users of a pole, and hence the 2 feet of Communications Space and 3.3 feet of Separation Space are considered to be dedicated for the sole use of the communications attachers (the "**Communications Dedicated Space**"). The

82 NBP(Rogers) IR-13 v), February 9, 2015.

10.7 feet of Power Space is dedicated for the sole use of the electrical utility. These two components comprise the "**Total Dedicated Space**" on the pole for a total of 16 feet.

127. The remaining spaces (18 feet of the Clearance Space and 6 feet of Buried section) are not dedicated to one particular attacher and are shared by the various attachers on the pole (the "**Shared Space**", for a total length of 24 feet).

128. Under the Proportional Use methodology, the communications attachers are responsible for:

(a) 100% of the Communications Dedicated Space (5.3 feet)**;** and

(b) a portion of the Non-dedicated Space based on their proportional use of the Total Dedicated Space. The communications attachers use 5.3 feet or 33.1% of the 16 feet of Total Dedicated Space. Therefore, their share of the Shared Space is 33.1% of 24 feet or 7.95 feet.

129. The sum of the space allocated to communications attachers is 5.3 plus 7.95 for a total of 13.25 feet. Dividing this by 40 feet of total pole height results in an allocation factor of 33.1%. The allocation to each communications attacher is then determined by dividing the number of communications attachers on a pole (i.e., **2**), which results in an allocation factor of 16.6% applied to the Total Pole Costs.

130. As noted above, as communications attachers require less of the space available on the pole for attachments relative to the electrical utility, the allocation of space to communications attachers is lower than to the electrical utility, in proportion to their relative use. This approach also recognizes that there are benefits to ownership and therefore the pole owner should bear a higher allocation of Total Pole Costs than third party communications attachers that pay the Pole Rate.

131. The Proportional Use approach has been applied by the CRTC and the Nova Scotia Utility and Review Board in Canada.[83] The CRTC concluded that the pole owner benefits from priority access to the pole, justifying a higher allocation to the pole owner.[84]

83 CRTC, Telecom Decision CRTC 99-13, available at: http://www.crtc.gc.ca/eng/archive/1999/DT99-13.htm; and NSUARB, Decision NSUARB-P-873, 2002, filed by NB Power as Exhibit 5.09, Attachment E (PI IR-07a).

84 CRTC, Telecom Decision CRTC 2010-900, paragraphs 18 to 20, Telecom Decision CRTC 99-13, paragraph 222, and Telecom Decision 95-13, page 18 (section III).

2. Equal Share Methodology

132. Under the Equal Share methodology, which corresponds to Dr. Mitchell's Rules 1 and 2, the dedicated space on the pole continues to be allocated based on proportionate use, but the shared space is allocated on an equal, or "per capita" basis. The Total Dedicated Space, in this context, is the Communications Space and the Power Space only. If attachers are considered to be equal users and beneficiaries of the pole, then the Separation Space is required as much for the electrical utility as a communications attacher and must be considered to be shared space.

133. Thus the allocation factor is determined by allocating to communications attachers:

(a) 100% of the Communications Space (2 feet);

plus

(b) an equal share of the Shared Space of the pole to each communications attacher. The Shared Space (Buried + Clearance + Separation) is 27.3 feet. If there are 2 communications attachers and 3 attachers in total, the communications attachers' share is 2/3 of this space, or 18.2 feet.

134. The sum of the space allocated to communications attachers is 18.2 feet plus 2 feet for a total of 20.2 feet. Dividing this by 40 feet of total pole height results in an allocation factor of 50.5%. Dividing the 50.5% by the two communications attachers on a pole results in an allocation factor of 25.3% of the Total Pole Costs to the Pole Rate.

135. The Equal Share approach requires attachers which are only tenants on the pole to contribute as much to the recovery of the shared portion of the pole costs as the electrical utility which owns the pole. As a result, the parties renting space pay for benefits of ownership that are enjoyed solely by the electrical utility and Bell Aliant.

136. A version of the Equal Share Approach was applied by the OEB, modified by treating the Separation Space as dedicated to communications attachers.[85]

3. Stand-Alone Methodology

137. The allocation of Total Pole Costs under the Stand-Alone approach (Dr. Mitchell's Rule 3) is based on the ratio of the cost of a stand-alone pole for one communications attacher to the sum of the costs of a stand-alone pole for each

85 OEB, RP-2003-0249, filed as Attachment F (PI IR-07a) and UM IR-6a), Exhibit NBP 5.10.

attacher. The height of a stand-alone pole has been proposed as a proxy for the stand-alone pole cost.

138. More specifically, each attacher is assumed to construct a pole designed to meet its own requirements and not that of other possible attachers. The height of that pole is divided by the sum of the height of the individual poles for each attacher.

139. The communications attacher is assumed to require a pole that is 25 feet (Buried plus Clearance plus one foot for attachments), while the electrical utility requires a pole that is 34.7 feet (Buried plus Clearance plus 10.7 feet for power attachments). If there are two communications attachers, the numerator is 25 and the denominator is 84.7, resulting in an allocation factor of 59% to all communications attachers and of 29.5% to each communications attacher.

140. This approach differs significantly from the other two in that it is based on proxy costs and an entirely hypothetical scenario since there is no real-life circumstance where a power, telephone and cable company have constructed stand-alone systems of distribution poles next to one another.

141. It also results in cost allocations based on pole heights that would never, in practice, occur. For example, using the pole space allocations proposed by NB Power, a power-only pole is 34 feet. According to NB Power's evidence, poles are manufactured in five foot increments,[86] therefore, this is not a pole height that would be installed by a power utility. The assumed height of poles becomes even more unrealistic when we turn to how NB Power applied this methodology in its evidence.

142. As noted above, the Stand-Alone allocation factor is calculated using the height of a communications-only pole in the numerator divided by the sum of the height of attachers' stand-alone pole in the denominator. NB Power used 26.43 feet for the communications-only pole in the numerator.[87] However, it appears as if a much smaller communications pole has been used in the denominator. The sum of the height of stand-alone poles for all attachers is given as 71 feet, when it should be at least 86 feet.[88] This is contrary to NB Power's statement that it

86 NB Power Evidence, Exhibit 1.03, November 21, 2014, page 75.

87 NB Power Evidence, Exhibit 1.19, November 21, 2014, tab "2.4 Attachers" (Excel file, cell D38, expanded to two significant digits). The formula is found in cell D23, which indicates the pole is comprised of 6 feet buried, 19 feet of Clearance Space plus 1.4 times 2 feet of Communications Space. A communications company would not construct a pole with more than one foot of space for its communications attachments.

88 This is based on the inputs and formulas provided in NB Power Evidence, Exhibit 1.19 (Excell file). It should be 86.86 feet to be consistent with the 26.43 feet for each communications attacher that NB Power used in the numerator of its calculations.

assumed a 26 foot communications-only pole in its calculations.[89] NB Power has significantly inflated the Stand-Alone allocation factor from 30.2% to 37.2% as a result of its misapplication of the inputs.

143. The Stand-Alone approach ignores the benefits of ownership as well as the fact that communications attachers that pay the Pole Rate do not have the option of constructing stand-alone poles where a power utility or telephone company already has a pole in place. It is also based on unrealistic stand-alone pole cost estimates.

144. The Stand-Alone approach was adopted by the Alberta Energy and Utilities Board.[90] However, I understand that the electrical utility did not apply the approved rate to the cable company's attachments.[91] A similar approach has been proposed in other regulatory proceedings by representatives of electrical utilities, but has not been adopted for setting pole attachment rates by any other regulatory authority to the best of my knowledge.

4. Comparison of allocation methodologies

145. Table 12 summarizes the allocation factors for each of the methodologies discussed above.

Table 12
Allocation of Total Pole Costs to communications attachers

	Space allocation (feet)	Proportional Use	Equal Share	Stand-Alone
Buried depth	6.0	1.99	4.00	6.00
Clearance	18.0	5.96	12.00	18.00
Communications space	2.0	2.00	2.00	1.00
Separation space	3.3	3.30	2.20	0.00
Power space	10.7	0.00	0.00	0.00
Total	**40. 0**	**13.25**	**20.20**	**25.00**
Allocation – all communications attachers		**33.1%**	**50.5%**	**59.0%**
Allocation - each communications attacher		**16.6%**	**25.3%**	**29.5%**

89 NBP(Rogers) IR-26 ii), February 29, 2015.

90 Alberta Energy Board (AEUB), Decision 2000-86, filed as Attachment D (PI IR-07a), Exhibit NB Power5.08.

91 Direct Evidence of Don Ford, filed by Rogers in the 2005 Rate Case, page 15.

146. None of the allocation methodologies result in an allocation between communications and electrical attachers that is the same as the 57%/43% ownership shares for NB Power and Bell Aliant respectively, set out in the Joint Use Agreement.

147. Moreover, because communications attachers that pay the Pole Rate are tenants on the pole and receive fewer benefits from the pole than Bell Aliant, the proportion of Total Pole Costs allocated to them should be less than the 43% allocated to Bell Aliant under the Joint Use Agreement. Thus it is inappropriate, in my view, to require tenants in the communications space to bear more than 43% of the Total Pole Costs, which is the result under the Equal Share and Stand-Alone approaches.

148. I recommend the allocation of Total Pole Costs to communications attachers apply the Proportional Use method, resulting in an allocation of 33.1% to communications attachers and a 16.6% share to each communications attacher that pays the Pole Rate.

PART IV - CONCLUSION

149. In my view, NB Power's Pole Rate should not exceed $13.68, based on the evidence available to me at this time. The costing inputs and adjustments I have made are summarized in Appendix B. This supports the Pole Rate I recommend, based on the Proportional Use allocation factor. It also indicates the Pole Rate that would result from applying the Equal Share and Stand-Alone allocation factors, which I do not recommend for the reasons discussed in my evidence.

150. I have discussed in my evidence other cost inputs that may not be valid based on the record to date, although I have not recommended any specific adjustments. If these adjustments were made, it would result in further reductions to the Total Pole Costs. Accordingly, the Pole Rate of $13.68 is in my view a maximum rate, based on the available evidence.

APPENDIX A

Relevant Work Experience and Curriculum Vitae of Suzanne Blackwell

I am the President of of Giganomics Consulting Inc., based in Ottawa Ontario, Canada. I am a consultant in the field of regulatory economics, specializing in the telecommunications and broadcasting sectors.

I have been employed in this field since 1989, working for the federal regulator of telecommunications and broadcasting, federally-regulated companies and as the head of my consulting firm since 2006.

Work Experience specific to pole attachments

I have participated in several regulatory proceedings respecting the establishment of the rates, terms and conditions for pole attachments during the past 15 years. During the period 1999 to 2006, I held the position of Vice-President, Telecommunications and Economics at the Canadian Cable Telecommunications Association (CCTA). I provided economic analysis of matters related to pole attachments that were subject to regulatory proceedings, discussed further below, and negotiated arrangements between cable companies that were members of the CCTA and various electrical distributors. This included electrical distributors operating in the provinces of Quebec, Nova Scotia and Alberta.

My analysis of pole attachments during my tenure at the CCTA included pole space allocation methodologies and inputs, as well as factors employed to derive administrative costs, loss of productivity costs, and capital costs of poles (e.g., net embedded costs, depreciation expense, capital carrying costs, pole maintenance expenses). My analysis was a key input to the CCTA's participation in regulatory proceedings as well as the advice provided to CCTA member companies in their negotiations.

I provided analysis for CCTA's application to the Ontario Energy Board (OEB) during 2003 and 2004. My contributions included providing economic analysis for CCTA's application, assessments of the submissions of intervenors, preparation of interrogatories to intervenors and responses to interrogatories addressed to CCTA, for CCTA's witnesses at the oral hearing, and inputs to CCTA's final and reply arguments. The proceeding before the OEB culminated in its decision RP-2003-0249 which determined the current rate of $22.35 for pole attachments.

As a consultant since 2006, I have provided economic analysis for clients participating in regulatory proceedings before the Canadian Radio-television and Telecommunications Commission (CRTC). The CRTC regulates the rates, terms and conditions of attachments to the poles owned by telephone companies. The telephone companies' poles include those subject to joint use arrangements with electrical distributors.

In 2009, the CRTC initiated a proceeding to review the rates, terms and conditions of pole attachments for all of the major telephone companies under its jurisdiction, in Telecom Notice CRTC 2009-432. I was retained by several cable companies (referred to collectively as the "Cable Carriers") to provide economic analysis of the pole space allocation and costs used as inputs to the rates for pole attachments. My contributions included providing economic analysis for, and drafting of, the Cable Carriers' submissions, assessments of the telephone companies' evidence, preparation of interrogatories to the telephone companies and analysis of the information provided in the telephone companies' responses.

Most recently, I have been engaged by Rogers and three other carriers in the proceeding before the OEB, in the matter of an application by Toronto Hydro-Electrical Systems Limited for an order approving just and reasonable rates and other charges for electricity distribution (EB-2014-0116). I prepared detailed evidence regarding the issues related to the pole space allocation and costs for pole attachments in that proceeding.

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GIGANOMICS CONSULTING INC.

President
March 2006 to present

Giganomics Consulting Inc. is a corporation I operate for the provision of consulting services to various clients in telecommunications, broadband and broadcasting distribution industries. I provide strategic advice on policy and regulatory issues in the Canadian communications industry. I conduct comprehensive quantitative and

qualitative research and analyses of competitive market trends and developments. I prepare submissions and expert reports on regulatory economics and policy issues in the telecommunications and broadcasting industry, and provide expert testimony for proceedings before the Canadian Radio-television and Telecommunications Commission (CRTC), other regulatory authorities and judicial panels. A list of some of my expert reports is provided at the end my C.V.

CANADIAN CABLE TELECOMMUNICATIONS ASSOCIATION

Vice-President, Telecommunications and Economics
November 1999 to February 2006

The Canadian Cable Telecommunications Association (CCTA) represented the cable television distribution industry in Canada with respect to regulatory and government-related issues. My role at the CCTA encompassed a broad range of responsibilities, most recently as the head of telecommunications regulatory and policy matters. I established industry positions on key policy regulatory matters that support the entry of cable companies in the voice telephony market. I provided leadership and built consensus among CCTA member companies on a number of significant regulatory and policy issues, including the forbearance of incumbents' local voice services and regulation of voice over internet protocol (VoIP) services.

I was a key contributor to strategic planning respecting critical regulatory and policy matters for the Association. I prepared competitive and economic analysis of issues for the CCTA members and the Board, including written and oral presentations. I conducted economic research on the competitive market conditions and financial trends of cable companies and their competitors in telecommunications and broadcasting services.

My role included providing economic analysis on matters such as carriage obligations of cable operators, access to cable facilities by competitors, access to support structures, rates for programming services, and copyright. I represented the CCTA at cross-industry forums and appeared as an expert witness at public hearings on both telecommunications and broadcasting matters. I developed expertise in the cable industry's advanced service offerings such as broadband internet, VoIP, high definition television, and video over internet protocol (IPTV). I was also responsible for managing the research budget and economic consulting work conducted on behalf of the CCTA.

Independent Consultant in Telecommunications Regulation

October 1998 to October 1999

I prepared several submissions for proceedings before the CRTC for a number of clients from the competitive entrant sector of the telecommunications industry. Policy documents and analysis were also prepared for Industry Canada, the CRTC and the Public Interest Advocacy Centre. These documents addressed a number of issues, including: the provision of affordable local telephone service in high-cost service areas; the level of contribution rates and subsidy support to local services; extended area service and the impact on competition in the local and long distance markets; recovery of costs of local competition; and new media and the scope for regulation under existing legislation.

As a consultant, I also advised clients on key issues and assisted them to develop appropriate and effective arguments to support their positions; conducted research and analysis of positions of other stakeholders, and prepared comments and related submissions to further the clients' positions.

AT&T CANADA LONG DISTANCE SERVICES COMPANY

Senior Manager, Regulatory Policy
February 1996 to September 1998

As a senior member of the Regulatory Matters division, I provided leadership on the development of the company's position on regulatory and policy issues. This work involved the formulation of new approaches to key regulatory issues such as the impact of local competition on cross-subsidization of telecom services and contribution, forbearance and effective competitive safeguards, and the implementation of local competition and price cap regulation.

I prepared formal written submissions presenting the company's views on regulatory issues raised at CRTC proceedings. This work involved extensive qualitative and quantitative analysis of the positions of other parties and factors that affected the company and its competitors. I represented the company as an expert witness at public hearings before the CRTC, testifying on issues such as price cap regulation, affordable local service pricing and appropriate regulations for telecom carriers entering broadcasting markets.

CANADIAN RADIO-TELEVISION AND TELECOMMUNICATIONS COMMISSION (CRTC)

Chief, Regulatory Policy

July 1990 to February 1996

I provided analysis and recommendations on several policy issues associated with implementing a new regulatory framework for the incumbent telephone companies, including an assessment of broadband investment, cost allocation, rate rebalancing, price caps and contribution. Prior to this, I was extensively involved in the analysis and development of recommendations leading to the opening of the public switched long distance market to competition and I remained active in analysis and recommendations overseeing the implementation of competitive access.

In addition to my involvement in competition issues, I provided recommendations on social policy issues with respect to new service offerings, rate proceedings and other regulatory filings. I worked on topics including consumer safeguards, telecommunications privacy, terms of service, extended area service, and access to service for the handicapped.

My duties included the analysis of a broad range of issues associated with telecom regulation in an increasingly competitive marketplace. I worked directly with executive management on several matters as well as in multi-disciplinary teams. I was also responsible for supervising four analysts. I prepared and presented numerous recommendations to the Chairman and Commissioners of the CRTC. I gained comprehensive knowledge regarding all aspects of regulatory proceedings and procedures in the Canadian telecommunications market.

Project Officer and Development Officer

January 1988 to July 1990

I was responsible for providing key analytical results in the proceeding leading up to the 1990 decision to liberalize resale and sharing in the telecommunications market. I constructed a market analysis model used by senior management in their decision-making. I participated on a related file concerning the resale and sharing of international telecommunications services. I was also involved in the econometric analysis of the price elasticity of demand. I prepared interrogatories to telephone companies and issue papers for rate cases.

CANADA EAST-WEST CENTRE LTD.

Consultant
September 1985 to December 1987

As a consultant, I conducted independent research on a broad range of topics, assimilated findings, performed quantitative analysis, and wrote reports for clients. I was responsible for the preparation and delivery of a project for Employment and Immigration Canada, including client relations and budget control. I also provided input on various aspects of the consulting firm activities, including responses to requests for proposals. Reports that I worked on addressed issues such as: native rights; Canada – U.S. free trade negotiations; and an evaluation of the national employment service for the department of Employment and Immigration Canada.

EDUCATION BACKGROUND

Masters in Economics – Dalhousie University, Halifax Nova Scotia – 1985

Bachelor of Arts (Honours) – University of King's College – 1984
(Economics with math minor)

GIGANOMICS CONSULTING INC. – LIST OF EXPERT REPORTS

"Economic Impact of a Fee for Carriage in the Canadian Television Broadcasting Industry," co-authored with Steven Globerman, prepared for Bell Canada, Rogers Communications and TELUS Communications Company, filed in Broadcasting Notice of Public Hearing CRTC 2007-10, January 2008

"Assessment of an ISP Surcharge to Support Canadian Content," prepared for Rogers Communications Inc., filed in Broadcasting Notice of Public Hearing CRTC 2008-11, December 2008

"Lagging or leading? The state of Canada's broadband infrastructure," co-authored with Mark H. Goldberg, commissioned by Bell Canada, Bell Aliant, Cogeco, Rogers, SaskTel, Shaw and TELUS, October 2009

"Economic Analysis of LPIF," prepared for Shaw Communications Inc., filed in Broadcasting Notice of Consultation CRTC 2011-788, February 2012

"Analysis of Economic Evidence Filed by Applications for Mandatory Distribution and Wholesale Rate Increases," prepared for Cogeco Cable Inc., Rogers Communications Inc. and Shaw Communications Inc., filed in Broadcasting Notice of Consultation CRTC 2013-19, February 2013

"Analysis of Sun News Forecasts versus Actual," prepared for Cogeco Cable Inc., filed in Broadcasting Notice of Consultation CRTC 2013-394, September 2013

"Evolution of the Internet in Canada 2000-2007," prepared for Videotron GP, filed in Union des consommateurs et al. v. Videotron s.e.n.c. Court no: 500-06-000411-070, before the Quebec Superior Court, December 2013

"Economic Impact of Proposed Revisions to BDU packaging of programming services," prepared for Cogeco Cable Inc., filed in Broadcasting Notice of Consultation CRTC 2014-190, June 2014

"Methodology, Data Inputs and Determination of a Just and Reasonable Pole Access Charge (Wireline Attachments) by Toronto Hydro-Electric System," Expert Evidence filed in Ontario Energy Board EB-2014-0116, March 26, 2015

APPENDIX B

Summary of Adjustments to the Pole Attachment Rate

		NB Power[92]	Adjusted	Notes
A	Average Embedded Cost per Pole	$889.45	$766.21	Remove Secondary & Neutral; add 2% for Neutral
B	Net Embedded Cost per Pole	$413.62	$353.62	Remove Secondary & Neutral; add 2% for Neutral
C	Depreciation Cost	$22.90	$19.73	A x 2.575%
D	Capital Carrying Cost	$21.22	$18.14	B x 5.13%
E	Utility Tax	$7.68	$6.56	$1.856 per $100 of B
F	Maintenance Cost	$31.58	$28.83	Remove unrelated storm costs Reduce allocation for Neutral; Use all poles for Storm Repair
G	Loss in Productivity	$6.47	5.42	Reduce overhead to 30%
H	Total Total Pole Costs	**$89.85**	**$78.68**	C+D+E+F+G
I	Administration Cost	$0.64	$0.62	Increase communications attachments
J	Equal Share (Rule 1)	33.8%	25.3%	3 attachers per pole; 2 communications attachers
K	Stand-Alone (Rule 3)	37.2%	29.5%	3 attachers per pole; 2 communications attachers
L	Proportional Use		16.6%	2 communications attachers per pole
	Pole Attachment Rate			
M	Equal Share	$30.99	$20.53	(H x J) + I
N	Stand-Alone	**$34.08**	$23.83	(H x K) + I
O	Proportional Use		**$13.68**	(H x L) + I

92 Based on corrections to the following inputs: the number of joint-use poles; the number of poles with multiple communications attachers; overhead applied to hourly cost of crew, and allocation of storm costs to pole and anchor, as indicated in the responses to NBP(Rogers) IR-20 and IR-22, February 9, 2015; NBP(Rogers) IR-44 ii), and IR-52 ii), March 27, 2015, respectively.

APPENDIX C

NB Power invests extra $5.1M in tree trimming in 2014-15 to improve reliability, deal with impact of Arthur

05 December 2014

Fredericton (GNB) – NB Power is spending an additional $5.1 million this year to bolster grid reliability by cutting and trimming thousands of trees weakened by last summer's Post-tropical Storm Arthur. This extra investment brings the utility's 2014-15 tree trimming expenditure to $12.1 million.

"Our customers are experiencing outages related to trees damaged by the high winds and heavy rains brought by Arthur in July," said Gaëtan Thomas, president and CEO of NB Power. "Our customers are frustrated by these outages and we are too. We have been working hard on the ground for the last few months to accelerate our regular programming and to deal with these tens of thousands of storm-weakened trees and we are extending our vegetation management program through the winter to make sure our system and our customers can be protected, as much as possible, from tree-related outages."

The $12.1 million includes an updated forecast of $8 million in program spending plus a one-time cost of $4.1 million on tree trimming contractors related to Arthur.

"Our infrastructure is built and maintained to rigorous standards and is among the strongest in North America. The best way for NB Power to take care of its customers this winter is to continue to increase our investments in tree trimming," said Thomas. "We are building more capacity into our vegetation management program through the use of remote-sensing laser technology and GIS mapping allowing us to make the most of our investment by focusing on areas with high likelihood of tree contacts. We know that trees and branches on lines are the biggest cause of outages during extreme weather and we are doing everything possible to prevent those contacts from happening."

While normally a seasonal program that runs during the late spring, summer and fall months, this year tree contractors will work through the winter months.

Revised numbers for tree trimming spending in 2013-14 are now also available. Last year, NB Power spent $2.5 million on tree trimming contractors in the days following the December ice storms in addition to $6.1 million for preventative maintenance, bringing the total spending to $8.6 million.

The table below details actual spending on tree trimming programs for NB Power's street-level infrastructure, which includes poles and lines serving homes and businesses (distribution) since 2005.

This does not include investments in vegetation management for the higher voltage transmission lines or capital spending on clearing for new line construction.

Distribution Tree Trimming Spending

Fiscal Year (April 1 – March 31) – Actual Expenditures:

- 2005-06: $3.2M
- 2006-07: $3.6M
- 2007-08: $3.6M
- 2008-09: $3.6M
- 2009-10: $4.7M
- 2010-11: $4.3M*
- 2011-12: $4.8M
- 2012-13: $5.9M
- 2013-14: $6.1M + $2.5 (storm restoration) = $8.6M
- 2014-15: $8 + $4.1 (storm restoration) = $12.1M

Budget

- 2015-16: $7.9M

* 2010-11 – Storm days delayed the vegetation management program resulting in a $300,000 underspend of budget.

05-12-14

APPENDIX D

See separate document.

APPENDIX "D"

ANALYSIS GROUP
ECONOMIC, FINANCIAL and STRATEGY CONSULTANTS

NEW BRUNSWICK ENERGY AND UTILITIES BOARD

IN THE MATTER OF the New Brunswick Power Corporation and Section 103(1) of the *Electricity Act*, SNB 2013 c.7

NB Power 2015/16 General Rate Application

Matter No. 0272

Expert Report

Dr. Roger Ware
Professor of Economics, Queen's University

May 4, 2015

Table of Contents

1 Introduction

1.1 NB Power's 2015/16 General Rate Application

1. New Brunswick Power Corporation ("NB Power"), a Crown Corporation owned by the Province of New Brunswick, is the primary electric utility company in the province. Its distribution network of electric power poles is essential for the delivery of electricity to residents and businesses in New Brunswick.

2. In its jurisdiction motion from October 27, 2005, the New Brunswick Energy & Utilities Board ("Board") concluded that it has jurisdiction to establish a rate for cable attachments to electric power poles of NB Power.[1] The following year, the Board approved an annual rate of $18.00 per pole, subject to an adjustment for inflation.[2]

3. As part of its *2015/16 General Rate Application*, NB Power seeks approval for a methodology to determine the annual rate to attach third party equipment to electric power poles owned and maintained by NB Power.[3]

4. I have been retained by counsel to Rogers Communications Partnership to provide an economic analysis of the principles of common cost allocation used to price pole access for third party attachments, and review and comment on the report of Dr. Bridger Mitchell entitled *Fair Cost Allocation and Rates for Cable Company Attachments to New Brunswick Power Poles* ("Mitchell Report") filed as part of NB Power's *2015/16 General Rate Application*.[4]

1.2 Summary of Conclusions

- The preferred solution to the problem of rate setting for access to pole networks is to compute a rate for attachers based on proportionate use. Proportionate use provides a reasonable compromise between more extreme proposals: charging attachers only for the incremental cost (plus a markup) that they impose on the owners of the pole network – which implies very low rates for attachment; and charging attachers an equal share of the common costs to that of the incumbent pole owner (or a relative share of the sum of stand-alone costs) – which imply very high rates for attachment.

- Proportionate use is the only methodology that attempts to identify different causal contributions to the common capital cost. Without this, an attacher that requires less space and places a

[1] New Brunswick Board of Commissioners of Public Utilities, *Disco Rate Application, Ruling – Rogers Jurisdiction Motion*, Oral Ruling, October 27, 2005.

[2] *In the Matter of an Application by the New Brunswick Power Distribution & Customer Service Corporation (DISCO) for changes to its Charges, Rates and Tolls*, Decision, New Brunswick Board of Commissioners of Public Utilities, June 19, 2006. The pole attachment rate for 2014/15 is $19.29.

[3] *In the Matter of the New Brunswick Power Corporation and Section 103(1) of the Electricity Act, SNB 2013 c.7*, 2015/16 General Rate Application, Evidence, New Brunswick Power Corporation, November 21, 2014.

[4] Supra note 3, Appendix 8, *Fair Cost Allocation and Rates for Cable Company Attachments to New Brunswick Power Poles* ("Mitchell Report").

minimal burden on the pole would pay the same share of common costs as a power attacher that requires more space and has heavier attachments and for whom the network was designed and built. Such an outcome would be both inefficient and unfair.

- The pole network in New Brunswick has been designed and constructed jointly by NB Power and NB Tel (now Bell Aliant), who agreed on joint-use arrangements for placing attachments on each other's poles. Third-party attachers were not involved in planning or building the pole network but must use it as they find it. As such, they are in an asymmetric position relative to the incumbent parties.
- As a tenant rather than the owner of the poles, a third-party attacher also does not have the same rights as the owner. The tenant attacher has a lower priority for space on the pole than do owner-attachers, and may be arbitrarily assigned other fees and costs at the discretion of the owner.

1.3 Background and Qualifications

5. I am a Full Professor of Economics at Queen's University, Kingston, Ontario. I have held full-time faculty positions for 35 years at the University of Toronto and Queen's University, and a visiting position at the University of California, Berkeley from 1987 to 1988. I have a Ph.D. in Economics from Queen's University.

6. I am an economist specializing in industrial organization, regulatory and public economics. I have published many articles in the area of Industrial Organization and Competition Policy, and co-authored *Industrial Organization: A Strategic Approach*, a major textbook on the economics of industrial organization, much of which is devoted to antitrust economics and regulation.[5] I teach three or four courses each year at both the undergraduate and graduate level, covering the Economics of Regulation and Industrial Organization. From 1993 to 1994, I held the T.D. MacDonald Chair at the Competition Bureau, and provided advice to the Director of Investigation and Research (Head of the Competition Bureau) and other officers on many cases and issues. I have testified, given evidence, and consulted in many matters involving competition and regulatory issues, including several prominent cases heard at the Competition Tribunal. I have also been an invited speaker to the Canadian Bar Association Annual Competition Law Conference on several occasions.

7. My curriculum vitae, which includes a list of my publications, is attached as Appendix A to this report.

2 Methodologies for Pricing Pole Attachments

8. Pole networks are often jointly used for electricity distribution, telecommunications and other third party attachments. Joint use results in economies of scope[6] compared to a scenario in which each

[5] Church, J.R. and R. Ware, Industrial Organization: A Strategic Approach, (San Francisco: McGraw-Hill-Irwin), 2000.

[6] "A production process is characterized by *economies of scope* if joint production is less costly than producing the products individually." (Church, J.R. and R. Ware, *Industrial Organization: A Strategic Approach*, (San Francisco: McGraw-Hill-Irwin), 2000, p. 782).

user constructs a separate pole network for its own purpose. Proliferation and wasteful duplication of pole networks is not in the public interest; both federal and provincial regulatory authorities have recognized the need to avoid such wasteful duplication of pole networks.[7]

9. The same set of issues arises in New Brunswick, where NB Power's network of utility poles is essential for the delivery of electricity to residents and businesses. In 1967, NB Power entered a joint-use agreement with NB Tel, subsequently Aliant and now Bell Aliant for the sharing of poles in New Brunswick. The Joint-Use Agreement specifies the respective joint-use pole ownership shares are 57 percent for NB Power and 43 percent for Bell Aliant.

10. When an applicant who is not the owner of the pole network applies to attach its cables to the poles, the question arises as to the appropriate methodology for setting a rate to be paid for the attachment services provided. In the following sections, I briefly describe various methodologies that have been proposed for pricing such attachments and evaluate the merits of each from the perspective of economic efficiency. Finally, I make a recommendation as to an appropriate methodology for calculating a rate for pole attachment in New Brunswick as part of the proceedings on NB Power's *2015/16 General Rate Application* before the Board.

[7] In its revised regulatory framework, the Canadian Radio-television Telecommunications Commission ("CRTC") determined that support structure facilities provide an important social benefit and classified them in the public good category, with mandated access. Canadian Radio-television and Telecommunications Commission, *Revised Regulatory Framework for Wholesale Services and Definition of Essential Service*, Telecom Decision CRTC 2008-17, March 3, 2008, ¶90, 93. The New Brunswick Public Utility Commission in 2005 found that "[i]t is in the public interest that every enterprise who wishes to provide services to the public which logically require access to electricity poles and telephone poles not have to obtain easements and erect its own poles when there are readily available poles to which the services can be attached with no technical interference with or harm to the owner of the poles. It is in the public interest to avoid proliferation of poles. […] [I]t would be uneconomic and wasteful if all utilities and persons seeking to provide services in New Brunswick were required to acquire their own easements and poles in areas already served by electric power poles. It would be appropriate to allow access to electric power poles to provide services provided it can be done without interference with the distribution system." (Supra note 1, p.10). In 2010, the British Columbia Utilities Commission stated: "The Commission Panel notes that the Commission is required to consider the public interest in its regulation of public utilities. […] In the Commission Panel's view, the policy objective against duplication of infrastructure is clear on a reading of the Act as a whole, for the reasons discussed above." (*In the Matter of an Application by Shaw Cablesystems Limited and Shaw Business Solutions Inc. to Continue to Use FortisBC Inc's Transmission Facilities*, Reasons for Decision, April 1, 2010, p.8.). The Court of Appeal for British Columbia similarly stated: "In my view, avoidance of duplication achieves an important policy goal within the scheme." (FortisBC Inc. v. Shaw Cablesystems Limited, 2010 BCCA 552, December 6, 2010, ¶58).

2.1 Incremental Cost Pricing

11. The Ontario Energy Board in its *CCTA Decision RP-2003-0249*,[8] and the New Brunswick Public Utilities Commission in the DISCO Rate Application in 2005[9] have in effect recognized pole networks to be an essential facility[10] for the purpose of regulating attachments by communications companies. The lowest price for an attachment to an essential facility that keeps the incumbent whole–no net cost or loss in profit to the incumbent–is a price corresponding to incremental cost, i.e. all of the *additional* costs associated with adding a single attacher to an existing pole. Incremental cost is the lowest price that can be considered economically efficient. A price for attachments that is at least equal to incremental cost will guarantee that there is no subsidy from the incumbent pole owner to the attaching party.

12. The CRTC for example has mandated in several decisions involving the pricing of essential facility inputs that pricing should, at a minimum, exceed the causally attributable incremental cost (referred to as Phase II costs) plus a contribution to the fixed common costs of the pole, captured by applying a markup to the incremental cost.[11] [12]

13. The rationale for charging a rate for attachers based on incremental cost is that the costs of the pole network are largely sunk, so that, in order to keep the incumbent whole, all that is required is to compensate the owner for any additional costs imposed by the attacher, in the form of administrative costs and any increments to maintenance expenditures.

14. Rates for attachment that are at least equal to incremental cost can be defended on grounds of economic efficiency, a position supported by the FCC in its 2011 decision on pole attachment rates.

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[8] *In the Matter of an Application pursuant to section 74 of the Ontario Energy Board Act, 1998 by the Canadian Cable Television Association for an Order or Orders to amend the licenses of electricity distributors*, Decision and Order, RP-2003-0249, March 7, 2005 ("CCTA Decision").

[9] *Supra* note 1.

[10] An essential facility is a "unique input to the production process that cannot be cheaply duplicated." Laffont, J.J. and J. Tirole, *Competition in Telecommunications*, (Cambridge, Massachusetts: MIT Press), 2000, p. 282.

[11] Starting with Telecom Decision CRTC 77-6, and re-affirmed in Telecom Decision CRTC 86-16, Telecom Decision CRTC 95-13, and , the CRTC Telecom Decision CRTC 99-13, the Commission's stated policy for support structures required rates to be sufficient to recover the causally attributable costs and provide for an adequate contribution to common costs, calculated in some reasonable manner. "The Commission remains of the view that rates for support structures should, at a minimum, exceed the causally attributable Phase II costs." (Canadian Radio-television and Telecommunications Commission, *Access to Telephone Company Support Structures,* Telecom Decision CRTC 95-13, June 22, 1995). "The Commission considers that cable companies should pay incremental costs and make a reasonable contribution to capital costs associated with attaching their cables to poles owned by power utilities." (Canadian Radio-television and Telecommunications Commission, Part VII Application – *Access to Supporting Structures of Municipal Power Utilities -- CCTA vs MEA et al -- Final Decision,* Telecom Decision CRTC 99-13, September 28, 1999).

[12] Canadian Radio-television and Telecommunications Commission, *Review of the Large Incumbent Local Exchange Carriers' Support Structure Service Rates,* Telecom Decision CRTC 2010-900, December 2, 2010, ¶9-12 and ¶18-23.

Rates below incremental cost would not be subsidy-free[13], meaning that the incumbent would be subsidizing the attaching firm.

2.2 Equal Sharing of Common Costs

15. An equal sharing rule divides common costs equally between joint uses, that is, on a "per capita" basis. Equal sharing makes no attempt to identify the causal contribution of different users in a common facility , e.g. a heavier electric cable that might require a thicker, taller pole than a lighter communications cable would need. Dr. Mitchell has filed an expert report on behalf of NB Power in this proceeding and proposes three cost allocation "rules", two of which are essentially based on equal sharing of common costs for all attachers.[14]

16. The rationale for equal sharing is based on a number of factors:

    - Equal sharing is posited as "fair": An equal division of common costs is often justified by an appeal to principles of fairness, impartiality, or by reference to a hypothetical ex-ante bargaining outcome among similarly situated parties.[15]
    - Dr. Mitchell argues that equal sharing of common costs is a good match empirically for various privately negotiated sharing rules between power utilities and telecom attachers.[16]

17. An equal sharing rule has no basis in economic efficiency. Rather it is a rule that originates from putting an extreme weight on equality, which is not an economic consideration.[17] In fact, from an economic perspective, the equal sharing rule has substantial drawbacks: First, equal sharing of common costs bears no relationship to economic activity. A user who places much heavier demands on a utility pole will pay the same contribution to common costs as a user who places much lighter demands on the pole.

18. Second, an equal sharing rule creates perverse incentives: Two users that take up space on the pole and combine their operations will reduce their total contributions to common costs even though their

[13] Rates that lie between incremental costs and stand-alone costs (the costs of the communications attacher constructing their own pole network) are said to be "subsidy free". See, for example, Church, J.R. and R. Ware, *Industrial Organization: A Strategic Approach*, (San Francisco: McGraw-Hill-Irwin), 2000, pp.797-799.

[14] Supra note 4. Rules 1 and 2 are essentially based on equal sharing of common costs. See my further discussion in Appendix B.

[15] Supra note 4, pp. 2-3.

[16] Supra note 4, pp 13-16.

[17] Whether an equal sharing rule satisfies any presumed objective of economic fairness is questionable. To give just one example: Condominium owners share common building costs and expenses related to common areas (e.g. roof replacement) according to a schedule set out in the condominium declaration. The share of common costs allocated to a particular condo unit is usually calculated by the size of the unit, with the owner of a large three-bedroom condo paying a higher monthly condo fee compared to the owner of a small one-bedroom condo. Equal sharing of common condominium costs would arguably be considered by many not to satisfy the principle of "economic fairness."

economic demands on the pole network are unchanged.[18] Changes in market structure affect contributions to common costs even if economic activities are unaltered.

2.3 Proportionate Use: a middle ground based on economic efficiency

19. The methodology of proportionate use is a middle ground between the more extreme pricing methodologies: essential facilities based pricing at incremental cost (plus a markup) (which leads to a low rate for attachment) and equal sharing of common costs (which leads to a high rate for attachment).

20. The approach of proportionate use allocates the common costs in proportions according to the relative shares used of the dedicated or usable space on the pole. The rationale behind this is that the proportion of dedicated space used can serve as an indicator of the differential burden placed on the common costs by the different users. This an example of a very standard approach in regulatory pricing, used and endorsed by regulatory agencies around the world, known as Fully Distributed Cost (FDC) pricing.[19]

21. To cite just two endorsements for this approach, first, the classic work of regulatory economics by Alfred Kahn states that common costs "may be distributed on the basis of some common physical measure of utilization, such as minutes, circuit-miles, message-minute-miles, gross-ton miles, cubic feet, or kilowatt-hours employed or consumed by each. Or they may be distributed in proportion to the costs that can be directly assigned to the various services. […] [T]he allocations among the various services are often made in part on the basis of the relative number of physical units of consumption or utilization by each, and the total allocation dollars are then divided by those physical units to get the unit costs."[20]

22. Second, Dr. Mitchell, in his co-authored textbook entitled "Telecommunications Pricing: Theory and Practice", states in regards to cost-based pricing that: "FDC pricing has been viewed as fair by courts and regulators, and may thus have to be seen as an equity issue". He goes on to say that "FDC prices are generally viewed as fair because every consumer pays her attributable costs and a share of the unattributable costs. […] The methods […] can be seen as simple proxies for determining elusive cost causality."[21]

23. The costs associated with the dedicated space, which are 100% borne by the communications attachers, on the pole are proportional to the amount of space used by the communications attachers.

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[18] The renter of a unit of an apartment building with five units in total pays the cost of his unit plus one-fifth the cost of all common areas. The renter does not pay half the cost of common building areas just because all the other four units in the apartment building are occupied by a single person.

[19] Church, J.R. and R. Ware, *Industrial Organization: A Strategic Approach*, (San Francisco: McGraw-Hill-Irwin), 2000, pp. 846-847.

[20] Kahn, A.E., *The Economics of Regulation*, (Cambridge: The MIT Press), 1988, pp. 152-153.

[21] Mitchell, B.M. and I. Vogelsang, *Telecommunications Pricing: Theory and Practice*, (Cambridge: Cambridge University Press), 1991, p. 138 and p. 140.

This is a rule based on the economic concept of opportunity cost. The dedicated or attachable space on the pole has an opportunity cost that can be approximately measured by the amount of dedicated space occupied by the communications attachers as a proportion of the total dedicated space.

24. A separation space of 3-4 feet is required to protect the communication users from the power cables on the pole. When the communications users are incremental, as in the proportionate use model, they are responsible for the separation space.

25. The calculation of costs allocated to each user for the non-dedicated space on the pole proceeds as follows. Pole costs are assumed proportional to length, so the share of dedicated plus separation space for the communications users, relative to the total dedicated space, is multiplied by the buried + clearance length of the pole, and multiplied again by the costs per foot of pole.

26. The proportionate use methodology occupies a middle ground between the two more extreme approaches of equal sharing and incremental cost. It is the only methodology that attempts to capture the different demands made by users on a common capital input, and reflects differences–legal or operational–in rights and advantages provided by pole ownership relative to tenancy. For both these reasons, proportionate use is the appropriate methodology for computing pole attachment rates for cable attachers in New Brunswick.

2.4 Cost Allocation Methodologies in Other Jurisdictions

27. In the past decade and a half, public utility boards in Ontario, Nova Scotia, Alberta, Newfoundland, and New Brunswick have had applications to review regulated pole attachment rates brought before them. The methodology used to calculate the pole attachment rates varies across jurisdictions. Annual rates per pole are typically based on direct costs such as administration, and indirect costs such as pole maintenance, depreciation, capital carrying costs, and a pole space allocation factor.[22]

28. Consistent with my earlier discussion, regulatory decisions on cost sharing methodology in other jurisdictions have ranged from a lower bound of incremental costs to equal sharing of common costs, or relative sharing of aggregated stand-alone costs, as listed in Table 1:

[22] *CCTA Decision*, pp. 4-12; *In the Matter of an application by Toronto Hydro-Electric System Limited for an order pursuant to section 29 of the Ontario Energy Board Act, 1998*, "Pole Attachment Regulation: Canada, U.S., U.K. and Other Jurisdictions," Nordicity ("Nordicity Report"), March 14, 2014.

Table 1: Cost Allocation Methodology Used in Other Jurisdictions[23]

Jurisdiction	Year	Methodology	Rental Rate per Pole
FCC	2011	Just and reasonable rates are between incremental cost and proportionate use	n/a
CRTC	1999	Proportionate use	$15.89
Nova Scotia	2002	Proportionate use	$14.15
Alberta	2000	Proportionate sharing of the sum of stand-alone costs	$18.34
OEB	2005	Equal sharing of common costs(CCTA Decision)	$22.35

2.5 Application of the Proportionate Use Methodology in the Current Case

29. For the purposes of allocating costs, we can conceptually divide each pole into usable or dedicated space (for attachments) and non-usable or common space (ground clearance, buried pole etc.). We require a rule for allocating costs for both the usable or dedicated space and for the non-usable space (the common costs).

30. As regards the dedicated space, the space required for communications attachers on the pole represents a reasonable estimate of the opportunity cost of attaching these users to the pole. If these users did not attach to the pole, the same space would be available to other users (or a smaller pole could be employed). These are the dedicated costs of attaching communications users to the pole.[24]

31. To implement this methodology for computing dedicated costs, if the space allocated to communications users (including the separation space) occupies Y feet on a pole of length Z, then the dedicated cost would be equal to

$$\frac{Y}{Z} \times \text{total annual pole costs}$$

[23] New Brunswick is not included in this table because the New Brunswick Board Energy and Utilities did not determine the appropriate methodology to allocate common costs when it set the rental rate per pole in its Decision in 2006.

[24] There are additional incremental costs associated with the administrative burden of adding attachers to the pole. I do not comment on the methodology of allocating those costs.

where the total annual pole costs include the costs of depreciation and pole maintenance, as well as the capital or interest costs of the pole. The above expression represents a method of determining the dedicated costs of attachment.

32. The second step in applying the methodology requires the allocation of common costs according to proportionate use. Recall that the common costs are the costs corresponding to the non-usable portion of the pole. Since the total dedicated space of the pole is X feet, the non-usable section of the pole is simply the length of the pole minus the dedicated space, or $Z - X$. I will assume that common costs for which a share is to be determined are the costs of the non-usable section of the pole, that is, the buried portion and the clearance portion. Allocating the costs of the non-dedicated portion of the pole to the different users in proportion to their space used on the dedicated section of the pole yields the following rule for common cost contributions:

$$\frac{Y}{X} \times \frac{(Z - X)}{Z} \times \text{total annual pole costs}$$

Adding together the dedicated cost and the common cost contribution yields

$$\frac{Y}{X} \times \text{total annual pole costs}$$

as the total capital cost contribution by the communications attachers.

33. To illustrate, assume a 40 foot distribution pole with 6 feet buried, 18 feet of clearance, 2 feet of communications space, 3.3 feet of separation space and 10.7 feet of power space.[25] Total usable space X, the sum of communications space, separation space and power space is 16 feet. Attachers to the communications space occupy $Y = 5.3$ feet of dedicated space on the pole.[26] Applying proportionate use formula provided above yields a total allocation factor, or joint common cost contribution, of $\frac{Y}{X} = \frac{5.3}{16} = 33.1\%$ for the set of users of the communications space. The proportionate use methodology can be illustrated in further detail as shown in Table 2:

[25] These are the same measurements used by Bell Aliant, as indicated in the evidence prepared for Rogers Communications Partnership by Clinton Lawrence and Suzanne Blackwell.

[26] Because the separation space is attributed to the communications users (under the proportionate use methodology) the communications space and the separation space are in effect added together for the purposes of this calculation.

Table 2: Fully Distributed Cost Allocation

Space	Classification	Feet	Power Allocation	Communication Allocation
Non-Usable / Common	Buried Depth	6	$\frac{10.7}{16} \cdot 24 = 16.05$	$\frac{5.3}{16} \cdot 24 = 7.95$
	Clearance	18		
Dedicated	Communications Space	2	-	2
	Separation Space	3.3	-	3.3
	Power Space	10.7	10.7	-
		40	66.9%	33.1%

3 Detailed Comments on the Expert Report of Dr. Bridger Mitchell

34. As part of its *2015/16 General Rate Application*, NB Power included an expert report by Dr. Bridger Mitchell entitled *Fair Cost Allocation and Rates for Cable Company Attachments to New Brunswick Power Poles* ("Mitchell Report").[27] The *Mitchell Report* reviews three rules for the "fair" allocation of costs and applies them to the issue of pricing access for attachers to joint-use poles.

35. Dr. Mitchell's three rules can be summarized as follows:

    Rule 1: Divide the common costs equally among all users.

    Rule 2: Compute the stand-alone costs for each user, i.e. the costs of constructing a pole network for their sole use. Then subtract from the sum of stand-alone costs the costs of constructing a single, joint-use pole network. The resulting "savings" from the joint-use network are then divided equally among users, in the sense that the equal share of "savings" are subtracted from each user's stand-alone costs to give that user's rate payable.

    Rule 3: Compute the stand-alone costs for each user and allocate total costs of the joint use network according to the ratio of each user's stand-alone costs to the sum of stand-alone costs of a separate pole for each user.

36. I will return to discuss Rule 1 after first reviewing Rule 2 and Rule 3. Rule 2, despite its apparent complexity, is for practical purposes the same rule as Rule 1. In Appendix B to this report, I provide a

[27] Supra note 3, pp. 66-67 and Appendix 8.

simple mathematical proof that Dr. Mitchell's Rule 1 and Rule 2 are actually the same rule is cases relevant to pricing of pole attachment. I will, therefore, subsequently no longer refer to Rule 2.

37. Rule 3 has many weaknesses: First, Rule 3 requires that estimates be constructed for each user of the cost of building its own single use pole network – its "stand-alone costs". But only one network has actually been built. Rule 3 is is essence, entirely *hypothetical*. Estimates of stand-alone costs for communications attachers would be extremely difficult to obtain, and subject to a significant degree of error. Each communications attacher would choose to optimally design a network with a different number and spacing of poles, different weight and strength of poles, and a different length of pole. Such cost studies would also be very expensive. And finally, in constructing these cost estimates, there is a strong incentive to strategically "game" the regulator by understating these stand-alone costs. To illustrate the seriousness of these deficiencies, Dr. Mitchell mostly ignores these problems in his hypothetical application of Rule 3 on p. 15 of his report – he assumes that the two attachers would choose to build identical networks (the only difference being the length of the poles) an assumption that is likely incorrect.

38. Second, under Rule 3, users with *lesser* requirements make *higher* contributions to common costs as Dr. Mitchell's pole example on p. 15 of his report demonstrates.[28] In the example, the common costs consist of the "buried", "clearance", and the "separation" space of the pole, or 29 feet. The stand-alone costs for communications users are 27 feet, the stand-alone costs for users of the power space are 34 feet.[29] Rule 3 then allocates $\frac{27}{27+34} = 44.3\%$, or 17.7 feet to users of the communications space, and $\frac{34}{27+34} = 55.7\%$, or 22.3 feet to users of the power space. Subtracting the dedicated power space of 9 feet from the total costs allocation to power users implies that power users bear 13.3 feet, or 45.8%, of the common costs. Similarly, subtracting the dedicated communications space of 2 feet from the total cost allocation to communications users implies that communications users bear 15.7 feet, or 54.1%, of the common costs. Rule 3 requires that users with *lesser* requirements make *higher* contributions to common costs (a more extreme allocation rule than equal sharing). The above property is perverse, and cannot form a reasonable methodology for allocating common costs.

39. Based on both of these major weaknesses, Rule 3 is not a sensible or practical methodology for determining pole attachment rates. Hence, in my further discussion I will focus solely on Rule 1.

3.1 Dr. Mitchell's critique of the Proportionate Use model as having a "Fundamental Flaw" has no validity

40. Dr. Mitchell, in an example, supposes that a third-party attacher could shrink its requirement for dedicated pole space to a miniscule or negligible space on the pole, thereby reducing the contribution

[28] This property of Rule 3 is acknowledged by Dr. Mitchell (Supra note 4, p.13).

[29] When determining stand alone costs for a single user (or class of users), no separation space is necessary.

to common costs to zero.[30] But the communications attachers in this hearing have acknowledged responsibility for the entire communications space on the pole plus the separation space under the proportionate use methodology. This is a finite amount, approximately 5.3 feet, and there is no potential whatsoever for strategically "shrinking" this space. Therefore I devote no further space to addressing this point which is clearly incorrect.

3.2 Ex-Ante Approach to the Pricing of Investment in Common Costs

41. The Mitchell report proposes three cost allocation "rules" based on cost sharing principles found in the economic literature and cites to a chapter by Young in the *Handbook of Game Theory*.[31] Dr. Mitchell's cost allocation rules are based on an ex ante approach that relies heavily on cooperative game theory. It builds on the principle of dividing common costs equally among users, irrespective of their use or demands on the common capital input. Ex-ante, in the planning and design process, all parties participate and consent to either a regulated or negotiated allocation of common costs among them. This ex-ante planning of an investment project and its associated cost allocation differs from the ex-post problem of pricing access to an essential facility. For this reason alone, cooperative game theory is probably not a useful tool for the problem that this hearing is considering: how to price attachments by a tenant to an existing pole network, which has been designed and constructed by the owner.

42. In any case the chapter by Young criticizes equal division (by municipality) as "suspect" and argues that division of costs according to population, or *division by use*, is more "plausible". Later, on p.1215 he comments on the same example again "This example illustrates why the symmetry axiom (equal division) is not plausible when the partners or projects differ in some respect *other than cost* that we feel has a bearing on the allocation." In other words, where there is a difference in use, there is no compelling argument to divide payment of common costs equally.

43. Another illustration of the arbitrary nature of an equal division rule can be made effectively using the following example: three neighbouring towns consider the benefits of building a joint water distribution system. Towns A, B and C could build their own systems for $11, $8 million and $6 million respectively, but they could clearly gain by building a joint system for $21 million. Town A has twice the population of the others. Equal division would have them paying $7 million each, which would not even convince C to join in as it could build its own facility more cheaply. Designing rates proportional to use (as I have proposed) would have Town A paying twice as much, $10.5 million, with $5.25 million for each of the others – and this division would satisfy the incentive property that no community could do better on its own.

[30] The link to his taxi example gets outright absurd as Dr. Mitchell suggests that "a vocalist who seeks to join the three musicians should not get a "free-ride" to Toronto just because she has no storage requirements" (Supra note 4, p.17). Apparently the said vocalist does not take up a seat (or any space) in the taxi!

[31] Young H.P., "Cost Allocation," in *Handbook of Game Theory with Economic Applications*, Volume.2, ed. R. Aumann and S. Hart, (Amsterdam: Elsevier Science), 1994.

44. The cited game theory literature is by no means the only strand of economic literature that addresses the allocation of common costs among different users. For example, as previously mentioned, Dr. Mitchell in his own textbook accepts that FDC pricing had been viewed as fair by the courts.[32]

3.3 Pole Ownership versus Tenancy

45. Agreements among pole users to share pole space have existed for decades. Electric utilities and incumbent telephone companies have negotiated reciprocal pole access agreements in various provinces. In 1967, NB Power entered a joint-use agreement with incumbent telecommunications company, now Bell Aliant, for sharing pole structures in the Province of New Brunswick.[33] In a typical joint-use agreement, each company owns 100% of its poles and the mutual right to attach to the other party's poles without any attachment rental fees. Furthermore, the agreement generally establishes ownership percentages to allocate costs and share ownership rents. In 1996, NB Power and Bell Aliant amended the original joint-use agreement with a joint-sub agreement to account for third-party attachments.[34]

46. Legal and operational differences exist between a party attaching to a support structure it (partially) owns and a party that attaches as a tenant. The pole owner controls the assignment of pole space, pole placement, replacements and removals, and is reimbursed for any make-ready fees. Moreover, joint-use agreements generally contain construction standards and the pole owner is guaranteed control and priority access to its dedicated pole space to meet current and reasonably anticipated future service needs.[35]

47. Conversely, the attaching third-party tenant has few administrative or operational rights. The differences between a joint-owner attacher (Aliant) and a third-party attacher (Rogers) include:

- Aliant does not need to seek prior approval from NB Power for placing attachments on NB Power's poles; specifically, the permit application process and fee does not apply to Aliant.[36]
- Aliant does not inform NB Power when or where it attaches to poles, other than to provide an annual count of the poles on which it is attached. [37]

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[32] See cite at para. 25.

[33] Supra note2, p 28. Under the 1996 joint-third-party sub agreement, Aliant administered the communications space for the joint-use poles and charged the cable service provider a pole attachment rate. NB Power cancelled the third-party sub-agreement in 2004 and re-assumed some administrative control over its poles.

[34] Supra note2, p 28; *Agreement Between NB Power and NB Tel*, Section 4.2.2 Joint Sub-Agreement: Support Structure Sharing, July 16, 1996. The respective pole ownership shares negotiated in New Brunswick in 1996 between NB Power and Aliant are 57 and 43 percent respectively.

[35] Under joint-use agreements with shared ownership, each party has some influence and control over the provisioning of the poles.

[36] NBP(Rogers) IR-41 viii).

[37] NBP(Rogers) IR-40 iii) and 41 ii) .

- Aliant does not pay NB Power for maintenance on NB Power's poles.[38]
- Aliant manages the communications space on NB Power poles, which includes determining where third party attachers can attach, and if any make-ready work is required. This has the effect of granting Aliant privileged access to the communications space on the pole as the first attacher in that space.

48. Conversely, Mitchell argues[39] that pole ownership by NB Power confers a disadvantage over the tenancy role of Rogers, because of "vacancy risk". He draws an analogy with real estate markets, where a landlord must rent space at a premium over the per unit rental value for a full building, because of the risk that some space will be unrented at times. This analogy is clearly an invalid one. The pole network was not even built with tenants like Rogers in mind (it is my understanding that the space on the pole for communications users has always been fixed at two feet, and that no thought has been given to any other communications space allocation, since the network was originally constructed)[40], so the arrival of new tenants such as Rogers in fact constitutes a windfall gain rather than a potential risk of loss. And second, there is no functioning market here for space on the pole – that is why all regulators agree that the pole network is an essential facility.[41] A private landlord in a real estate market, invests knowing that there will be turnover and occasional vacancies, but there is no analogy to an essential facility designed and continuously used by the incumbent owners. Further, the ownership of the poles actually confers an advantage on NB Power, not a disadvantage as Mitchell suggests. NB Power may attract additional users to the pole, and collect revenue in addition to that furnished by Rogers (in other words, if there is vacancy risk, it is upside risk). Moreover, NB Power has control over use of the separation space for transformers, streetlights and other attachments. There are other advantages to ownership: for example, NB Power has required that Rogers' cable be attached to the field side of the pole, which would not have been a choice that Rogers would have made as an owner.

49. The difference between the rights and advantages of pole owners and tenants who merely rent space on the pole has been recognized by various authorities. In its Telecom Decision 99-13, the CRTC for example stated that "[T]he Commission is of the view that in determining the appropriate costs to be recovered from the cable companies, it is important to consider that they do not have the rights of

[38] NBP(Rogers) IR-42 v).

[39] pp 18-19.

[40] This point was confirmed by NB Power in its Response to NBP(Rogers)IR-13.

[41] Even Mitchell acknowledges at p. 18 that "Electricity distributors are thus in a position to exercise market power is-à-vis cable distributors".

ownership of the pole." [42] In Decision NSUARB-P-873, the Nova Scotia Utilities and Review Board stated that "pole attachment service can hardly be characterized as a basic or core service provided by NSPI, and that an approach based on incremental costs plus a contribution to common costs is preferable where the customers receiving the service do not enjoy the advantages that an ownership interest in the poles would convey."[43]

50. Similarly, the Competition Bureau in its post-hearing submission in NSUARB-P-873 commented on the fairness of access by recognizing the benefits of joint ownership and control: "[T]he Bureau believes that any advantages such as those received by Aliant|MTT under the present arrangement between NSPI and Aliant|MTT should be reflected in the rate paid by the user to whom the advantages accrue. In the present case, as discussed above, it is appropriate for Aliant|MTT to be allocated a larger share of the fixed common costs than is allocated to other users of the communications space."[44] The Federal Communication Commission in its 2011 Pole Attachment Order also recognized that rates paid by incumbent telecommunications providers under existing joint-ownership agreement are not directly comparable to rates of third-party attachers without any ownership rights, control, or priority access to the dedicated communications space.[45,46]

3.4 The Significance of Negotiated Rates

51. Finally, Dr. Mitchell puts considerable weight on what he sees as a correspondence between the cost shares derived from bilateral negotiations between two groups of pole owners (the power utility and the telephone company) and the rates computed by application of his three rules for cost sharing (The 57-43 division between NB Power and Bell Aliant is one example). One rationale for this seems to be a belief that such negotiation rates mimic the outcome that would be observed in an efficient competitive market. But the comparison is inappropriate – the power utility and telephone company are in essence both monopolies engaged in bilateral bargaining. There is no reason to think that such bargaining will lead to competitive or efficient prices. All parties agree that pole networks are natural

[42] Canadian Radio-television and Telecommunications Commission (CRTC), *Part VII Application – Access to Supporting Structures of Municipal Power Utilities - CCTA vs MEA et al*, Telecom Decision CRTC 99-13, September 28, 1999, ¶222.

[43] Nova Scotia Utility and Review Board (NSUARB), *In the Matter of the Public Utilities Act and in the Matter of an Application by Nova Scotia Power Incorporated for Approval of an Increase in Its Pole Attachment Charge*, Decision NSUARB P-873, January 24, 2002, p. 3.

[44] Supra note 43, p. 32. The term joint ownership is used more broadly and also includes situations in which the pole is controlled, if not actually owned, by two parties.

[45] Federal Communications Commission (FCC), *Implementation of Section 224 of the Act A National Broadband Plan for Our Future, Report and Order and Order on Reconsideration*, FCC 11-50, April 7, 2011, ¶203, ¶216, fn. 651-656.

[46] In contrast to these agencies, the Ontario Energy Board in its CCTA Decision was not persuaded that the ownership of poles confers benefits that should affect the level of rates. (See *In the Matter of an Application pursuant to section 74 of the Ontario Energy Board Act, 1998 by the Canadian Cable Television Association for an Order or Orders to amend the licenses of electricity distributors*, Decision and Order, RP-2003-0249, March 7, 2005 ("CCTA Decision"), p. 6).

monopolies, so that no competitive market for pole space could operate. That is why this hearing is necessary in order to establish efficient regulated prices.

52. To further review this point. Dr. Mitchell has illustrated his arguments with references to pricing of shared taxis and pricing of shared costs in condominiums. But both of these services are embedded in well functioning competitive markets – the market for taxi rides and that for condominiums. There is no such discipline of competition impinging on a pole network – there is literally no competitive alternative to which a potential attacher may turn in order to mitigate the abuse of market power by the incumbent owner of the pole network. Thus, evidence from negotiated agreements is at least as likely to be evidence of the exercise of market power as it is evidence of competitive pricing.

Appendix A Curriculum Vitae of Dr. Roger Ware

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PERSONAL INFORMATION

BUSINESS ADDRESS

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DATE AND PLACE OF BIRTH

February 23, 1951 - England

CITIZENSHIP

Dual Canadian and U.K. citizenship

EDUCATION

1981 Ph.D., Queen's University, Kingston, Canada.

1973 M.A. (Industrial Economics), University of Sussex, England.

1976 M.A. (Cantab).

1972 B.A. Honours (Economics), Cambridge University, England.

PROFESSIONAL EXPERIENCE

July 1997 – present	Professor, Queen's University
January 1991 - June 1997	Associate Professor, Queens University
August 1993 - August 1994	Holder of T.D.MacDonald Chair in Industrial Economics, Bureau of Competition Policy, Ottawa
1989 - December 1990	Associate Professor, University of Toronto
1987-88	Visiting Associate Professor, Department of Economics, University of California, Berkeley.
1986-87	Sabbatical Leave. Visiting Research Scholar, Carleton University and National Bureau of Economic Research, Stanford University
July 1986	Promoted to Associate Professor with Tenure, University of Toronto.
1981-86	Assistant Professor (Economics), Erindale College, University of Toronto.
1980-81	Lecturer in Economics, Erindale College, University of Toronto.
1979-80	Instructor, Introductory Economics, Queen's University
1977-79	Various Tutorial and Research Assistantship Positions held, Queen's University.
1975-1977	U.K. Department of Industry, Industrial Policy Analysis and Briefing Division. Provided advice on government support for research and development, and special assistance schemes for industry. During this period I completed a cost-benefit study of cost sharing support for industrial development projects.
1973-1975	U.K. Department of Industry. Economic Assistant, working on an econometric forecasting model of U.K. trade flows. Promoted to Senior Economic Assistant, October 1974.

BOOKS

Industrial Organization: a Strategic Approach. (with Jeffrey Church, University of Calgary) 2000. Boston: Irwin McGraw-Hill.

JOURNAL PUBLICATIONS

"How do Consumers Respond to Gasoline Price Cycles?" (with David Byrne and Gordon Leslie) forthcoming, *Energy Journal*, 2014.

"Identifying Market Power in Natural Gas Storage" with David Brown and David Harding, 2008 *Canadian Competition Record*. Vol 23, No. 1.

"Efficiencies Analysis for Retail Sector Mergers," (with John Blakney) *European Competition Journal*, November 2006, pp. 285-310.

"Does Canada Pipe Really Have Market Power?" (with A. Basiliauskas) 2005 *Canadian Competition Record*. Vol 22, No. 2.

"Predatory Pricing In Canada, The United States And Europe: Crouching Tiger or Hidden Dragon," with Brian Facey, December 2003, *World Competition Review.*

"Is Competition Law 'Beyond the Ken of Judges'?" 2001. *Canadian Competition Record*. Vol 20, No. 3.

"Efficiencies and the Propane Case" (2000), *International Antitrust Bulletin*.

"A Dynamic Model of Endogenous Trade Policy," (2001) joint with Bev Lapham, *Canadian Journal of Economics*.

"Interac, Essential Facilities and Access to Electronic Funds Networks: a Comment on Mathewson and Quigley," (1998) with Brian Rivard, *Canadian Competition Record*, 18: 12-21.

"Abuse of Dominance under the 1986 Canadian Competition Act," with Jeffrey Church, (1998) *Review of Industrial Organization*, 13: 85-129.

"Trade Dress and Pharmaceuticals: Efficiency, Competition and Intellectual Property Rights," 1997 with Jeffrey Church, *Policy Options*, September.

"Delegation, Market Share and the Limit Price in Sequential Entry Models," (1996) with Jeffrey Church, *International Journal of Industrial Organization*, 14: 575-609.

"Public Firms as Regulatory Instruments with Cost Uncertainty," (1996) with Devon Garvie, *Canadian Journal of Economics*, XXIX No. 2: 357-378.

"Raising Rivals' Costs and Alcoa: a Rejoinder" (1994) *Canadian Competition Policy Record*, October.

"Understanding Raising Rivals' Costs: a Canadian Perspective," (1994) *Canadian Competition Policy Record*, March.

"Markov Puppy Dogs and Related Animals," (1994) with Bev Lapham, *International Journal of Industrial Organization*, 12, 569-593.

"A Sequential Entry Model with Strategic Use of Excess Capacity," (1993) with Brad Barham, University of Wisconsin, *Canadian Journal of Economics*, XXVI, No. 2, 286-298.

"Evolutionary Stability in the Repeated Prisoner's Dilemma," (1989) with Joseph Farrell, *Theoretical Population Biology*, 36, 161-166.

"Eliminating Price Supports: a Political Economy Perspective," (1989) with Tracy Lewis and Robert Feenstra, *Journal of Public Economics*, 40, 159-185.

"Forward Markets, Currency Options and the Hedging of Exchange Risk," (1988) with Ralph Winter, *Journal of International Economics*, 25, 291-302.

Review of The New Industrial Organization: Market Forces and Strategic Behavior by Alexis Jacquemin (1988), Southern Economic Journal.

"A Theory of Market Structure with Sequential Entry" (1987), with Curtis Eaton, *Rand Journal of Economics*, Vol. 18, #1, 1-16.

"A Model of Public Enterprise with Entry" (1986), *Canadian Journal of Economics*, XIX, 642-655.

"Long Term Bilateral Monopoly: The Case of a Resource" (1986), withTracy Lewis and Robin Lindsey, *Rand Journal of Economics*, vol. 17, No.1.

"Public Pricing Under Imperfect Competition" (1986), with Ralph Winter, *International Journal of Industrial Organization*, 4, 87-97.

"On the Shapes of Market Lattices in Loschian Spatial Models" (1986), with Mukesh Eswaran, *Journal of Regional Science*.

"Inventory Holding as a Strategic Weapon to Deter Entry" (1985) *Economica*, 52, 93-102.

"Lumpy Investment in a Growing Differentiated Market" (1984), *Economica*, 51, 377-391.

"Sunk Costs and Strategic Commitment: A Proposed Three-Stage Equilibrium" (1984), *Economic Journal*, 94, 370-378.

ARTICLES IN BOOKS

Publication (on CD) of paper “The Role of Price Correlations" contained in proceedings of Canadian Bar Association 2004 Annual Fall Conference on Competition Law.

Publication (on CD) of paper “Recent legislative changes: is competition law becoming too industry specific?" contained in proceedings of Canadian Bar Association 2002 Annual Fall Conference on Competition Law.

“The Effect of Uncertainty on theValue of Strategic Commitment.” 2002. With B.C.Eaton, in volume, Applied Microeconomic Theory: Selected Essays of B. Curtis Eaton. Northampton, MA: Edward Elgar.

“Leading Edge Issues in the Economics of Competition Law,” in J.B.Musgrove ed., Competition Law for the 21st Century, (proceedings of the 1998 Canadian Bar Association), Juris Publishing.

“Network Industries, Intellectual Property Rights, and Competition Policy.” 1998. in N. Gallini and R. Anderson ed., Competition Policy, Intellectual Property Rights and International Economic Integration Industry Canada Research Series, The University of Calgary Press.

"Entry Deterrence" (1991) chapter in New Developments in Industrial Organization ed. by Manfredi La Manna and George Norman, Edward Elgar Publishing, London.

Review of Market Structure and Innovation, by M.I.Kamien and N.L.Schwartz (1983), Canadian Journal of Economics.

WORKING PAPERS

"Price Cycles and Price Leadership in Gasoline Markets: New Evidence from Canada" co-authored with David Byrne, SSRN Working Paper.

RECENT PROFESSIONAL ACTIVITIES

Presentations in Melbourne, Australia at Law and Economics Society, Australian Competition Commission, February-March 2012.

Presentation at New Zealand Competition Commission, March 2012.

Participated in a panel session on Competition Policy at the CEA Meetings, Ottawa, June 2011.

Participated in a panel session on Competition Policy at the CEA Meetings, Vancouver, June 2008.

Presented the paper "Market Power in Natural Gas", co-authored with David Brown, Ontario Energy Board, and David Harding, Competition Bureau at the 2007 Canadian Economics Association Meetings, Halifax, June 2007.

Refereeing on a regular basis for *American Economic Review*, *Canadian Journal of Economics*, *The International Journal of Industrial Organization*, *The Journal of Industrial Economics*, and occasionally for *Journal of International Economics*, and *International Economic Review*.

Presentations at the Canadian Bar Association annual conference, 2011.

Presentation of a paper "Efficiencies and the Propane Case" at the CBA Competition Law Section Meetings, Ottawa, September 2000.

MEMBERSHIP OF PROFESSIONAL SOCIETIES

Member of Canadian Economics Association

APPENDIX B: Proof that, for most relevant cost functions, Dr. Mitchell's Rule 1 and Rule 2 are the same rule.

(In other words, in the examples presented by Dr. Mitchell in his report and all relevant examples applicable to pricing for pole attachment, there is no need to treat Rule 1 and Rule 2 as if they are separate rules.)

PROOF:

Assume a generic cost function for a pole network and two possible users, of the form:

$$SAC_1 = f + f_1$$
$$SAC_2 = f + f_2$$
$$JTC = f + f_1 + f_2 + f_3$$

Where

SAC_1 = the stand alone costs for user 1 of constructing their own pole network

SAC_2 = the stand alone costs for user 2 of constructing their own pole network

JTC = the Joint Total Costs of constructing a pole network that can service two users

f = Common Capital Cost that both users must incur if they are to build a pole network (the buried and clearance space)

f_1 = Capital cost particular to user 1 but not required by user 2 (the power space)

f_2 = Capital cost particular to user 2 but not required by user 1 (the communications space)

f_3 = Capital cost of the separation space

Rule 1: Each user must pay an equal share of the common capital cost *i.e.* $\frac{f+f_3}{2}$

Total Pole Costs of user 1: $C_1^1 = \frac{f+f_3}{2} + f_1$

Total Pole Costs of user 2: $C_2^1 = \frac{f+f_3}{2} + f_2$

Rule 2: The "savings" from constructing a joint use pole network are shared equally among the users. The savings are the total costs incurred by both users in building separate pole networks less the joint costs of building a single pole network, or $SAC_1 + SAC_2 - JTC$ in the notation defined above. Simplifying, it is straightforward that

$$SAC_1 + SAC_2 - JTC = f - f_3$$

And dividing these "savings" equally leads to identical costs for each user as under Rule 1. They are in effect the same rule.

UNDERTAKING NO. JTC3.15

Provide the excerpts of the reference documents that are relied upon in response to SEC interrogatory 1.

RESPONSE:

See Appendix "E".

APPENDIX "E"

fashion.[65] In general, some costs can be directly assigned exclusively to one service or other—for example, railroad passenger agents to passenger service, box cars and freight terminals to freight. But most costs must be allocated at least in part because they are incurred in serving more than one class of customers—maintenance, depreciation, return, operating costs of locomotives, roundhouses, track and right of way, and so on. These common or joint costs may be distributed on the basis of some common physical measure of utilization, such as minutes, circuit-miles, message-minute-miles, gross ton-miles, MCF, or kwh employed or consumed by each. Or they may be distributed in proportion to the costs that can be directly assigned to the various services.[66] An ingenious variant of the latter was the "alternative justifiable expenditures" method devised by the Tennessee Valley Authority, which in general allocated the common costs of multipurpose river development schemes among the various services supplied (electric power, navigation, flood control) in proportion to what it *would* have cost to provide each of those services in the same quantity in single-purpose projects set up exclusively for them.[67]

Quite simply, the basic defect of fully distributed costs as a basis for rate making is that they do not necessarily measure marginal cost responsibility in a causal sense. They do not measure by what amount costs would be increased if additional quantities of any particular service were taken, or by what amount costs would be reduced if the service were correspondingly curtailed. They are average costs: the allocations among the various services

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[65] For an excellent discussion and appraisal, see Bonbright, *Principles of Public Utility Rates*, Chapter 18.

[66] See for instance, Howard W. Nicholson, "Motor Carrier Costs and Minimum Rate Regulation," *Q. Jour. Econ.* (February 1958), LXXII: 142. For an example of a combination of these two methods, the ICC prorates running track maintenance on the basis of the gross ton-miles of passenger and freight service, common equipment repairs on the basis of the relative use in each service, and some other expenses in proportion to solely related expenses. ICC *Investigation of Costs of Intercity Rail Passenger Service*, Report transmitted to the Senate Committee on Commerce and House Committee on Interstate and Foreign Commerce, Washington, July 16, 1969, 15. See also *Separation of Operating Expenses between Freight and Passenger Service*, 302 ICC 735 (1958) and *Railroad Passenger Train Deficit*, 306 ICC 417 (1959). For other examples of plausible methods of allocating common costs, see note 36, Chapter 3.

[67] The method was actually slightly more complicated, in that those investment costs specifically attributable to the individual services were deducted both from the aggregate investment costs of the multipurpose project and from the estimated costs of the individual, single-purpose projects, with the residue of the former being distributed in proportion to the residues of the latter. See the Federal Power Commission, *Report on Review of Allocations of Costs of the Multiple-Purpose Water Control System in the Tennessee River Basin*, Washington, March 23, 1949, 21–22. The FPC was later prevailed on to accept a similar method, the "relative cost method," for allocating the costs of production on joint-product leases between natural gas, on the one hand, and oil and various natural gas liquids, on the other, in order to ascertain a "just and reasonable" field price for the natural gas. The method involved distributing the joint costs of producing those same quantities in proportion to the actual costs of producing that same number of barrels of crude oil on leases in which oil was produced in the absence or virtual absence of natural gas, on the one hand, and that number of cubic feet of natural gas from virtually dry gas leases on the other. See *Phillips Petroleum Co.*, 24 FPC 537, 553, 623–625 (1960) and *Opinion and Order Determining Just and Reasonable Rates for Natural Gas Producers in the Permian Basin*, 34 FPC 159, 214–215 (1965). In advocating this method, at a later stage only for pricing gas that had already been discovered and committed to pipeline purchasers, the present writer emphasized that while it might be deemed to provide a just or a fair distribution of the joint costs, it did not provide an economic measure of the separate costs. Testimony in the *Permian Basin* proceeding, FPC Docket No. AR 61–1, 1962, tr. 7212–17, 7346–47. See also my *op. cit.*, *Amer. Econ. Rev., Papers and Proceedings* (May 1960), L: 510–514.

are often made in part on the basis of the relative number of physical units of consumption or utilization by each, and the total allocated dollars are then divided by those physical units to get the unit costs. Also, being apportionments of historical costs, even when they do accurately reflect historical responsibility for the incurrence of these costs among the respective users, they do not provide a reliable measure of what will happen to costs in the future if particular portions of the business are expanded or dropped. Therefore, they do not tell whether a particular service is really profitable or unprofitable, in the sense that its continued provision at existing rates makes a net contribution to company revenues over and above the costs for which it is responsible, or whether, instead, it is a burden on the other subscribers.

This is a defect, of course, only to the extent that marginal costs diverge from average. The full distribution of costs that underlies the familiar two- or three-part tariff for gas and electricity, for example, with its separate customer, commodity (or energy) and demand charges, is in part along lines that reflect true causal responsibility: costs such as meter reading and billing do in fact depend on the number of customers, others (such as fuel) on the mere quantity taken, and others (capacity costs) on the amount the supplier may be called on to provide on demand at the time of the system's peak. Note that the distribution is not among classes of customers, as such, but along functional lines that recognize the various genuine determinants of cost. But the unit costs so determined are average, not marginal. They give no recognition, therefore, to the fact that some of the capacity is provided under LRDC conditions; and that the generation of electricity is subject to short-run increasing costs, with the result (see pp. 94–97, Chapter 4) that those charges ought properly to be high enough at times to make a contribution to overheads. The functional distribution itself may conceal interesting discrepancies between marginal and average costs. In the case of gas pipeline companies, for example, the costs of their own gas producing operations are placed among commodity costs, presumably on the ground that the cost of the gas itself obviously must vary with the number of cubic feet taken. But pipelines obtain most even of their *purchased* gas under long-term contracts that promise a certain maximum daily deliverability and often oblige the line to pay for certain minimum specified daily quantities of gas whether or not they take that much. Even though they pay a certain price per MCF, therefore, some part of the costs of the purchased gas is fixed, not variable, and is a function of the capacity required at the peak. Similarly, many of the costs of the pipelines' own production are fixed, representing the investment required to provide a certain production capacity. Therefore, the cost of the gas itself that the pipelines transport and sell is only partly variable with quantities taken, and hence belongs only partly in the commodity charge; part of it really belongs in the demand charge.

Again, one important component of the "separations procedures" used by the Federal Communications Commission to (fully) distribute Bell System investment costs between interstate and intrastate service (since it regulates only the former) is the allocation of those costs on the basis of relative minute-miles or relative minutes of use for the two purposes.[68] To the extent that capacity costs incurred do indeed depend on the number of minutes taken up

[68] See, for example, FCC, *In the Matter of American Telephone and Telegraph Co. et al.*, Docket Nos. 15011 and 16258, Interim Decision and Order, 9 FCC 2d 30, 93 and *passim* (1967).

and miles covered by individual messages, this allocation method does reflect the respective average cost responsibilities of the two services. But since this procedure treats all minutes the same, peak and off-peak, it fails to recognize the varying capacity cost responsibilities of calls made at different times. Moreover, being a measure of average historical instead of marginal cost, it ignores the very marked tendencies to decreasing cost in long-distance telephonic communication, which we have already described. Finally, it is simply not the case that all the costs thus allocated do in fact vary with minutes or miles of use.[69]

A particularly clear example of the lack of correspondence between average, fully distributed and marginal costs and of the irrationality of basing rates on the former is provided by the FCC's distribution between intra- and interstate jurisdictions of the costs of telephone "subscriber plant"—the equipment on the customer's premises and between those premises and the local office or exchange. (Net investment in Bell System subscriber plant amounted to $15.4 billion in 1966.) It decided in 1967 to do so on the basis of (1) the relative minutes of use of that equipment for interstate and intrastate service, which measure produced an allocation of only 4% to the former, (2) with a judgmental adjustment for the greater average *value* of a minute's use for interstate than for intrastate messages—producing a final allocation of 12% to the former.[70] But subscriber plant is in fact idle most of the time: it was used an average of only 29 minutes a day in the test period. It is simply available at all times for any and all calls. A doubling of any of these utilizations would cause the company no additional cost incurrence for subscriber plant: the marginal cost is therefore zero.[71] The FCC's adjustment for the different value of the different uses was a recognition that since neither the 4% nor any other allocation could produce a measure of relative marginal cost responsibility, the allocation would have to be based on demand considerations. But in so doing it failed entirely to recognize that the economically relevant demand characteristic in these circumstances would have been demand elasticity, as Commissioner Johnson implied in his concurring opinion,[72] and that the upward adjustment of the allocation to

[69] On these separation procedures, see also note 39, p. 100, Chapter 4 and Richard Gabel, *Development of Separations Principles in the Telephone Industry* (East Lansing: Institute of Public Utilities, Michigan State Univ., 1967). AT&T has pointed out, for example, that it was irrational of the FCC to allocate all the costs of interexchange plant on the basis of message-minute-miles, since some of that plant consists in terminals, the costs of using which have nothing whatever to do with the miles over which the messages travel. *Ibid.*, 9 FCC 2d 30, 100.

The CAB and the airlines have in recent years come to recognize the same serious defect in a passenger fare structure that was originally based on a uniform rate per mile. Since the costs at the terminal—ticket sales, baggage check-in, loading and unloading, landing and take-off—are essentially the same per passenger or per flight, regardless of the length of the trip, these costs are fixed when the dimension of output is the number of miles traveled. On the other hand, obviously the costs of the flight itself will vary with the length of the trip. Combining the fixed and variable costs produces a "tapered" cost structure, one in which costs per mile decline the longer the journey. The CAB has pointed out and the airlines have come increasingly to recognize that at a uniform rate per mile the long trips have been subsidizing the short runs, and both parties have therefore been moving toward a more tapered fare structure. See, for example, *Wall Street Journal*, June 16, 1969, 34; *New York Times*, August 10, 1969, Sec. 3, 1; and the CAB Rates Division, Bureau of Economics, Staff Report, *A Study of the Domestic Passenger Air Fare Structure* (Washington, January 1968).

[70] *In the Matter of American Telephone and Telegraph Co. et al.*, Docket Nos. 15011 and 16258, 9 FCC 2d 30, 101–110.

[71] We set aside the increased possibility of busy signals, that is, of congestion costs.

[72] *Ibid.*, 128–129, 135–137.

1978 when it added section 224 to the Communications Act.[385] Although section 224 relied on "cost" as the foundation for determining just and reasonable attachment rates, it recognized the range of ways that "cost" could be interpreted. In particular, section 224(d)(1) defines a just and reasonable rate as ranging from a statutory minimum based on the additional costs of providing pole attachments to a statutory maximum based on fully allocated costs.[386]

128. The additional, or incremental, costs that form the basis for the statutory minimum are the costs that would not be incurred by the utility "but for" the pole attachments.[387] These costs include pre-construction survey, engineering, make-ready, and change-out costs incurred in preparing the pole for attachments.[388] Congress expected a pole attachment rate based on incremental costs to be minimal since most of those costs would have been fully recovered in the make-ready charges already paid by the attacher.[389] The maximum rate for attachments under section 224(d)(1), identified as a percentage of fully allocated costs, reflects a portion of operating expenses and capital costs that a utility incurs in owning and maintaining poles; the percentage is equal to the portion of space on a pole occupied by an attacher.[390]

129. In a series of orders, the Commission implemented a formula that cable television system attachers and utilities could use to determine a maximum allowable just and reasonable pole attachment rate – referred to as the cable rate formula – and procedures for resolving rate complaints.[391] In 1987, the U.S. Supreme Court found that the cable rate formula adopted by the Commission provides pole owners with adequate compensation, and thus did not result in an unconstitutional "taking."[392]

130. *Telecommunications Act of 1996*. Congress expanded the reach of section 224 in the 1996 Act to promote infrastructure investment and competition. Among other things, Congress added "provider[s] of telecommunications service[s]" as a category of attacher entitled to pole attachments at just and reasonable rates, terms and conditions under section 224,[393] and added section 224(e), which provides a methodology "to govern the charges for pole attachments used by telecommunications carriers

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[385] Pole Attachment Act of 1978, Pub. L. No. 95-234, 92 Stat. 33, codified at Communications Act of 1934, as amended; 47 U.S.C. § 224. Congress reacted to an apparent need in the cable television industry to resolve conflicts between such providers, then known as "CATV systems," and utility pole, duct, and conduit owners over the charges for use of such facilities. *See generally* 1977 Senate Report, *reprinted in* 1978 U.S.C.C.A.N. 109.

[386] 47 U.S.C. §§ 224(d)(1); *see also* 1977 Senate Report at 19–21, *reprinted in* 1978 U.S.C.C.A.N. at 127–28.

[387] 1977 Senate Report at 19, *reprinted in* 1978 U.S.C.C.A.N. at 127.

[388] "Make-ready" generally refers to the modification of poles or lines or the installation of guys and anchors to accommodate additional facilities. *See* 1977 Senate Report at 19, *reprinted in* 1978 U.S.C.C.A.N. at 127. A pole change-out is the replacement of a pole to accommodate additional users. *Amendment of Rules and Policies Governing the Attachment of Cable Television Hardware to Utility Poles*, CC Docket No. 86-212, Report and Order, 2 FCC Rcd 4387, 4388, para. 6 n.3 (1987) (*1987 Rate Order*), *recon. denied*, 4 FCC Rcd 468 (1989).

[389] *See* 1977 Senate Report at 19, *reprinted in* 1978 U.S.C.C.A.N. at 127; *1987 Rate Order*, 2 FCC Rcd at 4388, para. 4.

[390] 1977 Senate Report at 19–20, *reprinted in* 1978 U.S.C.C.A.N. at 127–28.

[391] *See*, *e.g.*, *First Report and Order*, 68 FCC 2d 1585 (adopting complaint procedures); *Adoption of Rules for the Regulation of Cable Television Pole Attachments*, CC Docket No. 78-144, Memorandum Opinion and Order, 77 FCC 2d 187 (1980) (defining, e.g., safety space, average usable space, attachment as occupying 12 inches of space, and make-ready as non-recurring cost); *1987 Rate Order*, 2 FCC Rcd 4387. The cable rate formula was codified in the *1998 Implementation Order*, 13 FCC Rcd 6777 at 47 C.F.R. § 1.1409(e)(1).

[392] *FCC v. Florida Power Corp*., 480 U.S. 245 (1987); *see Alabama Cable Telecomm. Ass'n v. Alabama Power Co.*, *Application for Review*, File No. PA 00-003, Order, 16 FCC Rcd 12209 (2001) (*Alabama Cable Order*), *review denied sub. nom*. *Alabama Power Co. v. FCC*, 311 F.3d 1357 (11th Cir. 2002), *cert. denied*, *Alabama Power Co. v. FCC*, 540 U.S. 937 (2003).

[393] 47 U.S.C. §§ 224(a)(4), (b)(1).

For multiproduct firms, the setting of rates is much more complicated. Rather than use Ramsey pricing techniques, regulators have typically used **fully distributed cost (FDC) pricing** rules. Regulators start with the notion that rates or prices should be based on cost causality. If production of product A gives rise to a cost, that cost should be recovered through the prices of product A. The problem that arises is that it is not possible to assign causality to common costs. Recall that common costs arise from the use of common inputs, inputs that are used to produce more than one product. For instance suppose that an electricity generation facility has a cost of \$1 million a day and produces two products, electricity in the day and electricity at night. The incremental or attributable costs of producing either electricity in the day or electricity at night, given that the other is produced, will not include the costs of the generation facility. Both products can be produced if the facility is built, but neither product can be produced without it. The firm's common costs—for FDC pricing—equal the difference between its total costs less those that are attributable, where attributable cost includes product-specific fixed costs.

We know from our discussion of Ramsey pricing in Chapter 25 that raising prices above marginal costs based on the inverse elasticity of demand is the optimal way to raise prices above marginal costs so that the firm breaks even. This involves information regarding marginal costs and demand elasticities. FDC pricing, on the other hand, imposes a definition of cost causality and on that basis allocates common costs. Each product is then priced such that it recovers its cost allocation.

FDC pricing will be inefficient for two reasons. First, FDC prices are not Ramsey prices: they are not based on marginal costs or demand elasticities.[9] Second, even though the revenue from a product will be at least as great as its allocated costs, FDC prices will not, in general, be subsidy free. As we saw in Chapter 25 incremental and stand-alone costs are the relevant measures of costs to assess the existence of cross-subsidies. Consequently, FDC prices can often provide incentives for inefficient bypass or entry. Customers or entrants will have an incentive to construct their own facilities if stand-alone costs are less than their revenue requirement determined by FDC pricing.

Three common allocation rules to assign common costs are (i) relative output, (ii) attributable cost, and (iii) revenues. To understand the application of these FDC methods, consider a simple example of a multiproduct firm that produces two goods. Let demands be independent so that $R_i(q_i) = P_i(q_i)q_i$ is the revenue of good i where $P_i(q_i)$ is the demand function. Assume that the cost function for the firm is $C(q_1, q_2) = C_1(q_1) + C_2(q_2) + CC$ where C_i are the attributable costs for product i and CC are common costs. FDC pricing requires that for each product i,

$$R_i(q_i) \geq f_i CC + C_i(q_i) \tag{26.20}$$

where f_i is the cost allocator for product i. The three FDC rules differ in their determination of f_i:

1. *Relative Output:* $f_i = \dfrac{q_i}{\sum_{i=1}^{2} q_i}$.
2. *Attributable Cost:* $f_i = \dfrac{C_i(q_i)}{\sum_{i=1}^{2} C_i(q_i)}$.
3. *Revenues:* $f_i = \dfrac{R_i(q_i)}{\sum_{i=1}^{2} R_i(q_i)}$.

[9] See Berg and Tschirhart (1988) or Braeutigam (1980) for a discussion of the nature of the price distortions associated with FDC pricing.

FDC prices can be calculated based only on costs and estimated demand. Of course estimates of demand should incorporate changes in prices. In order to do that, the estimates must incorporate demand elasticities. Failure to do so will mean that when prices change substantially, demand forecasts will prove to be inaccurate and the firm will either make profits or incur a deficit, requiring the creation of deferral accounts or rebates.

26.2.2 An Assessment of COS Regulation

COS regulation has come under considerable attack from economists because of its incentive structure. The critics of COS regulation highlight six significant difficulties with the incentive structure created by COS regulation.

Incentives for Cost Efficiency

COS regulation provides low-powered incentives for cost reduction because of the link between prices and costs. If the firm reduces its costs, the benefits of cost efficiency accrue to consumers in the form of lower prices, not to the firm as profits. If costs increase, then so do prices, and the firm—or more accurately its shareholders—continues to earn its allowed rate of return. COS regulation changes the nature of the relationship between managers and shareholders in such a way that the opportunity for managers to shirk probably increases. As a result, critics contend that COS regulation results in cost inefficiency. This manifests itself in excessive managerial perquisites; managerial slack, overstaffing, and other underutilized inputs; failure to bargain aggressively with input suppliers; etc. In addition COS regulation encourages firms to be excessively risk averse. It reduces the incentives for firms to undertake efficient but risky investments to reduce costs. All reasonably incurred costs are recovered and there is no payoff to the firm if the investment is successful—if anything it might be penalized since costs are reduced. Furthermore it is virtually impossible for the regulator to punish a firm for failing not to undertake cost-saving investment, let alone detect missed opportunities for cost savings, innovation, and new product introduction.

Averch-Johnson

Economists have focused on the incentive effects of rate-of-return (ROR) regulation (embedded in cost-of-service regulation), contending that it provides a profit-maximizing firm with incentives to inefficiently expand its rate base in order to relax the constraint on allowed profits. Suppose that the firm uses only two inputs, capital (K) and labor (L). The profits earned by the firm are $\pi = PQ - wL - rK$ where w is the price of labor and r is the cost of capital. The rate of return constraint is

$$s \geq \frac{PQ - wL}{K} \tag{26.21}$$

where s is the allowed rate of return and the right-hand side of (26.21) is the realized rate of return. By subtracting total capital costs from both sides of (26.21) and simplifying we have

$$(s - r)K \geq \pi. \tag{26.22}$$

The left-hand side is allowed profits, while the right-hand side is realized profits. A profit-maximizing firm subject to the constraint (26.21) overinvests in capital relative to a monopolist (assuming that the monopoly rate of return is greater than s). This is shown in Figure 26.2. Feasible profits as a function of K (assuming that L is chosen optimally) reach a maximum at K^M. The constraint on allowed profits, (26.22) is a line with slope $(s - r)$. The profit-maximizing choice of K

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Confirm and/or amend the assumptions in Exhibit TCK 3.1, with respect to the Brown evidence.

RESPONSE:

The information in the column labelled "Brown", for the rows relating to key assumptions and direct costs (A-C) is confirmed.

In the case of indirect costs, the information in the column labelled "Brown" for the rows relating to net embedded cost/pole (D) and pole maintenance expense (F) is confirmed. In accordance with WR-VECC-20, Attachment A, the remaining rows should be adjusted as follows:

Depreciation Expense (E):	$42.30
Capital Carrying Cost (G):	$59.88
Subtotal Indirect cost/pole (H):	$106.95
Allocation Factor (I):	0.1254
Indirect Cost/Attacher:	$13.41
Estimated Annual Cost (K):	$15.28