Canadian Radio-television and Telecommunications Commission
Conseil de la radiodiffusion et des télécommunications canadiennes

Telecom Order CRTC 2019-288

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Public record: Bell Canada Tariff Notices 7504 and 7533; Bell MTS Tariff Notice 798; Cogeco Communications Inc. Tariff Notices 52, 52A, and 52B; Eastlink Tariff Notices 37 and 37A; MTS Inc. Tariff Notices 778, 778A, and 778B; Rogers Communications Partnership Tariff Notices 45 and 45A; Saskatchewan Telecommunications Tariff Notices 329 and 329A; Shaw Cablesystems G.P. Tariff Notices 26, 26A, and 26B; TELUS Communications Company Tariff Notice 512; and Videotron G.P. Tariff Notices 52, 52A, 55, and 55A

Follow-up to Telecom Orders 2016-396 and 2016-448 – Final rates for aggregated wholesale high-speed access services

Following the publication of Telecom Orders 2016-396 and 2016-448, wherein the Commission set revised interim wholesale high-speed access (HSA) service rates for Bell Canada, Bell MTS, Cogeco, Eastlink, RCCI, SaskTel, Shaw, TCI, and Videotron (collectively, the wholesale HSA service providers), the Commission directed the wholesale HSA service providers to file revised cost studies for these rates.

In this order, the Commission sets final rates for the wholesale HSA service providers' aggregated wholesale HSA services that are just and reasonable. The Commission considers that the final rates will facilitate greater competition and promote innovative broadband services and more affordable prices for consumers.

The Commission has made a number of adjustments to certain proposed rates, including the monthly access rates per end-user, the 100 Mbps increment monthly rate, and certain service charges.

The Commission has also determined that the final rates will be applied retroactively.

Introduction

1. The Commission regulates the wholesale high-speed access (HSA) services provided by incumbent local exchange carriers (ILECs)[1] and cable carriers[2] (collectively, the wholesale HSA service providers). Competitors (i.e. the customers that purchase wholesale HSA services) can use these services to provide their own retail Internet services and other services to their end-users.

[1] In this order, "ILECs" refers to Bell Canada, Bell MTS, Saskatchewan Telecommunications, and TELUS Communications Inc.

[2] In this order, "cable carriers" refers to Bragg Communications Incorporated, carrying on business as Eastlink; Cogeco Communications Inc.; Videotron G.P.; Rogers Communications Canada Inc.; and Shaw Cablesystems G.P.

2. There are two types of wholesale HSA service: aggregated and disaggregated. With the aggregated service, the competitor connects its network at a small number of points of interconnection (POIs) to reach all end-users connected to the wholesale HSA service provider's network. The wholesale HSA service provider's network transports traffic for the competitor between a POI and all head-ends or central offices (COs) it serves. The competitor provides or leases transport facilities from its network to the POI. With the disaggregated service, the competitor connects its network to one POI per head-end or CO. The ILEC or cable carrier does not provide transport – instead, the competitor provides or leases transport to each head-end or CO serving end-users that it wishes to serve.

3. In Telecom Decision 2016-117, the Commission reviewed certain costing assumptions reflected in wholesale HSA service rates. As a result, all aggregated wholesale HSA service rates that had been approved on a final basis were made interim, effective the date of the decision. The Commission did so on the basis that these rates were likely not just and reasonable. The Commission also directed the wholesale HSA service providers to file revised cost studies for their banded non-legacy aggregated wholesale HSA service speeds,[3] reflecting the determinations set out in the decision, and directed the providers that use the capacity-based billing (CBB) model to file updated monthly capacity rates per 100 megabits per second (Mbps).[4]

4. The Commission received tariff applications and supporting cost studies in response to the above-noted directions from the following wholesale HSA providers: Bell Canada; Bell MTS; Bragg Communications Incorporated, carrying on business as Eastlink (Eastlink); Cogeco Communications Inc. (Cogeco); MTS Inc. (MTS);[5] Quebecor Media Inc., on behalf of Videotron G.P. (now Videotron Ltd. [Videotron]); Rogers Communications Canada Inc. (RCCI); Saskatchewan Telecommunications (SaskTel); Shaw Cablesystems G.P. (Shaw); and TELUS Communications Company (now TELUS Communications Inc. [TCI]).[6]

5. In Telecom Orders 2016-396 and 2016-448, the Commission expressed concern that certain wholesale HSA service providers had not conducted their cost studies in accordance with the costing principles detailed in their respective Regulatory

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[3] Under the speed-banding approach, various service speeds with similar costs are grouped in a band. A single access rate applies to services within each band; this rate is established on the basis of the weighted average costs of all service speeds within the band.

[4] Rates determined using the CBB model have two components: (i) a monthly rate per speed band for access to the network, and (ii) a separate rate for capacity in increments of 100 Mbps. The CBB model requires that a competitor determine in advance the amount of capacity it will need to provision Internet and other services to its end-users.

[5] An initial tariff application was received from MTS, which amalgamated with Bell Canada on 1 April 2017 and is now operating as Bell MTS, a division of Bell Canada. A subsequent application was received from Bell MTS. For ease of reference, "Bell MTS" is used hereafter to refer to both entities.

[6] The record for each of these applications closed on 16 November 2018, with the exception of Videotron Tariff Notice 55A, for which the record closed on 8 March 2019.

Economic Studies Manuals (the Manual), and had not justified departure from the principles and methodologies set out in the Manual. The Commission further indicated that revisions were required to ensure that the interim rates were not based on overstated costs. Accordingly, the Commission set revised interim rates for aggregated wholesale HSA services in those orders.

6. As a result of the above determinations, the wholesale HSA service providers (with the exception of SaskTel) filed revised cost studies.

7. The Commission received interventions regarding the wholesale HSA service providers' applications from the British Columbia Broadband Association (BCBA), the Canadian Network Operators Consortium Inc. (CNOC), Distributel Communications Limited, Ice Wireless Inc., the Public Interest Advocacy Centre (PIAC), and Vaxination Informatique.

Issues

8. Following a comprehensive review of all submissions from the wholesale HSA service providers, the Commission has identified the following categories of issues to be addressed in this order:

    - Costing issues common to all wholesale HSA service providers
    - Costing issues specific to the cable carriers
    - Costing issues specific to the ILECs
    - Other issues

Costing issues common to all wholesale HSA service providers

Annual capital unit cost change assumption

9. The annual capital unit cost change assumption is the annual change in unit cost of equipment.

10. The Commission determined in Telecom Decision 2016-117 that an annual capital unit cost[7] change assumption of minus 26.4% provided a reasonable estimate of the impact of expected equipment capacity increases and the resulting unit cost reductions for all traffic-driven equipment for the wholesale HSA service providers over the five-year study period.

Positions of parties

11. TCI proposed a revised annual capital unit cost change assumption of minus 4.5% for routers and minus 13.6% for optical equipment, based on its company-specific data for traffic-driven equipment for the years 2016 and 2018.

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[7] i.e. the annual cost per megabit per second

12. Bell Canada and Bell MTS proposed an annual capital unit cost change assumption of minus 15.7% to reflect the 2016 Dell'Oro Router Report.[8]

13. SaskTel used the approved annual capital unit cost change assumption of minus 26.4%.

14. Cogeco, Eastlink, Shaw, and Videotron proposed an annual capital unit cost change assumption of minus 17%, based on the 2016 Dell'Oro Router Report.

15. RCCI proposed an annual capital unit cost change assumption of minus 9%, using data from the most recent (2017) Dell'Oro Router Report.[9]

16. Cogeco, RCCI, and Videotron further submitted that the annual capital unit cost change assumption of minus 26.4% should not apply to Converged Cable Access Platform (CCAP) facilities, given that CCAP facilities have recently replaced the Cable Modem Termination System (CMTS) and Edge Quadrature Amplitude Modulation (EQAM)[10] devices in their networks. They submitted that since the replacement of CMTS facilities occurred recently, they have limited ability to effect significant annual price changes over the study period.

17. Cogeco further submitted that calculating a company-specific annual capital unit cost change assumption is a complex exercise and, if it were to develop a company-specific assumption, it would have to consider the generational gap in equipment.

18. CNOC noted that Bell Canada and the cable carriers did not provide any company-specific data to support their proposed annual capital unit cost change assumptions, and argued that this is a clear indication that their proposals lack substance and should be rejected.

19. With respect to Cogeco's, RCCI's, and Videotron's views regarding their inability to effect price changes in CCAP equipment prices, CNOC submitted that the conclusions are unsubstantiated by evidence, and that the companies' circumstances and relationships with equipment suppliers are no different than those of any other operating carrier.

Commission's analysis and determinations

20. As stated above, the Commission determined that an annual capital unit cost change assumption of minus 26.4% provided a reasonable estimate of the impact of expected equipment capacity increases and the resulting unit cost reductions for all

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[8] *Dell'Oro Router & Carrier Ethernet Switch Five Year Forecast Report 2016-2020,* January 2016

[9] *Dell'Oro Router & Carrier Ethernet Switch Five Year Forecast Report 2017–2021,* January 2017

[10] EQAM devices enable cable carriers to provide video-on-demand (VoD) and other advanced digital services.

traffic-driven equipment. However, the wholesale HSA service providers submitted different assumptions ranging from minus 4.5% to minus 26.4%.

21. The Commission notes that the ILECs (with the exception of SaskTel and TCI) and cable carriers have selectively chosen data from third-party reports (i.e. the Dell'Oro Router Reports) to estimate company-specific annual capital unit cost change assumptions for use in their cost studies, instead of relying on company-specific information. Given that the wholesale HSA service providers are sophisticated network operators, it is reasonable to expect that they have detailed company-specific equipment prices and capacities for traffic-driven equipment that they acquire on an annual basis. Accordingly, the Commission determines that the approach adopted by these ILECs and cable carriers is not appropriate since it is not consistent with the general use of company-specific data in regulatory cost studies.

22. With respect to TCI's proposed annual capital unit cost change assumption (based on company-specific data), this data was limited to only two years: 2016 and 2018. The Commission is of the view that two years of data does not represent a long enough time frame to forecast a reliable annual capital unit cost change assumption for a five-year study period.

23. With respect to Cogeco's, RCCI's, and Videotron's submissions that the annual capital unit cost change assumption of minus 26.4% should not apply to newer CCAP equipment, the Commission notes that the objective of calculating this figure is to quantify the generational gap that exists between newer equipment with higher capacities and older equipment with lower capacities over an appropriate period of time, in order to forecast a reasonable annual capital unit cost change assumption over the study period. Accordingly, it is appropriate to apply the annual capital unit cost change assumption to newer CCAP equipment.

24. In light of the above, the Commission determines that the previously approved annual capital unit cost change assumption of minus 26.4% continues to be a reasonable estimate for the annual capital unit cost change assumption for all traffic-driven equipment and should be applied accordingly to all wholesale HSA service providers' cost studies.

Bell Canada's, Bell MTS's, and RCCI's unrecovered costs

25. In Telecom Regulatory Policy 2009-274, the Commission stated that it would be appropriate for wholesale service providers to recover past introduction costs that were left unrecovered due to the wholesale HSA service rates being updated prior to the end of the original study period. Any over-recovery of costs of a mandated wholesale service, which may occur when actual costs incurred are less than the forecasted costs, should also be included in the updated cost study to ensure that the revised rates are just and reasonable.

26. In Telecom Decision 2016-117, the Commission indicated that unrecovered costs that were causal to service could be recovered according to the methodology

outlined in the ILECs' Manuals, which were approved in Telecom Order 2008-237. The Commission further stated that for all other unrecovered costs (i.e. costs causal to demand) for which there was no Commission-approved estimation methodology, wholesale HSA service providers were requested to identify and justify the costs.

Positions of parties

Bell Canada

27. Bell Canada submitted that it estimated its unrecovered costs causal to service based on actual capital expenditures and actual tracked demand. The resulting unrecovered costs were restated to 2016 dollars.

28. Bell Canada submitted that it estimated its unrecovered costs causal to demand based on costs, as determined in Telecom Decision 2013-73, and actual tracked demand. The resulting unrecovered costs were also restated in 2016 dollars.

29. With respect to the estimation of unrecovered costs causal to demand, Bell Canada submitted that the Commission's suggestion that the company's proposed methodology did not take into consideration actual capital expenditures identified in Telecom Order 2016-396 is not theoretically sound, because it is impractical to calculate and compare projected expenditures (using the capacity costing approach) to actual expenditures. In particular, the extensive time, effort, and cost required to update the installed first costs and related cash flows used in the cost study are not justified.

Bell MTS

30. Bell MTS submitted that it estimated its unrecovered costs causal to service for its Very High-Speed Digital Subscriber Line (VDSL) Data Access Services (VDAS), based on the Commission-adjusted start-up costs from previous cost studies.[11]

31. Bell MTS submitted that its unrecovered costs causal to demand for its VDAS and network capacity services were not provided since the demand for them is very low and the associated costs are not expected to be significant.

RCCI

32. RCCI proposed to estimate unrecovered costs causal to service for certain speed tiers based on the difference between the interim rates and the cost-study-supported rates, multiplied by the number of end-users per month per speed tier. The resulting unrecovered costs were restated to 2016 dollars.

CNOC

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[11] For VDAS 30 Mbps service, the unrecovered cost was based on monthly costs causal to service, as approved by the Commission in Telecom Regulatory Policy 2011-703. For VDAS 50 Mbps service, the unrecovered cost was based on monthly costs causal to service, as approved by the Commission in Telecom Order 2014-390.

33. CNOC submitted that any capital costs and capital-related expenses calculated by Bell Canada as being unrecovered due to a shortfall in demand are theoretical only and not based on projected capital expenditures. Further, the unrecovered costs causal to demand claimed by Bell Canada are not costs associated with the introduction of the original service and therefore do not qualify for inclusion.

34. CNOC also submitted that Bell Canada's product management expenses, which the company included in its costs causal to service, are unjustified because they are ongoing costs and not service introduction costs. Bell Canada replied that the unrecovered costs for product management resulted from the fact that the recovered costs calculated in the original 10-year cost study were lower than the actual tracked product management costs that it was entitled to recover.

35. CNOC submitted that Bell Canada's and RCCI's proposals to restate unrecovered costs causal to service to 2016 dollars are not appropriate because the unrecovered introduction costs had, by definition, already been expended at the beginning of the original study period.

36. CNOC submitted that Bell MTS did not comply with the directives of the Manual concerning the required steps to calculate the unrecovered portion of the introduction costs in its updated cost study.

37. CNOC further submitted that RCCI's proposed unrecovered costs should be adjusted to reflect only unrecovered costs associated with (i) POI routers, and (ii) service provisioning expenses associated with engineering to design and plan Internet service, as these costs are service introduction costs.

Commission's analysis and determinations

38. As a result of the wholesale HSA service rates being revisited prior to the end of the period captured by the original cost study, it is expected that there may be unrecovered costs (due to an underestimation of unit costs and/or an overestimation of demand) and/or over-recovered costs (due to an overestimation of unit costs and/or an underestimation of demand).

Bell Canada

39. With respect to unrecovered costs causal to demand, Bell Canada reported substantial costs. However, the Commission considers that the company's supporting information was not complete and that its analysis was flawed, as explained below.

40. In estimating unrecovered costs causal to demand, Bell Canada brought forward costs contained in its 2011 and 2013 cost studies used to set rates for its wholesale HSA services. These studies used a minus 10% annual unit cost change assumption for usage-based equipment. However, in Telecom Decision 2016-117, the Commission determined that the proper annual unit cost change assumption for such equipment was minus 26.4%. If this value is applied to the costs contained in the

2011 and 2013 cost studies, capital expenditures are less than the included projected capital expenditures.

41. With regard to Bell Canada's submission that the actual expenditures are not readily available and that the extensive time, effort, and cost to update the installed first costs and related cash flows used in the cost study are not justified, the Commission is of the view that Bell Canada did not substantiate this argument having regard to the significant amounts of unrecovered costs causal to demand being claimed. The magnitude of these costs calls for a detailed and fulsome review for the Commission to properly assess their reasonableness.

42. Further, Bell Canada's analysis is incomplete because it does not account for any over-recovery of costs that may have occurred. The Commission expects that there would be over-recovery of costs associated with usage-sensitive equipment, having regard to the determination in Telecom Decision 2016-117 discussed above.

43. Concerning Bell Canada's total unrecovered costs, which comprise both unrecovered costs causal to service and unrecovered costs causal to demand, the Commission considers that the total unrecovered costs claimed are not reasonable because any over-recovery of costs was not taken into consideration.

Bell MTS

44. The Commission has previously approved Bell MTS's unrecovered costs causal to service. Further, the Commission considers that the company's costs causal to service were reasonably estimated and are unlikely to be offset by any over-recovery of costs causal to demand, due to significantly lower demand than forecasted in the original cost study. Accordingly, it would be appropriate to include these costs in the company's cost study.

RCCI

45. RCCI's proposed unrecovered costs were estimated based on interim rates. Given that the rates for the speed tiers for which the company has proposed unrecovered costs were (i) approved on an interim basis, (ii) under review, and (iii) not approved on a final basis, the question of unrecovered costs does not arise. The difference between the interim rates and final rates is resolved through retroactivity. In view of the above, the Commission determines that RCCI's proposed unrecovered costs are not appropriate.

Conclusion

46. In light of the above, the Commission has excluded Bell Canada's and RCCI's proposed unrecovered costs from the companies' respective cost studies. The Commission determines that Bell MTS's proposed unrecovered costs are appropriately included in its cost study.

Working fill factors

47. The working fill factor (WFF) is a measure of the utilization of a shared facility and is used to recognize the non-working capacity and to apportion the cost of non-working capacity to the per-unit cost of the working capacity.

48. Working capacity is the capacity that is available to provide service to customers making use of the relevant facility. This includes all units that are potentially revenue generating, while non-working unit capacity is all other remaining units (e.g. units required for maintenance).

49. The Commission determined in Telecom Regulatory Policy 2009-274 that companies could propose a company-specific WFF for a particular facility for use in a cost study, as long as it meets the following conditions:[12]

    - Condition 1: the company must satisfy a common definition of the measure;
    - Condition 2: the company must satisfy a common measurement methodology;[13]
    - Condition 3: the company must demonstrate that the company-specific measured WFF has reached stability;
    - Condition 4: the company-specific measured WFF must meet an acceptable level of consistency with other companies' company-specific WFFs in similar circumstances; and
    - Condition 5: the company-specific measured WFF must be approved by the Commission.

50. The Commission further determined that when a company-specific proposed WFF does not meet the above-noted conditions, the Commission-mandated WFFs are to be used.

51. The Commission-mandated WFF for switching facilities, hardware, and software is 80%, as per a Commission staff letter dated 18 July 2003, which refers to customer-specific arrangements.

52. In Telecom Regulatory Policy 2011-703, the Commission found no evidence to justify inconsistency with the cable carrier cost determinations in Telecom Decision

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[12] While that decision dealt with ILECs, this determination was the result of the parties participating in the associated proceeding. Since cable carriers follow the Manual, the Commission considered it appropriate to apply the determination to cable carriers.

[13] In Telecom Regulatory Policy 2009-274, the Commission determined that company-specific measured WFFs should be measured as follows: the measure is to be developed for growth technology only (e.g. for the technology expected to be provisioned in the future); the point of measure is to be defined consistently across ILECs for comparable facilities; and a company average over the ILEC's current operating territories should be used (through a census or a representative sample).

2006-77 and approved the WFF of 75% used in the cable carriers' cost study models, where applicable, to set what were then final rates.

53. The Commission's review of the proposed WFFs is divided into two parts:

    - Cable carriers' proposed WFFs
    - ILECs' proposed WFFs

Cable carriers' proposed WFFs

Positions of parties

54. The cable carriers proposed WFFs for the following facilities: (i) optical nodes, (ii) CCAPs, and (iii) routers.

55. The cable carriers proposed company-specific WFFs that are based on three different methods of estimation of working capacity, namely (i) measurements,[14] (ii) augmentation triggers,[15] and (iii) the directives in the Manual; or they proposed WFFs that the Commission had accepted in previous decisions.

56. Relying on a report prepared by CableLabs (the CableLabs Report),[16] the cable carriers jointly submitted that a WFF can be interpreted to be the average operational utilization of a specific facility (e.g. optical nodes) over the entire access network.

57. The cable carriers submitted that their respective proposed WFFs reflect the working and non-working units at the moment of measurement. However, they acknowledged that this capacity will be used at some point by the subscribers that share it.

58. The cable carriers submitted that their company-specific utilization statistics support their proposed WFFs, and that each of the company-measured WFFs being proposed meets the conditions outlined in Telecom Regulatory Policy 2009-274.

59. With respect to optical node facilities, RCCI proposed to use a WFF of 28% at the beginning of its study period, based on average operational utilization, and a WFF of 60% based on the augmentation trigger for years one through five.

60. RCCI submitted that the capacity costing approach is a proxy of the cost of advancement,[17] and that using this method with a WFF of 75% for optical node

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[14] This refers to the utilization of a given facility as measured at a specific point in time.

[15] An augmentation trigger point is the level of utilization of a given facility at which the company begins the process of capacity augmentation. This is to be distinguished from the point at which the facilities themselves are physically installed.

[16] The cable carriers submitted a joint report entitled *Cable Broadband Network Architecture and Capacity Planning: Working Fill Factor*.

[17] When a service uses a new or existing shared facility, the impact of using a portion of the facility's capacity for the service is estimated by considering the effect that the additional demand for the facility will

facilities produces an estimation error. RCCI submitted, however, that it is neither practical nor possible to produce a cost of advancement study on its optical node facilities, and estimated the estimation error to be over 50%. As a result, RCCI proposed to apply an initial WFF of 28%, which was based on average operational utilization at the end of 2016 across all optical node facilities, as a means of eliminating this estimation error.

61. RCCI proposed to use a WFF of 75% for router facilities.

62. With respect to CCAP facilities, RCCI submitted data that reflected the working units versus the maximum capacity of these facilities, which results in a WFF of 83%.

63. CNOC submitted that the Manual is clear with respect to the conditions that apply to the use of company-specific measured WFFs and company-specific target WFFs, and that none of the conditions associated with approval were addressed in the CableLabs Report.

Commission's analysis and determinations

64. As noted above, in Telecom Regulatory Policy 2009-274, the Commission outlined the conditions that have to be met when a company-specific measured WFF of a particular facility is proposed for the purposes of a cost study.

65. Cogeco, Eastlink, Shaw, and Videotron proposed to use company-specific measured WFFs throughout their study periods for all three categories of facilities.

66. The company-specific WFFs they proposed do not meet condition 1 (i.e. the company must satisfy a common definition of the measure), since they defined working units as those units that are used at the moment of measurement, whereas Telecom Regulatory Policy 2009-274 defines working units as those units that are expected to provide service to an end-user.

67. The approach used by these cable carriers results in an underestimation of working units because it does not take into account all working units that can provide service to a customer. Consequently, the Commission determines that the proposed company-specific measured WFFs are not appropriate for use in cost studies because they do not meet condition 1. The Commission determines that the following previously approved WFFs continue to be reasonable for Cogeco, Eastlink, Shaw, and Videotron:

    - for optical node and CCAP facilities: 75%

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have on future facility relief requirements. The use of some of the capacity for the service means this capacity is no longer available for other services that could have shared the facility, resulting in the advancement of future relief of the facility. The cost associated with the advancement of the future relief is referred to as the cost of advancement.

- for routers: 80% (the same as for the ILECs' routers, on the basis that cable carriers use similar equipment).

RCCI

68. RCCI proposed two WFFs for the optical node facilities: a WFF of 28% at the start of the cost study and a WFF of 60% for each subsequent year of the cost study.

69. The WFF of 28% is based on the average utilization at the end of 2016 across all optical node facilities, and it does not include all working units that are expected to provide service to a customer. The Commission considers that this WFF does not satisfy the first condition and is not appropriate for use in cost studies.

70. Furthermore, the Commission considers that RCCI did not provide sufficient evidence to validate its proposed estimation error, and is therefore unable to establish that use of the proposed WFF of 28% for optical node facilities would eliminate any estimation error. Consequently, the proposed WFF of 28% is not appropriate.

71. Concerning the proposed WFF of 60% for each year of the cost study, the Commission notes that in Telecom Decision 2013-76, it stated that the capacity trigger point (i.e. the augmentation trigger) and WFF are not synonymous, since there is typically a delay between the capacity trigger point and the point when the capacity expansion is completed, and that during this delay period, the capacity utilization can continue to increase.

72. Further, RCCI did not provide compelling evidence or rationale as to why the utilization that occurs between the capacity trigger point and the point when the capacity expansion is completed should be excluded from the calculation of the WFF for optical node facilities. Failure to include this utilization results in underestimation of the WFF.

73. In light of the above, the Commission is of the view that the WFFs of 75% that were used in Telecom Regulatory Policy 2011-703 in setting the cable carriers' final rates for optical nodes facilities should continue to apply.[18]

74. With respect to RCCI's WFF of 83% for CCAP facilities, the Commission considers that this WFF was estimated correctly using the working units versus the maximum capacity of the CCAP facilities. Therefore, it is appropriate for use in the company's cost studies.

75. Consistent with the determination reached above for the other cable carriers, the Commission determines that a WFF of 80% should also apply to RCCI's routers on the basis that cable carriers and ILECs use similar equipment.

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[18] In that decision, the Commission relied on the WFFs that were used to set final rates in Telecom Decision 2006-77.

ILECs' WFFs

Positions of parties

Bell Canada

76. Bell Canada submitted that the capacity costing approach is not an appropriate approach for assessing the cost of traffic-driven equipment and that explicit costing is the preferred approach.

77. Bell Canada submitted, however, that if the Commission adopted the capacity costing approach, then it would no longer be appropriate to use the Commission-mandated 80% WFF for traffic-driven equipment (e.g. routers and switches) in the company's cost studies. Bell Canada submitted that WFFs for traffic-driven equipment need to take into account both traffic utilization and port utilization. The company submitted that similar to how the traffic utilization factors serve to recognize that not all of the capacity of a utilized port would be used, the port utilization factors serve to recognize that not all ports on a network device would be used.

78. Bell Canada submitted that the company-proposed WFF meets the conditions outlined in Telecom Regulatory Policy 2009-274, as described below.

79. It meets condition 1, the common definition of a measure, in that the proposed port utilization factor is calculated as the revenue-generating units divided by the total number of ports provisioned on the device, which is used as its capacity. This is consistent with the definition of WFF set out in the Manual.

80. It complies with condition 2, the Commission's guidelines for the use of a common measure. Bell Canada proposed to use measured port utilization data for its growth technology equipment, namely 1 gigabit (G), 10G, and 100G Ethernet ports, to establish its port utilization factors. The company measured the total number of growth technology ports provisioned on a device, which it submitted would likely be similar to the measurement techniques adopted by the other ILECs. Finally, the company submitted that it had measured the utilization across its entire incumbent operating territory.

81. With regard to condition 3 (stability of the WFF), Bell Canada acknowledged that it was using only two years of data, 2016 and 2017, but argued that it was not possible to have data for a longer period of time associated with its growth technology. Bell Canada argued that before 2016, it was provisioning its network mainly with Synchronous optical networking (SONET)-type interfaces that are now being decommissioned. Accordingly, Bell Canada argued that including earlier data would show lower utilization rates on these earlier technologies.

82. With respect to condition 4 (consistency with other ILECs' WFFs), Bell Canada submitted that the WFF varies significantly in different parts of the network, such as the edge and the core networks. It therefore measured the WFFs separately for

similar facilities, such as routers, being used in the edge and the core networks to ensure consistency with provisioning practices being followed by other ILECs and to take into account the limitations in particular sections of the network. Bell Canada proposed to use these segment-specific WFFs to achieve consistency with other ILECs' WFFs.

83. Bell Canada submitted that if the Commission does not approve the use of the company's approach to deriving WFFs based on measured utilization data for port utilization and for design and engineering considerations related to traffic utilization, it should approve a proposed alternative approach, in which both the port utilization factor and traffic utilization factor are set to 80% (hereafter, the alternative approach). Using the alternative approach, the proposed WFF would be 64% (80% traffic utilization multiplied by 80% port utilization).

84. CNOC submitted that Bell Canada has not satisfied the conditions set out in Telecom Regulatory Policy 2009-74, and detailed in the Manual, to justify the use of company-specific measured WFFs or company-specific target WFFs.

85. CNOC argued that Bell Canada failed to meet condition 3 regarding stability of the WFF, since it did not demonstrate that the associated facilities are in the mature state of their life cycles and have reached the ultimate level of utilization. It further argued that Bell Canada's statement that the utilization rates cannot be based on historical measurements because of rapidly evolving technology confirms that the company cannot meet this condition.

86. Bell Canada replied that the traditional definition of stability over a long period of time is irrelevant for rapidly evolving networks, and that utilization rates should be based partly on design and engineering considerations, and partly on the utilization levels currently being achieved. Further, additional equipment capacity is available in much larger increments than in the past. Therefore, stability with respect to measured WFFs for this network would have to be defined over a much shorter time period than in the case of networks that are more stable.

87. CNOC also submitted that Bell Canada's proposed WFF does not meet condition 4, which requires consistency with other ILECs' company-specific WFFs in similar circumstances. CNOC submitted that Bell Canada did not address this condition at all and simply ignored the condition's requirement that "the consistency across ILECs is met if the current company-specific measured WFF is within minus 20% of or greater than the average of all ILECs' company-specific WFFs for the same facility as set out in the Manual."

88. Bell Canada replied that the other ILECs face the same challenges of having to deal with rapidly evolving technology and high traffic growth. It added that other factors, such as the number of technologies supported, the specific equipment models used, and provisioning practices, vary across companies.

89. CNOC also submitted that Bell Canada did not provide a detailed list of information and documentation in support of its proposed company-specific WFFs, as prescribed in the Manual.

90. With regard to Bell Canada's proposal to apply WFFs to both port and traffic, CNOC submitted that this approach is the result of an inaccurate and unfounded interpretation of the Commission's approach to applying WFFs.

91. In this regard, CNOC submitted that in Telecom Decision 2005-6, the Commission saw no need to apply specific port or traffic utilization factors in the development of WFFs for traffic-driven equipment; rather, it approved an average WFF of 80% for CO equipment. CNOC argued that, in any event, the capacity-related driver for the development of the unit cost of the router equipment is the number of ports, and not traffic capacity. Accordingly, CNOC questioned why traffic utilization should be factored into the development of the unit cost if the driver is ports and not traffic.

92. In reply, Bell Canada submitted that in Telecom Decision 2005-6, the Commission mandated a WFF of 80% when addressing costing issues related to Competitor Digital Network (CDN) services. Bell Canada argued that whereas the rates and costs for CDN services are port driven, the costs for the equipment under consideration in the current proceeding are both port and traffic driven.

Other ILECs

93. Bell MTS used a WFF of 80%, except for certain components of the router equipment, for which it proposed the use of a WFF of 40%.

94. SaskTel and TCI both used the Commission-mandated WFF of 80%.

Commission's analysis and determinations

95. In a later section entitled "Bell Canada's explicit costing approach" the Commission addresses Bell Canada's proposal to use an explicit costing approach as opposed to the capacity costing approach, which relies on WFFs.

96. In this section, the Commission addresses the conditions to be met for use of company-specific WFFs.

97. Bell Canada's proposed WFF does not meet Condition 1 regarding a common definition of the measure. Specifically, Bell Canada has defined working units as those units used at the moment of measurement, whereas Telecom Regulatory Policy 2009-274 defines working units as the units that are expected to provide service to an end-user.

98. Bell Canada's arguments as to why its proposed WFFs' non-compliance with condition 3 (the stability of the WFFs) should not be an issue cannot be sustained. The Commission considers that Bell Canada's proposal to use only two years of data to establish WFFs on the basis of measured utilization rates is not appropriate.

Specifically, the proposal fails to account for the fact that the equipment under consideration can accommodate increased traffic. In this regard, adoption of the proposed WFFs, in the current context, would result in a significant overestimation of costs. Accordingly, for new technologies that have not reached the mature state of their life cycles, the measured utilization rates cannot be used as WFFs.

99. In addition, Bell Canada's proposed WFFs do not meet condition 4 regarding consistency of WFFs among ILECs in similar circumstances since its proposed WFFs are not within minus 20% of or greater than the average of all other ILECs' company-specific WFFs. The fact that different ILECs use different mixes of technologies and equipment makes and models, as Bell Canada argued to demonstrate that the ILECs are not in similar circumstances to one another, does not justify or otherwise shed light on why Bell Canada would proceed to augment its equipment once it had reached a much lower proportion of its total capacity as compared to what transpires with other ILECs.

100. With respect to Bell Canada's alternative approach to estimating the WFFs, the Commission considers that if the proposal were adopted, Bell Canada would use its equipment up to a much lower percentage of its total capacity as compared to what other ILECs use. The Commission is not persuaded that the company has satisfactorily demonstrated that its provisioning practices would diverge considerably from those of other ILECs.

101. In view of the above, the Commission determines that Bell Canada's proposed company-specific WFFs are not appropriate for use in cost studies. The Commission determines that, based on the record of this proceeding, continued application of an 80% WFF remains appropriate for all CO equipment. In this regard, the Commission notes that Telecom Decision 2005-6 refers to the 18 July 2003 Commission staff letter (discussed above), wherein Bell Canada was advised to use a WFF of 80% for CO equipment, and that the Manual reflects this position.

102. Bell MTS did not provide any evidence in support of its proposal to use a 40% WFF for certain components of router equipment. Accordingly, the Commission determines that it is reasonable for Bell MTS to continue to use the Commission-mandated 80% WFF for all of the components of its router equipment.

Costing issues specific to the cable carriers

Coaxial facility costs

103. In Order 2000-789, the Commission considered it appropriate to use a proxy monthly cost of $0.152 per channel, per subscriber, as proposed by the cable carriers, to estimate the costs associated with coaxial facilities.[19] The proxy cost was set to equal the monthly per-subscriber rate of $0.152 approved in Public Notice 1997-35 for access by exempt programming undertakings to cable carriers' channel capacity.

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[19] The proxy was used to recognize the use of a downstream six megahertz channel.

104. The monthly rate was based on 1995 annual return data and is meant to reflect the following relevant cost categories: depreciation, operating expenses, and rate of return.

Positions of parties

105. The cable carriers submitted that the use of $0.152 as a proxy for the incremental per-end-user monthly cost of a cable carrier channel is no longer appropriate, since information and data used to calculate the proxy is outdated.

106. The cable carriers further submitted that existing and new coaxial facilities are shared facilities and, as per the Manual, capacity costing is the most appropriate method of estimating the cost of advancement associated with such facilities.

107. Cogeco, Eastlink, Shaw, and Videotron proposed to estimate the capacity cost of the coaxial facilities included in the cost study by multiplying the total costs of the relevant coaxial facilities by the ratio of channels used to provision Internet services to the total number of channels available for all services.

108. RCCI proposed to attribute to wholesale HSA and retail Internet services 50% of the cost associated with coaxial facilities included in its cost study. RCCI based this allocation on its forecasted share of the network capacity used in the delivery of Internet services. RCCI submitted that its approach is identical to the capacity costing approach.

109. Cogeco, RCCI, and Videotron proposed coaxial facility costs that do not vary by speed band, whereas Eastlink and Shaw proposed to estimate these costs based on the weighted average of channels used per end-user and per speed band.

110. With respect to existing coaxial facilities, CNOC submitted that these costs should be valued based on their salvage value net of removal costs, since these facilities are not fungible and there is no cost of advancement associated with them. With respect to new coaxial facilities, however, CNOC submitted that their costs should be assessed based on the capacity costing approach.

111. The cable carriers submitted that using the salvage value as a cost for coaxial facilities is not appropriate, because these facilities are shared between various services; therefore, the capacity costing approach is the correct approach to use in such circumstances.

Commission's analysis and determinations

New and existing coaxial facility costs

112. The capacity costing approach is generally used when the use of existing shared facilities results in the advancement of future relief of facilities.

113. With respect to existing coaxial facilities, there is no cost of advancement. This is due to the fact that when wholesale HSA and retail Internet services make use of the

facilities, relief is provided by segmenting the facilities.[20] Accordingly, the Commission considers that it is not appropriate to use the capacity costing approach to estimate the costs of existing coaxial facilities.

114. With regard to the cable carriers' concerns regarding the use of outdated cost information in the proxy approach, the Commission considers that updated cost information should be used to reflect the forward-looking, company-specific costs for existing coaxial facilities.

115. With respect to estimating existing coaxial facility costs, the Commission determines that, subject to what follows, it is reasonable to include forward-looking coaxial facility costs associated with the same cost categories as before. The cable carriers provided the depreciation and operating expenses for coaxial facility costs, and the Commission has used these amounts to estimate the coaxial facility costs. The Commission determines, however, that it is not appropriate to include a specific category to account for a rate of return given that the after-tax weighted average cost of capital (AT-WACC) takes into consideration the rate of return.

116. With respect to estimating new coaxial facility costs, the Commission determines that it is appropriate to do so based on an average cost for provisioning coaxial facilities per new home passed during the cost study period.

Wholesale HSA and retail Internet costs associated with new and existing coaxial facilities

117. With respect to RCCI's proposal to allocate 50% of the costs to coaxial facilities for Internet service, the Commission considers that since the company provided the actual number of channels used to support Internet service, as well as the actual number of available channels for all services, the proposed 50% allocation is not necessary. Accordingly, the Commission determines that Internet costs associated with new and existing coaxial facilities for RCCI are to be estimated by applying RCCI's actual numbers to the same formula used by Cogeco, Eastlink, Shaw, and Videotron.

Estimating Internet costs associated with new and existing coaxial facilities on a speed-band basis

118. With respect to estimating Internet costs associated with new and existing coaxial facilities on a speed-band basis, the Commission is of the view that coaxial facility costs do not vary by speed band, because the coaxial facilities that are provisioned to an end-user are not affected by the service speed. Accordingly, the Commission has adjusted Eastlink's and Shaw's coaxial facility costs to be equal in each speed band, consistent with the methodology used by Cogeco, RCCI, and Videotron for new and existing coaxial facilities on a speed-band basis.

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[20] Segmentation requires the addition of an optical node along with fibre facilities that connect back to the head-end. However, no additional coaxial facilities are required.

Segmentation facilities – segmentation fibre, optical nodes, and CCAPs

119. Segmentation facilities include segmentation fibre, optical nodes, and CCAPs. These facilities transport various services such as television and Internet. Additional segmentation fibre facilities may be required when a neighbourhood optical node is segmented (i.e. node segmentation) to reduce the number of customers serviced by that optical node.

Positions of parties

120. The cable carriers proposed to use the replacement cost new approach to estimate segmentation fibre facility costs.

121. In response to requests for information, the cable carriers (except Eastlink) also submitted their fibre cost factors for segmentation fibre facilities.[21]

122. Eastlink submitted that its historical records related to segmentation fibre facilities do not categorize the information in a way that would enable the company to calculate a cost factor.

123. Cogeco, Shaw, and Videotron submitted that their cost factors are based on historical capital expenditures associated with segmentation fibre facilities and optical node facilities, while RCCI submitted that its cost factor is based on historical capital expenditures associated with segmentation fibre facilities and CCAP facilities.

124. The cable carriers submitted that the use of a cost factor for segmentation fibre facilities is not appropriate for the following reasons:

- segmentation fibre facilities do not have unlimited capacity, as demonstrated by the fact that new optical node builds require new segmentation fibre builds;
- segmentation fibre cables are not shared between an infinite number of optical nodes and, when a fibre cable runs out of strands, additional fibre cables must be laid and connected to additional nodes. This demonstrates that there is finite capacity;
- the Manual refers to “fibre cable in the inter-office network” when providing an example of a facility with unlimited capacity, and does not refer to all fibre optic cables, regardless of their location in the network;
- the capacity of segmentation fibre cannot be increased by simply changing the electronics attached to it, as may be the case for inter-office-related fibre; and

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[21] Cost factors (in this case, technology cost factors) are capital cost factors that relate the total expenditures for one technology to the total expenditures for a related technology. Cost factors are developed for facilities such as fibre optic cable for the inter-office (also referred to as transport or backbone) network and are generally developed using the average of the previous three years of actual expenditures and two years of forecasted expenditures, as follows:

Cost factor = Total expenditures on one technology / Total expenditures on related technology

- explicit estimates of segmentation fibre facility costs were submitted; therefore, the use of an estimated cost factor to estimate these costs is moot.

125. Shaw submitted that although segmentation fibre may have a theoretically unlimited capacity, the need to augment capacity is driven by the node location and the CCAP serving-group capacity; therefore, segmentation fibre is not in any way similar to inter-office-, transport-, or backbone-related fibre segments. RCCI similarly argued that segmentation fibre facilities should be viewed as having limited capacity given that once a node has been installed, no additional segmentation fibre will be installed to that node in response to capacity constraint issues.

126. Videotron submitted that the use of a cost factor can cause significant distortions when a reliable explicit cost is available. Videotron submitted that use of a cost factor in the current case would greatly underestimate the true cost of the company's segmentation fibre.

127. With respect to the matter of what proportion of the companies' segmentation fibre costs should be attributed to their retail Internet and wholesale HSA services, the cable carriers submitted that 100% of the costs of the segmentation fibre should be attributed to these services as retail Internet and wholesale HSA services are the sole driver of these costs.

128. CNOC submitted that it fully supports the use of the cost factor approach to estimate segmentation fibre facility costs, consistent with the approach documented in the Manual.

Commission's analysis and determinations

Costs associated with segmentation fibre facilities

129. The cable carriers proposed to use the replacement cost new approach to estimate their segmentation fibre facility costs.

130. The Commission considers that the use of this approach, as proposed, is not appropriate, given that fibre facilities are shared among different services. As per the Manual, a cost factor approach is an appropriate method to use to estimate the costs for such facilities.

131. With respect to the capacity of segmentation fibre facilities, the Commission is of the view that once they are deployed to a given node, no further augmentation of the deployed fibre facilities is required since the fibre's capacity to serve a given node is, in practice, not subject to exhaustion. Accordingly, the capacity of a given segmentation fibre facility to provision an optical node cannot be said to be limited.

132. With respect to the cost factors provided by Cogeco, RCCI, and Videotron, the Commission notes that they are based on five years of actual historical expenditures, which is appropriate.

133. Accordingly, the Commission accepts the cost factors submitted by Cogeco and Videotron. However, the Commission considers that RCCI's cost factor was underestimated due to a computation error. This matter is addressed later in this order.

134. Shaw submitted a cost factor that is significantly higher than those developed by Cogeco and Videotron. Given that these cable carriers use similar facilities in developing their respective cost factors, it would be reasonable to expect the cost factors to be comparable. To address this discrepancy, the Commission has estimated a cost factor of 80% by using the total capital expenditures relating to segmentation fibre and optical node facilities provided by Shaw.

135. Having regard to the fact that Eastlink did not develop a cost factor, the Commission is of the view that applying a cost factor of 105%, obtained based on the average of Cogeco's and Videotron's segmentation fibre and optical node facility costs, would produce a reasonable proxy to estimate Eastlink's cost factor for segmentation fibre facilities.

Attribution of segmentation facility costs to retail Internet and wholesale HSA services

136. In Telecom Decision 2006-77, the Commission determined that 75% of the proposed all-carrier node segmentation capital costs would be causal to the wholesale HSA and retail Internet services, in recognition of the use of these investments for other cable carrier services such as television and voice.

137. The Commission remains of the view that these facilities are used to provision a variety of services; therefore, it would not be appropriate to attribute 100% of the costs of these facilities to retail Internet and wholesale HSA services.

138. In the absence of any evidence, and given that future services are expected to benefit from segmentation facility investments over the cost study period, the Commission determines that an attribution factor of 75% continues to be appropriate.

Segmentation fibre facilities: Access versus usage

139. The cost model for cable carriers is composed of two categories of costs: access and usage. Access costs comprise costs associated with facilities (such as coaxial cable) that are non-usage-sensitive (i.e. the costs do not vary with changes in usage levels). Usage costs comprise costs associated with facilities (such as optical nodes) that are usage-sensitive (i.e. the costs vary with changes in usage levels).

140. In Telecom Decision 2016-117, the Commission determined that wholesale HSA service providers must ensure that all equipment costs accounted for in the access portion of their cost models include costs for only non-usage-sensitive equipment.

Positions of parties

141. The cable carriers submitted that the costs associated with segmentation fibre facilities should be accounted for in the access portion of the cost model.

142. RCCI submitted that a high-speed-tier end-user causes more stress on the access network than a low-speed-tier end-user; therefore, more of the access costs should be recovered from high-speed-tier end-users, independent of traffic volume. RCCI submitted that as a reflection of this, its access network relies on tiered pricing for different speed bands to better ensure a predictable and manageable mix of different usage patterns by end-users on each node.

143. RCCI argued that including segmentation fibre facility costs in the usage portion of the cost model would result in flat wholesale HSA access rates, which would lead to end-users subscribing to higher-speed tiers and increases in usage of the service.

144. RCCI also submitted that moving segmentation fibre facility costs from the access portion to the usage portion of the cost model would prevent the company from recovering the costs related to the added demands that higher speeds place on the access network.

145. RCCI further submitted that including segmentation fibre facility costs in the usage portion of the cost model would result in a higher monthly usage rate per 100 Mbps capacity increments, and would harm the wholesale HSA service providers.

146. Eastlink and Shaw submitted that inclusion of segmentation fibre facility costs in the access portion of the cost model is consistent with the speed-banding approach adopted by the Commission in Telecom Decision 2016-117, whereby the access rate explicitly recognizes speed-dependent costs that apply to each speed band.

147. Eastlink and Shaw further submitted that segmentation fibre is installed only when it is necessary to segment a node to alleviate congestion at the optical node, not as a result of the existing fibre facility reaching its capacity; therefore, segmentation fibre is non-usage-sensitive.

148. Videotron submitted that when the capacity needs to be increased, a new optical node is added, but existing segmentation fibre can be partially reused. It would therefore not be accurate to assign all the costs of the initial segmentation fibre to the usage portion. In fact, only a portion could be assigned to the usage component of the cost model.

149. Videotron added that the higher speeds mean that more nodes and segmentation fibre are added, regardless of the level of traffic generated. It is therefore appropriate to assign part of the costs to the access portion.

150. Videotron submitted that just as segmentation fibre facility costs may be partially allocated to the usage portion of the cost model, optical node costs may be partially allocated to the access portion. However, Videotron submitted that it was simpler to

assign the optical node costs entirely to the usage portion and the segmentation fibre facility costs entirely to the access portion.

151. Videotron further submitted that including all segmentation fibre facility costs in the usage portion of the cost model would result in flat wholesale HSA access rates, which would lead competitors to offer only the maximum speed to all their end-users.

152. Cogeco submitted that segmentation fibre facility costs consist of planned, upfront investments that are required in a shared cable access network for a company to be ready to accommodate the launch of higher-speed tiers and, as such, these costs are non-usage-sensitive.

153. CNOC submitted that RCCI appeared to acknowledge that segmentation fibre facilities are usage-sensitive, but that these facilities are treated as non-usage-sensitive in its cost model and, therefore, should be included in the access portion.

154. CNOC further submitted that RCCI referred to irrelevant considerations, such as the requirement for a tiered rate structure and the benefits of lower CBB rates for wholesale HSA service providers, in support of its position. These arguments do not address the fundamental costing principle as to whether segmentation fibre facilities are usage-sensitive. Accordingly, RCCI's arguments should be rejected and the segmentation fibre facility costs should be assigned to the usage-driven portion of the cost model.

155. CNOC also submitted that Shaw, in its cost study, described the calculation of segmentation fibre facility costs and that it is clear from the calculation steps that these facilities are usage-sensitive. This assumption would apply to all cable carriers with a similar hybrid fibre-coaxial architecture based on optical nodes.

Commission's analysis and determinations

156. The record of this proceeding demonstrates that the cable carriers install new segmentation fibre when a new optical node is installed to augment an existing node that has reached its maximum capacity as a result of usage generated on all speed bands that the node serves. This demonstrates that segmentation fibre is provisioned to alleviate congestion caused by changes in usage levels across all speed bands.

157. With respect to Eastlink's and Shaw's submissions that the speed-banding approach to setting access rates adopted by the Commission explicitly recognizes speed-dependent costs (which, they argued, include those related to segmentation fibre), the Commission notes that speed-dependent costs are different than usage-sensitive costs. Usage-sensitive costs vary with changes in usage levels, such that as the usage level of a specific service speed increases, the costs for that service speed increase as well, whereas speed-dependent costs are costs that are incurred to provide a specific service speed and do not vary with changes in the usage level of that speed.

158. In light of the above, the Commission considers that segmentation fibre is deployed to address usage requirements, and not to respond to the speed requirements of new services.

159. With regard to concerns raised by a number of cable carriers that including segmentation fibre facility costs in the usage component of the cost model will result in flat or flatter wholesale access rate structures for all speed tiers, and thus undermine the relevance of having a tiered rate structure, the Commission notes that the intent behind the speed-banding approach is, in part, to apply the same access rate to various service speeds that share the same speed-dependent costs. As a matter of principle, different access rates should not be applied to different service speeds at the wholesale level if these service speeds do not have different access-related costs.

160. The Commission acknowledges that end-users in lower-speed bands generate, on average, less usage – and, as a result, lower costs – than end-users in higher-speed bands. This conclusion is validated by network measurements of peak period end-user traffic. Migrating the segmentation fibre facility costs to the usage portion of the cost model does not serve to overlook this reality. Rather, the average higher usage generated by end-users in higher-speed bands would be accounted for in the greater number of 100 Mbps usage increments purchased by wholesale HSA service providers to meet the needs of these end-users.

161. In light of the above, Commission determines that the costs associated with segmentation fibre facilities are usage-sensitive, and that these costs are to be included in the usage portion of the cost models (i.e. in the 100 Mbps CBB increment).

Cable carriers' proposed growth rates for annual peak period upstream traffic

162. Peak period traffic growth rates reflect the annual increase in end-user downstream or upstream peak period traffic. These rates are used to forecast peak period traffic, which is used to estimate the facilities required to provide service over the study period.

Positions of parties

163. Cogeco submitted that it has no historical upstream traffic growth rate measurements at the end-user level; accordingly, it proposed to estimate this rate based on historical channel utilization measurements and maximum upstream channel capacity.[22]

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[22] Specifically, Cogeco's proposed growth rate for annual peak period upstream traffic is based on (i) historical upstream monthly utilization channel measurements during the peak period for in-service equipment (i.e. the peak level of upstream traffic transmitted through a given channel by all users of that channel) beginning in 2013, and (ii) the estimated maximum upstream channel capacity for each measurement beginning in 2013.

164. RCCI proposed an annual peak period upstream traffic growth rate based on the compounded annual growth rate of monthly upstream traffic measurements beginning in November 2012.

165. Eastlink and Shaw proposed forecasted growth rates based on historical peak period upstream traffic growth rates.

166. Videotron did not propose the use of a growth rate for upstream traffic.

Commission's analysis and determinations

167. Cogeco's and RCCI's historical annual peak period upstream traffic growth rates have been declining; therefore, it is not reasonable to expect that annual peak period upstream traffic will increase, over the cost study period, to the levels proposed by these companies.

168. In light of the above, and having regard to the record before it, the Commission considers it appropriate to use the most recent year's value from Cogeco's and RCCI's respective historical annual peak period upstream traffic growth rates as the growth rate to be applied in each year of their cost studies.

169. The Commission finds that Eastlink's and Shaw's proposed annual peak period upstream traffic growth rates are reasonable.

RCCI's and Videotron's transport fibre facility costs

Positions of parties

170. RCCI and Videotron proposed transport fibre facility costs that are equal to the replacement cost of the existing transport fibre facilities.

171. In response to requests for information, the companies provided company-specific transport fibre technology cost factors (TCFs) based on five years of historical data. The transport fibre TCFs for RCCI and Videotron were 36% and 9%, respectively. However, both companies argued against the application of TCFs to their transport fibre.

172. RCCI submitted that transport fibre facilities do not meet the requirements for the establishment of a TCF, since transport fibre does not have unlimited capacity in terms of kilometres of fibre needed to connect the network.

173. Videotron submitted that the use of TCFs is recommended when the calculation of the explicit costs is too laborious or where the financial data required to complete a direct calculation is not available. These conditions are not met in this case. Videotron further submitted that the use of a TCF can cause significant distortions. In particular, these distortions arise when the actual TCFs applied during the study period differ from the ones calculated using historical data.

174. CNOC submitted that the approach proposed by RCCI and Videotron is contrary to the Commission's determinations set out in Telecom Decision 2006-77, and that transport fibre facility costs should be estimated using TCFs.

Commission's analysis and determinations

175. With respect to RCCI's and Videotron's explicit estimates of the costs of transport fibre facilities, the Commission is of the view that the companies provided the replacement cost new, and not the explicit costs, of the facilities.

176. As per the Manual, the replacement cost new approach is used for discrete facilities. Given that transport fibre facilities are shared facilities, it is not appropriate to use the replacement cost new approach.

177. The Manual also provides that a cost factor approach is an appropriate method to estimate costs for shared facilities that have unlimited capacity or when capacity is difficult to estimate.

178. With respect to the sharing of facilities, the Commission considers that transport fibre facilities are shared among different services.

179. Further, the Commission considers that once transport fibre facilities are deployed, their capacity to transport traffic is not limited; further, once inter-office fibre is provisioned, these facilities are not augmented to deal with increased traffic.

180. In light of the above, the Commission considers that it is appropriate to use a cost factor approach to estimate the costs for transport fibre facilities. The Commission further considers that the TCFs provided by RCCI and Videotron are based on actual expenditures; therefore, the Commission finds that the TCFs are appropriate.

RCCI's project development costs

Positions of parties

181. RCCI proposed annual development costs associated with its aggregated wholesale HSA service. In addition, it proposed separate annual development costs associated with its wholesale HSA and retail Internet services.

Commission's analysis and determinations

182. With respect to annual development costs causal to aggregated wholesale HSA service, development costs are normally incurred only at the beginning of the study period. The Commission considers that RCCI did not provide sufficient evidence to support ongoing development costs. Accordingly, the Commission has excluded RCCI's development costs from year two and beyond in its cost studies.

183. With respect to the separate annual development costs associated with its wholesale HSA and retail Internet services, RCCI did not provide evidence that these initiatives

are causal to the provisioning of wholesale HSA service. Therefore, the Commission has excluded these development costs from RCCI's cost studies.

Costing issues specific to the ILECs

Labour costs per DSLAM port

184. The fibre-to-the-node (FTTN) Digital Subscriber Line Access Multiplexer (DSLAM) costs proposed by the ILECs are composed of two components: equipment and labour. The labour component consists of engineering and installation activities for the DSLAM equipment.

Positions of parties

185. Bell Canada and Bell MTS submitted that their proposed DSLAM labour costs were developed based on the assessment of actual jobs of their employees who perform work associated with engineering the DSLAM, and of external contractors who perform the installation and civil work activity labour.

186. CNOC submitted that DSLAM engineering costs, a significant cost component, should not vary significantly among the ILECs as this technology has been in use for many years.

Commission's analysis and determinations

187. DSLAM equipment is a mature technology that has been in service for a long time and provides similar functionality and capacity across all ILECs. Accordingly, DSLAM labour costs should be similar across the various ILECs. When compared to other ILECs (i.e. SaskTel and TCI), Bell Canada's and Bell MTS's proposed DSLAM labour costs per port are significantly higher. Accordingly, the Commission considers that these costs are not reasonable.

188. In light of the above, the Commission is of the view that Bell Canada's and Bell MTS's proposed DSLAM labour costs per port should be revised to be consistent with those of the other ILECs, and considers that an average of the other ILECs' DSLAM labour costs per port would be a reasonable proxy for these costs.

Bell Canada's explicit costing approach

189. Cost studies should reflect the principles of causality and prospective incremental costing. In other words, the studies should include causal, forward-looking, company-specific costs.

190. The Manual recognizes that the capacity costing approach is to be used to estimate the unit cost for shared facilities. This approach is used to determine the per-unit cost by dividing the installed first cost of the shared facilities (i.e. the total cost of equipment plus installation) by its maximum capacity, then dividing this ratio by the appropriate WFF.

Positions of parties

191. Bell Canada proposed to use an approach it described as “explicit costing” (hereafter, the proposed approach) rather than capacity costing. The proposed approach consists of including the total costs of the capital equipment, regardless of whether it is used at its full capacity or not.

192. Bell Canada applied the proposed approach to estimate CBB capital costs as follows:

- determine the actual and forecasted “all-carrier” traffic (measured in Mbps) over the study period, and assign the traffic to existing network nodes in line with current traffic patterns; and
- determine costs for the number of equipment units, based on the minimum number of equipment configurations available from manufacturers, needed at each node to provision the actual and forecasted traffic demand.

193. Bell Canada submitted that the proposed approach fully complies with cost study requirements, and that it was the original costing approach proposed in the proceeding that led to Telecom Decision 79-16. The capacity costing approach was added toward the end of the cost inquiry leading to Telecom Decision 79-16 to provide an approximation of costs that would be valid under certain circumstances. Bell Canada further submitted that the introduction of the capacity costing approach did not displace explicit costing, which remains a valid and appropriate approach in the present situation.

194. Bell Canada submitted that the capacity costing approach is appropriate only when the network is stable and evolving slowly. The company submitted that since these conditions are not met today, capacity costing is not as accurate an approach as explicit costing.

195. Bell Canada added that the capacity costing approach is valid if additional equipment is triggered by growth in traffic and not by upgrading the functionality (e.g. by providing higher speeds). Bell Canada noted that investments are taking place to generally upgrade the network rather than to address relief.

196. Bell Canada further submitted that the capacity costing approach requires the use of stable WFFs that are based on historic measurements of utilization levels, which are difficult to determine, which produces misleading results when the network is evolving rapidly.

197. Bell Canada submitted that the best way to model the rapidly changing network is to use the proposed approach, which posits a theoretical network built from scratch that includes only the network elements and facilities necessary to provision wholesale HSA and retail Internet services. It includes only the minimum level of resources to meet the projected levels of coverage and traffic capacity of these services, and the resources are not shared with any other services.

198. Bell Canada added that the proposed approach also assumes that there will be some spare capacity in the theoretical network, which is an unavoidable consequence of the indivisibilities in equipment.

199. Bell Canada further submitted that the proposed approach is similar to the one used by the cable carriers in their cost studies for wholesale HSA services. The company argued that for competitive equity and consistency with the Policy Direction,[23] the cable carriers and ILECs should use the same methodology.

200. TCI supported the proposed approach because it avoids concerns associated with the capacity costing approach. The proposed approach is more accurate because it is based on actual costs of the newest growth technologies and therefore provides a more accurate view of the true costs.

201. CNOC submitted that the proposed approach does not recognize the reality of the existing shared equipment at the beginning of a study period, because the plant used for retail Internet and wholesale HSA services is also used to deliver a variety of IP-based services, including IP voice, IP television (IPTV), retail Internet, and wholesale HSA.

202. CNOC added that the proposed approach implies that the equipment is discrete plant dedicated to wholesale HSA services. CNOC noted that the Manual states that a discrete facility that is non-fungible is to be estimated as the lost opportunity of salvage, net of removal costs.

203. CNOC further submitted that Bell Canada did not provide any evidence that the cable carriers are using a similar explicit costing approach. In addition, the Manual does not include the option to ignore the use of the capacity costing approach because WFFs are difficult to estimate.

204. In response to Bell Canada's claim that the cable carriers used a similar explicit costing approach, Cogeco and RCCI submitted that they follow the incremental costing approach in accordance with the Manual.

205. Eastlink and Shaw agreed that the proposed approach is similar to the approach that they had adopted, but differs in a number of areas. For example, Eastlink and Shaw did not assign forecast traffic to existing node locations and then determine the capacity needed to serve that traffic at each of these locations. Instead, the capacity costing approach, including the application of WFFs, was used, consistent with the incremental costing approach.

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[23] *Order Issuing a Direction to the CRTC on Implementing the Canadian Telecommunications Policy Objectives*, P.C. 2006-1534, 14 December 2006

Commission's analysis and determinations

206. Bell Canada's proposed approach to estimate the costs associated with its CBB tariff elements assumes that a new network has to be built from scratch. Given that wholesale HSA services are provided using Bell Canada's existing facilities, the Commission is of the view that the proposed approach does not reflect the causal, incremental, forward-looking, company-specific costs that Bell Canada would actually incur in providing wholesale HSA services. Therefore, it is not appropriate for use in cost studies.

207. Furthermore, the proposed approach does not recognize that facilities which provide retail Internet and wholesale HSA services are shared with a variety of other services (e.g. IPTV). Bell Canada allocated 100% of the costs associated with these shared facilities to retail Internet and wholesale HSA services. Accordingly, adoption of the proposed approach would result in an overestimation of costs. Only the impact of using a portion of the capacity of the shared equipment for wholesale HSA services should be included in the cost study.

208. While Bell Canada asserted that the capacity costing approach is not accurate, given that it assumes that the installation of additional equipment is triggered only by growth in traffic, and not by upgrades to functionality, the implication resulting from the proposed approach is that existing equipment is replaced rather than augmented. No evidence was submitted to support this, and the Commission considers that such a practice is unlikely as a general course of action. Where new facilities are required to support the provision of high-speed services, for example, such facilities are provisioned to provide relief to existing facilities (e.g. to provide for additional bandwidth required to serve end-users). With respect to Bell Canada's reference to new functionalities, the company did not expand upon this point. Therefore, the Commission is unable to assess the merits of the associated claim.

209. Finally, the Commission considers that the capacity costing approach cannot be invalidated simply because it may be difficult to estimate the WFFs.

210. Accordingly, the capacity costing approach is the appropriate approach to use to estimate the costs of a shared network making use of, in part, existing facilities, even in an evolving technology environment, since it is based on the latest growth technology.

211. With respect to Bell Canada's claim that the cable carriers are also using the explicit costing approach, the cable carriers submitted that they followed the ILECs' Phase II costing principles. The Commission considers that the cable carriers' proposed costing approach appropriately recognizes that network elements are shared among different services and accounts for existing facilities.

212. In light of the above, the Commission is of the view that the proposed approach does not conform to the incremental costing approach. As a result, the Commission considers that capacity costing remains the appropriate approach to be used.

Attribution factors to be applied to DSLAM equipment, umbilical fibre, and Ethernet port costs

213. For network facilities that are shared by multiple services, an attribution factor can be used to allocate the associated costs to these services.

Positions of parties

214. The ILECs submitted that 100% of their DSLAM equipment, umbilical fibre, and Ethernet port costs are attributable to retail Internet and wholesale HSA services on the basis that these services are the sole drivers of these facilities. In this regard, Bell Canada submitted that no costs associated with these facilities should be attributed to current and future narrowband-based services such as IP voice and Internet of Things (IoT), because they are not drivers of the access costs and do not require broadband capability.

215. In response to requests for information, the ILECs, with the exception of SaskTel, provided attribution factors based on a calculation of an all-carrier subscriber count[24] for IP-based services (service-based attribution factors).[25]

216. Bell Canada, Bell MTS, and TCI submitted that the service-based attribution approach counts the number of services being sold over the access by the ILECs, and ignores the number of services being sold by the competitor, thus providing competitors an advantage over the ILECs. They further submitted that there is no causal link between services and the costs associated with the network. Rather, network costs are incurred as a result of provisioning an access, and not as a result of the services that will use it.

217. Therefore, Bell Canada and Bell MTS provided alternative attribution factors based on a calculation of Internet access counts,[26] while SaskTel provided an alternative attribution factor based on a calculation of DSLAM port counts.[27]

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[24] This count included retail plus wholesale subscriber counts.

[25] The service-based attribution factors were calculated based on a six-year (2017 to 2022) forecasted average of the percent of Internet service subscriber counts over the total number of all IP-based service (Internet, IPTV, and other) subscriber counts, expressed as a percentage.

[26] These factors were calculated based on a six-year (2017 to 2022) forecasted average of the standalone Internet service subscriber counts (in increments of 1.0) plus shared Internet service subscriber counts (in increments of 0.5) over the total number of all standalone Internet service subscriber counts (in increments of 1.0) plus shared Internet service subscriber counts (in increments of 1.0), expressed as a percentage. “Standalone” includes the average number of subscribers to retail Internet service only, to retail Internet service with voice service, and to wholesale Internet service. “Shared” includes subscribers to Internet service with IPTV service, and to Internet service with IPTV and voice services.

[27] This was calculated based on a six-year (2017 to 2022) forecasted average of end-user Internet port terminations over the total number of end-user Internet plus IPTV plus other service port terminations, expressed as a percentage.

218. With respect to the attribution factor it provided in response to a request for information, TCI submitted that DSLAM facility costs should not be attributed to other services. If the Commission were to apply a service-based attribution factor, it should be applied only to the costs associated with umbilical fibre and Ethernet ports.

219. To the extent that the Commission decides to apply an attribution factor to DSLAM equipment costs, TCI submitted that these costs should be apportioned based on port usage per end-user: one DSLAM port for single-line service configurations, and two DSLAM ports for bonded service configurations.

220. SaskTel did not provide an attribution factor based on a count of service subscribers in its reply to a request for information. It submitted that it would be incorrect to interpret "subscribers" as "customers," because (i) multiple services may be provided over one access line, (ii) multiple services may require the use of multiple accesses, or (iii) multiple accesses may be used to provide one service. Therefore, instead of calculating the requested attribution factor based on the count of services, SaskTel completed the analysis based on the number of ports on the equipment used for each requested service.

221. CNOC submitted that the service-based attribution factor is appropriate, because it follows the all-carriers approach, which is meant to ensure competitive equity between competitors and ILECs. It also submitted that Bell Canada's and Bell MTS's alternative attribution factor approach, and Bell Canada's proposal to exclude voice and other narrowband services from the service-based attribution factor calculation, ignores the impact of the demand of other incumbent IP services that use the same access network, and suffers from competitive inequity. CNOC further submitted that TCI's proposed rates, before and after the application of the attribution factor to the costs for the equipment under consideration, were not materially different from each other, and that SaskTel failed to provide all of the information requested in its response to the request for information.

222. In light of the above, CNOC requested that the Commission direct the ILECs to apply service-based attribution factors and draw whatever inference is necessary with respect to SaskTel and TCI in order to come to a determination, despite the missing information in SaskTel's case.

Commission's analysis and determinations

223. With respect to the ILECs' proposals that 100% of the costs associated with DSLAM equipment, umbilical fibre, and Ethernet ports be attributed to retail Internet and wholesale HSA services on the basis that these services are the sole driver of these facilities, the record of this proceeding demonstrates that IPTV, voice, and other services make use of these facilities. Accordingly, it is unreasonable to attribute 100% of these facilities' costs to retail Internet and wholesale HSA services.

224. The Commission considers that when the ILECs make investment decisions and/or set retail prices for the services that use these access facilities, they do not attribute

100% of the shared facility costs to Internet service when assessing service profitability. It would be reasonable to assume that a portion of the shared facility costs would be attributed to each of the services that use the shared facilities. Accordingly, the Commission considers that it is appropriate to apply an attribution factor to the ILECs' relevant DSLAM equipment, umbilical fibre, and Ethernet port costs.

225. With respect to Bell Canada's, Bell MTS's, and TCI's position that the number of services being sold by the competitors is not included in the service-based attribution factor calculation, thus providing competitors with an advantage over incumbents, the Commission notes that the objective of the service-based attribution factor is to attribute the facilities' costs across the number of each ILEC's IP-based services that use these facilities. In this case, the IP-based services using these facilities are Internet, wholesale HSA, IPTV, voice, and other services. The ILECs recover the wholesale HSA costs from the competitors, and this recovery does not depend on the number of services offered by the competitors. Accordingly, it is not appropriate to account for the number of services offered by the competitors in the service-based attribution factor calculation. If the number of services offered by the competitors are accounted for as proposed by the ILECs, it would distort the attribution of costs among the IP-based services offered by the ILECs.

226. With regard to the question of which attribution method is to be applied, the Commission considers that the alternative attribution approaches proposed by Bell Canada, Bell MTS, and SaskTel present a number of issues. For example, they recognize only a limited subset of revenue-producing units of current and future IP-based services (i.e. retail Internet, wholesale HSA, and IPTV services) and thus ignore other services that generate revenue from investments in these facilities.

227. Further, they rely extensively on a complex dataset of internal company data (e.g. counts of customers who subscribe to one service or a combination of prescribed services within the ILEC, Internet service provider [ISP], or ILEC/ISP combined, or counts of DSLAM port terminations). The difficulty in validating the resulting attribution factor calculation is further compounded when assumptions are incorporated with the purpose of developing forecasts.

228. In addition, the underlying parameters used for the attribution factor calculation cannot be properly assessed or validated for reasonableness, since no historical trending information or comparable industry-wide data exists.

229. In contrast, the Commission considers that the service-based attribution approach has several benefits. In particular, it takes into consideration the full extent of the current base of revenue-producing IP-based services that fall within the study period.

230. In addition, the validation of the underlying parameters (IP-based service subscriptions) used in the calculation of the service-based attribution factor can be performed using readily available historical information and comparable industry-wide metrics to assess trends and validate for reasonableness.

231. Finally, this approach lends itself to the inclusion of future revenue-producing IP-based services in the reassessment of the attribution factor in subsequent study periods.

232. In light of the above, the Commission determines that the service-based attribution factor submitted by each company is to be applied to DSLAM equipment, umbilical fibre, and Ethernet port costs to recognize that other services besides retail Internet and wholesale HSA services can be expected to benefit from these investments.[28]

233. With respect to SaskTel, the Commission is of the view that, in the absence of company-specific information, the attribution factor to be applied to the company's relevant costs is to be based on the average of the other ILECs' service-based attribution factors.

Bell Canada's productivity enhancements costs

234. Productivity enhancement costs are associated with initiatives that are introduced to reduce the costs of operations.

Positions of parties

235. Bell Canada submitted that it included costs related to productivity-enhancing projects that serve to benefit the provision of both retail and wholesale services. The company argued that these projects were undertaken to enhance network standardization and to introduce new technology, with the aims of improving the quality of experience for customers and of reducing the unit costs in order to achieve the annual capital unit cost change assumption of minus 26.4% set by the Commission in Telecom Decision 2016-117. Bell Canada assigned the productivity-enhancing costs to retail and wholesale services according to their respective share of total demand.

236. Bell Canada further submitted that these costs are not fixed; rather, they are causally related to growth of the network as a whole. The company submitted that, consistent with Phase II costing principles, these costs should be apportioned as proposed.

237. CNOC submitted that Bell Canada's projects are described as being of benefit to all services and the entire network, with associated costs attributed to wholesale and retail Internet based on the allocation of relative traffic across services. CNOC submitted that this proposal is consistent with the fully distributed costing approach instead of the prospective incremental costing approach that is mandated in the Manual. CNOC further submitted that these project costs are more likely fixed and common costs that should be recovered through the Commission-approved markup.

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[28] For Bell Canada, the company's submitted service-based attribution factor, which excludes the voice service subscribers, is to be applied in order to recognize that these services are not provisioned over the FTTN access network.

Commission's analysis and determinations

238. For productivity improvement costs to be recovered through a tariffed rate, a company must demonstrate that these costs have resulted in savings that are at least equal to the costs being claimed. Bell Canada did not provide any quantifiable benefits for its productivity improvement costs.

239. In light of the above, the Commission considers that the inclusion of costs associated with productivity-enhancing projects, without the inclusion of the associated cost benefits, is not reasonable. Therefore, the Commission has excluded the costs associated with productivity enhancements from Bell Canada's cost study.

240. In addition, the Commission notes that the annual equipment unit cost reduction factor referenced by Bell Canada was applied to traffic-driven equipment in recognition of the fact that, due to technological advancements, equipment suppliers are able to meet rising demands from traffic growth by increasing equipment capacity at a lower cost per unit. In other words, this cost factor recognizes cost savings realized at the manufacturing level and is not related to the productivity enhancements undertaken by Bell Canada.

Umbilical fibre costs: Access versus usage

241. An umbilical fibre connects the FTTN DSLAM to the Ethernet switch in the serving CO over fibre links.

Positions of parties

242. Bell Canada submitted that costs for FTTN umbilical fibre should be treated as traffic driven rather than access driven. The company indicated that there may be a need for an additional umbilical fibre if the peak-hour traffic at a given DSLAM exceeds the capacity of its associated umbilical fibre. Therefore, the costs associated with the umbilical fibre should be recovered through the CBB usage rate component.

243. In response to a request for information, Bell Canada provided the forecasted annual average peak-hour traffic per end-user and per DSLAM over the cost study period for its DSLAM configurations.

244. Bell Canada submitted, however, that the average peak-hour traffic provided a misleading assessment regarding the need to add more umbilical fibres. In particular, the number is an average of traffic during a selected monthly peak hour. During the peak hour, traffic will vary and there will be traffic peaks higher than the hourly average. In addition, the number is a network-wide average. Traffic patterns will vary across the network and across DSLAMs, depending on the services and speeds in use. As a result, the peak-hour traffic at individual DSLAMs will be higher or lower than the average peak-hour traffic.

245. Bell Canada further submitted that it plans the relief of DSLAM umbilical fibres when they start to reach a utilization threshold of 75% for brief instances during the

peak hour, not when the average utilization over the peak hour period reaches a 75% threshold. Bell Canada noted that as subscribers migrate to higher speeds on its FTTN network, the company is seeing more instances of peak-hour traffic reaching the above-mentioned 75% utilization threshold, thereby causing the advancement of the installation of additional umbilical fibres.

246. Bell Canada initially submitted that although the capacity of fibre can usually be augmented by changing the electronics at either end of the fibre, the DSLAM configurations that are currently available support a maximum of 1 gigabit per second (Gbps) on umbilical fibre, and there has been little movement by suppliers to enhance equipment electronics to provide FTTN umbilical fibre capacities greater than 1 Gbps.

247. CNOC submitted that the addition of umbilical fibres to select DSLAMs in Bell Canada's access network is not compelling evidence that umbilical fibre is traffic driven. CNOC therefore submitted that Bell Canada's proposal to treat umbilical fibre as traffic driven should be rejected.

248. CNOC added that it would think that equipment suppliers would make higher capacities available for umbilical fibre as the Internet market evolves in terms of increased traffic throughput requirements. CNOC submitted that Bell Canada provided no evidence to substantiate its statement that suppliers were not evolving umbilical fibre electronics to support higher capacities.

249. In its final comments, Bell Canada conceded that DSLAM suppliers will support higher-capacity interfaces, if they are not already doing so. However, for a very large number of DSLAMs in the company's network, the only option is to add 1 Gbps umbilical fibres to support traffic growth. These DSLAMs support 192 subscribers and are the company's growth technology for the period covered by the cost study.

Commission's analysis and determinations

250. Bell Canada's response to the request for information regarding the forecasted annual average peak-hour traffic per end-user and per DSLAM over the study period demonstrates that the DSLAM umbilical fibre will have enough capacity to cover this traffic to the end of the study period. For Bell Canada's growth technology DSLAM that supports 192 end-users, the average peak utilization of the umbilical fibre is significantly lower than the 75% peak utilization in the busy hour that Bell Canada stated it uses to initiate planning for the addition of another umbilical fibre on a DSLAM. Given the forecasted utilization levels, which reflect, among other things, continued and increased migration of end-users from FTTN to fibre-to-the-premises (FTTP), the Commission considers it likely that there will be few DSLAMs that will require additional umbilical fibres.

251. Although there may be an increase in the number of umbilical fibres on specific FTTN DSLAMs at several locations, Bell Canada did not demonstrate that this would be a network-wide requirement. The company did not provide any data for DSLAM locations that may have higher average peak-hour traffic than the overall

average peak-hour traffic, or any data for locations where traffic peaks within the busy hour, requiring the company to add umbilical fibres. Further, the Commission notes that, in its cost study, Bell Canada did not include additional umbilical fibres on its DSLAMs.

252. In light of the above, the Commission finds that Bell Canada did not demonstrate that, in order to respond to increased traffic demands, it will need to provision a material amount of additional umbilical fibre, if any. Accordingly, the Commission considers that it would be appropriate to treat umbilical fibre as an access-driven component and to recover the associated costs under the FTTN monthly access rate.

Bell Canada's FTTN bonded access installation rate

253. The FTTN bonded access installation rate covers the work required to connect an end-user to the competitor's network.

Positions of parties

254. Bell Canada proposed a number of major activities whose costs are to be included in the estimate of the FTTN bonded access installation rate. Included in these activities were POTS splitter[29] installation and Control Centre activities.

255. Bell Canada proposed to move the costs for installing the POTS splitter from the monthly access rate to the installation charge based on the fact that it is a one-time capital injection at the time of installation and, therefore, is a one-time occurrence.

Commission's analysis and determinations

256. The Commission considers that the POTS splitter provides a useful function over the life of FTTN access service for all speeds. Accordingly, it is not reasonable to include the POTS splitter costs in the one-time installation rate.

257. For travel time and Control Centre activities, Bell Canada proposed an occurrence rate that is not consistent with the Commission's previous determination in Telecom Regulatory Policy 2011-703. Since Bell Canada did not provide any evidence or justification for its proposed deviation from the Commission's previous determination, the Commission has reduced the occurrence rate by 80%, in accordance with the determination set out in Telecom Regulatory Policy 2011-703.

Bell Canada's project development costs for aggregated FTTN access rates

258. Bell Canada proposed project development costs to support the introduction of its mandated disaggregated wholesale HSA service (addressed in a separate proceeding). Bell Canada proposed to recover these costs through its FTTN access rates, FTTP access rate, disaggregated CBB rate, disaggregated service charges, and

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[29] The POTS [plain old telephone service] splitter is a device used to prevent interference by filtering the low frequencies of the telephone line from the high-frequency DSL line.

Disaggregated Meet-Me-Point (DMMP) charges. Although this matter was introduced as part of the separate proceeding, Bell Canada further proposed to use the same FTTN access rates for both its aggregated and disaggregated wholesale HSA services.

259. The Commission agrees that common FTTN access rates should be applied to both the company's aggregated and disaggregated wholesale HSA services. Given this, and the fact that a decision disposing of Bell Canada's disaggregated wholesale HSA service tariff has not yet been issued, the Commission considers it appropriate to address the company's above-noted project development costs in the present order.

Positions of parties

260. Bell Canada submitted that the relevant project development activities aim to update the current systems supporting its aggregated wholesale HSA service to facilitate the introduction of disaggregated wholesale HSA service.[30] The company submitted that this updating has resulted in a substantial increase in the level of complexity of its information system/information technology (IS/IT) infrastructure due to unique and significant differences between the disaggregated and aggregated wholesale HSA services, and has resulted in many changes.[31]

261. Bell Canada proposed to generally assign the associated project development costs to the specific rate elements that are affected by the project. Bell Canada submitted that in certain instances, it was proposing to allocate a portion of relevant costs to other rate elements (i.e. elements not directly impacted by the project), where failure to do so would result in a high rate for a given rate element. In other instances, Bell Canada proposed that costs for project development activities relevant to multiple rate elements be allocated to the disaggregated CBB rate, the FTTN access rates, and the FTTP access rate rather than to the company's proposed service charges. As mentioned above, with a view to establishing common FTTN access rates, the company proposed to allocate a portion of these costs to its aggregated FTTN access rates.

262. CNOC submitted that Bell Canada's description of the project development activities associated with inventory management, operations support readiness, testing and standardization in the lab, and enhancements of performance management and other systems suggest that these activities are beneficial to other services in addition to disaggregated wholesale HSA service.

263. CNOC noted that in Telecom Regulatory Policy 2011-703, the Commission determined that certain start-up costs related to FTTN development were neither

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[30] The proposed project costs relate to the development of service functionalities and associated labour and supplier/contractor costs.

[31] Bell Canada submitted that across all IS/IT domains, it was required to build, implement, and test specific additions, modifications to its qualification order fulfillment, service assurance, billing and reporting systems, and processes to ensure that all disaggregated wholesale HSA services could be processed, qualified, ordered and provisioned, maintained, billed, and reported on as required.

prospective nor incurred as a result of the introduction of aggregated wholesale HSA service, and were therefore removed from the cost study for aggregated FTTN. CNOC submitted that, for the same reasons, Bell Canada's claimed hardware and software costs should be removed from the disaggregated CBB cost study and should instead be recovered through the markup associated with the recovery of fixed and common costs.

264. CNOC further submitted that to the extent that any claimed capital expenditures associated with project development activities are removed from Bell Canada's cost study, any related maintenance and service provisioning expenses should also be removed.

265. CNOC did not specifically address Bell Canada's proposal to allocate a portion of its project development costs to its aggregated wholesale HSA FTTN access rates.

Commission's analysis and determinations

266. A majority of the initiatives and systems to be implemented for project development are associated with order fulfillment, billing, and reporting. The Commission considers that it would be more appropriate to recover the related costs on a per-access basis. Accordingly, the Commission determines that the project development costs should be recovered through the company's disaggregated and aggregated FTTN monthly access rates and through its disaggregated FTTP monthly access rate.

267. Bell Canada proposed project development costs for disaggregated wholesale HSA service that are significantly higher than those that were allowed for the company's aggregated wholesale HSA service when the Commission originally set those rates in Telecom Regulatory Policy 2011-703. Further, a significant portion of the total project development costs claimed by Bell Canada relate to contractor and supplier activities. The Commission considers, however, that the company has provided insufficient detail to justify the relevant costs claimed.

268. The Commission considers that, given that the service functionalities at issue leverage and update the company's existing systems that support its aggregated wholesale HSA service, the proposed total costs are unreasonable.

269. The Commission is of the view that the project development costs for these additions and modifications should be lower than the costs for the underlying systems that are being augmented. The Commission considers that it would be reasonable to retain project development costs for the additional capabilities for Bell Canada's disaggregated wholesale HSA service in an amount equal to 50% of the project development costs allowed by the Commission when it first approved the rates for aggregated wholesale HSA service in Telecom Regulatory Policy 2011-703.

270. The FTTN access rates approved for Bell Canada's bonded and non-bonded aggregated wholesale HSA services reflect these determinations.

TCI's financial parameters

271. TCI proposed financial parameters (cost of equity and debt ratio) that are different from those approved by the Commission.

272. The proposed changes to the financial parameters were not supported by evidence and are not consistent with the company's currently approved parameters. Consequently, the Commission determines that the approved financial parameters are to be used in TCI's cost study to establish rates for aggregated wholesale HSA services in this proceeding.

273. However, the Commission has identified certain wholesale service rate-setting elements whose treatment would benefit from further review, including debt and equity ratios and other cost inputs that generally affect wholesale service rates. The Commission plans to initiate a proceeding to examine whether changes need to be made to the Commission's approach to these elements on a going-forward basis.

SaskTel's VDSL Access service charge

274. SaskTel proposed a service charge per end-user for its VDSL Access 25 Mbps service. SaskTel proposed six major activities whose costs are to be included in the estimate of its VDSL Access service charge.

275. The Commission considers that SaskTel's proposal is reasonable, with the exceptions described below.

276. First, SaskTel proposed to include line conditioning costs in its service charge. The Commission determined in Telecom Regulatory Policy 2011-703 that the line conditioning costs are causal to the monthly access charge.

277. Second, SaskTel proposed to include in its service charge the costs for (i) installing the customer jack, (ii) installing the inline filter, and (iii) testing the line. With respect to the customer jack and inline filter costs, the Commission notes that SaskTel's Competitor Access Tariff (item 650.34, sub-item 3.2.9 – Conditions of Service) stipulates that the end-user or competitor is responsible for the provision and installation of any customer premise equipment, filters, splitters, and inside wiring. Therefore, the costs for the customer jack and the inline filter installation should be removed. As for testing the line, this activity can be performed within the included activity of line provisioning and jumper work; therefore, it should also be removed.

278. Finally, SaskTel proposed an occurrence rate of 100% for jumper wire work, line provisioning, and programming the DSLAM. The Commission considers that the occurrence rate for jumper wire work and line provisioning should take into account that some retail locations will already have been set up.

279. In light of the above, the Commission has moved the line conditioning costs from the company's service charge to its monthly access rate and has removed the costs

associated with the customer jack and inline filter installation, and with the testing of the line. The Commission has also reduced the occurrence rate by 40%, in accordance with the determination set out in Telecom Regulatory Policy 2011-703.

SaskTel's VDSL interface monthly charge

280. The interface service provides a POI between the competitor and the ILEC. SaskTel proposed to recover specified product management costs through the rate for this service.

281. The Commission considers that the forecast level of service demand does not justify the proposed product management activities and claimed associated costs. Accordingly, the Commission has removed SaskTel's claimed product management costs.

SaskTel's other charges

282. SaskTel proposed rates for the VDSL interface service charge (1000 Mbps), virtual local area network remapping charge per VDSL access, and diagnostic maintenance charge per hour.

283. The Commission considers that the proposed rates are reasonable and therefore approves them.

Other issues

Markup

284. When the Commission establishes a rate for a wholesale service, it typically adds a percentage markup to the service's costs, with the result that the service's rate equals its costs plus the amount of markup. The markup contributes to the recovery of the company's fixed and common costs, such as corporate overhead expenses. Markups have varied over time depending on a number of factors, including whether the wholesale service is essential and whether there may be additional risk to network investment if the wholesale service is mandated.

285. In Telecom Regulatory Policy 2010-632, with respect to ILECs' FTTN investments, the Commission considered that the investment risk associated with the construction of FTTN facilities is greater than the risk associated with the construction of other ILEC facilities. Accordingly, the Commission determined that it would be appropriate for the ILECs to use a higher cost of capital, which would be comparable to the hurdle rate that Bell Canada used in its internal FTTN investment studies, to reflect the additional risk. However, the Commission noted that determining a revised cost of capital would involve a review of each ILEC's capital structure (e.g. the cost of equity and cost of debt), and that for tariff purposes, the simplest approach for recognizing the higher cost of capital would be to apply a supplementary markup of 10% to the costs in addition to the base markup of 30%.

286. In Telecom Regulatory Policy 2011-703, the Commission noted that, in setting rates, it balances the need to ensure that network providers are reasonably compensated for their costs with the need to ensure that markups are not so high as to significantly impede competitors from providing competitive alternatives in the marketplace.

Positions of parties

287. SaskTel submitted that the speed-matching requirement[32] continues to add risk to any fibre deployments made by the ILECs. The risk of losing customers to competitors means the risk of losing retail revenues.

288. Bell Canada and SaskTel submitted that eliminating the supplementary markup for aggregated FTTN services would be contrary to the Commission's determination in Telecom Regulatory Policy 2015-326. They added that reducing the rates for aggregated FTTN services would discourage the migration from those services to next-generation technologies, to the detriment of investment in those technologies.

289. Bell Canada added that the rollout of retail and wholesale FTTN services was predicated on the rates approved by the Commission in Telecom Regulatory Policy 2010-632. Investments in plant and equipment were based on a 10-year period, and the terms and conditions approved by the Commission to be in effect during that period. In granting the supplementary 10% markup on the wholesale use of Bell Canada's FTTN plant and facilities, the Commission noted that the cost of capital used in the company's cost studies for aggregated FTTN services was significantly lower than the cost of capital used by the cable carriers in their cost studies. The supplementary markup of 10% applied to Bell Canada's services was also intended to equalize these costs of capital.

290. Bell Canada submitted that, given that (i) the above considerations apply to both the transport and the access components, and (ii) these components are tightly integrated, the supplementary markup of 10% should continue to apply to both the transport and the access components.

291. Further, Bell Canada submitted that if the Commission is concerned about consistency between any changes it mandates to disaggregated wholesale HSA service rates, which the Commission is also considering, and the company's FTTN rates, it can find that FTTN is a legacy service and freeze FTTN rates as it did for non-FTTN DSL services in Telecom Regulatory Policy 2015-326.

292. TCI argued that if FTTN access rates are set too low, it will cause competitors to rely on FTTN services rather than migrating to FTTP services. Accordingly, TCI submitted that it was appropriate to maintain the 10% supplementary markup.

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[32] The speed-matching requirement was set out in Telecom Regulatory Policy 2010-632 and requires an incumbent to provide wholesale services at the same speeds that it is offering to its retail end-users.

293. TCI added that revoking the supplementary markup while the service remains mandated by the Commission would raise significant concern and signal greater investment risk to the industry due to an unstable regulatory environment.

294. Further, TCI submitted that due to its flat-rate model for its aggregated wholesale HSA service, which covers both the access and usage components of the service within a single monthly rate, the supplementary markup should continue to apply to the entirety of the service.

295. Cogeco submitted that the supplementary markup of 10% for the ILECs' FTTN facilities is no longer appropriate and that the current asymmetrical treatment between ILECs and cable carriers should cease immediately.

296. Eastlink and Videotron submitted that the deployment of fibre into the cable carriers' and ILECs' access networks has been a widespread phenomenon for many years. Both the cable carriers and ILECs continue to invest heavily in their facilities, and the ILECs' FTTN networks are no more "next-generation" than cable networks. Eastlink and Videotron argued that there is therefore no justification for preferential regulatory treatment of the ILECs' FTTN networks.

297. Videotron added that instead, the Commission should be guided by the concept of technological neutrality, as required by paragraph 1(c)(ii) of the Policy Direction, and should attribute to cable carriers the same supplementary markup that applies to the ILECs' FTTN networks.

298. Eastlink added that the continued provision of the 10% supplementary markup to the ILECs will enable them to recoup a greater share of their investment relative to what Eastlink can recover.

299. Shaw submitted that the circumstances that the Commission relied on in deciding to provide the supplementary markup of 10% have not materially changed, and that the level of risk remains the same for both the ILECs and the cable carriers.

300. Shaw requested that in setting rates for wholesale wireline services, the Commission should apply the 10% supplementary markup to all FTTN services so that carriers are equally incented to continue to invest in new technologies and fibre facilities.

301. RCCI maintained the arguments it had previously made[33] in support of the proposition that the supplementary markup for ILECs be applied to the cable carriers to provide equal competitive footing. In that regard, the company submitted that the supplementary 10% markup currently applied to ILECs should also be applied to its FTTN facilities.

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[33] See paragraphs 47 to 57 of RCCI's Part 1 application, dated 10 February 2012, regarding billing practices for wholesale residential HSA services.

302. CNOC submitted that it is important for the Commission not to allow ILECs and cable carriers to apply excessive markups to their costs for the purpose of setting wholesale HSA service rates.

303. CNOC further submitted that Eastlink and RCCI did not provide any evidence to support their requests for a supplementary markup of 10%.

304. CNOC also submitted that the conclusion that a supplementary markup of 10% is appropriate to distinguish between the additional risks associated with home fibre builds over non-FTTP facilities is unfounded.

305. CNOC added that if the Commission nevertheless determines that the supplementary markup associated with FTTN-based HSA services should continue, this markup should not apply to cable carrier FTTN-based HSA services for the reasons provided by the Commission in Telecom Regulatory Policy 2010-632.

Commission's analysis and determinations

306. In Telecom Regulatory Policy 2010-632, the Commission recognized that significant upfront investment was required to construct the facilities that ILECs use to provision new higher-speed wholesale service options over fibre facilities (i.e. FTTN facilities). Therefore, the rates for these service options include, in addition to the markup on costs that would otherwise be used, a supplementary markup of 10%.

307. The Commission considers that the ILECs' focus has shifted from expanding their FTTN networks to growing their FTTP footprints as much as possible, given the important benefits associated with higher speeds and long-term service reliability. In this regard, the Commission notes that the ILECs' volume of new FTTN builds has become minimal and is dropping significantly each year, particularly when compared to new FTTP builds.

308. In light of this, the Commission considers that the rationale set out in Telecom Regulatory Policy 2010-632, in which the Commission considered that the investment risk associated with the construction of FTTN facilities is greater than the risk associated with other ILEC facilities, is no longer supported. Consequently, the Commission considers that the 10% supplementary markup that has applied to both the access and the transport components of aggregated wholesale HSA services should not be maintained.

309. With respect to the impact of changing the wholesale HSA service rates for FTTN during the 10-year period upon recovery of the upfront investment made, the Commission considers that the ILECs have had sufficient time to realize a reasonable return on FTTN investments, given that the 10% supplementary markup has been applied to both the access and transport components of the ILECs' wholesale HSA services since 2011.

310. With respect to Bell Canada's proposal to freeze the company's FTTN rates, the Commission considers that the ILECs continue to have a significant number of customers using FTTN facilities, and that FTTN is still being deployed. Therefore, freezing the rates at this time would be premature.

311. With respect to TCI's argument that removal of the additional markup will cause competitors to rely on FTTN services rather than migrate to FTTP services, the Commission considers that competitors will likely migrate to FTTP services given the benefits associated with those services' higher speeds and long-term reliability.

312. With respect to the cable carriers' cost studies, the Commission considers that the conditions faced by these companies in relation to the provision of their aggregated wholesale HSA services have not changed. Therefore, the rates for these services should continue to be based on a 30% markup.

313. In light of the above, the Commission finds that the supplementary markup included in the rates for the ILECs' aggregated wholesale HSA services is no longer appropriate. The Commission therefore approves a 30% markup for the wholesale HSA service providers' aggregated wholesale HSA services.

Effective date of the final aggregated wholesale HSA service rates

Positions of parties

314. CNOC proposed that the Commission retroactively apply the final rates resulting from this proceeding to the date each of the affected rates was first approved on an interim basis. It argued that this proposal strikes an appropriate balance between an approach to retroactivity that ensures that rates are always just and reasonable and one that does so in a manner that is not unduly complex to administer. Distributel supported CNOC's proposal.

315. Bell Canada argued that there should be no retroactive adjustments, regardless of whether the final FTTN service rates are higher or lower than the interim rates for aggregated wholesale HSA services.

316. Bell Canada submitted that the rates will have been interim for approximately two years by the time the Commission issues a decision on the final rates, and that during that time, industry participants were making investment and marketing decisions based on the interim rates and their individual expectations of how rates may evolve over time.

317. Bell Canada further submitted that competitors, in contrast, experienced a significant drop in input costs, which not only improved their ability to sell retail services, but also appeared to substantially dampen their interest in disaggregated wholesale HSA services.

318. Bell Canada added that the Commission's ability to make retroactive adjustments to interim rates can be exercised only to ensure that rates are just and reasonable, and

that it cannot be used as a wealth transfer tool to redress perceived market imbalances or to calibrate competitive dynamics.

319. TCI submitted that given the extended length of the interim rate period, and in the interest of market stability, the Commission should ratify the historic interim rates for the interim rate period. As a result, the final rates should only be made effective as of the date of the final rates decision.

320. TCI added that, in the event the Commission decides that some retroactive application of final rates is required, such an application should not extend prior to 31 March 2016, the date on which Telecom Decision 2016-117 was issued, since this marked the point at which certain costing approaches were changed and the previous final rates were converted to interim.

321. TCI also submitted that if the Commission approves the retroactive application of the final rates, no retroactivity should apply to the company's grandfathered services, such as its 100 Mbps service for residential customers.

322. Cogeco submitted that the Commission should avoid applying rates on a retroactive basis, considering the unreasonably long interim rate period and the consequent detrimental effects. However, should the Commission decide to do so, the final rates should apply as of the date of issuance of Telecom Order 2016-396, in which the Commission issued its preliminary determinations on the proposed rates (i.e. 16 October 2016). Cogeco submitted that the rates set out in that order were supported by prospective cost studies filed in accordance with the new costing principles adopted in Telecom Decision 2016-117.

323. RCCI argued against applying the final rates on a retroactive basis. In its view, altering the rates retroactively, midway through the study period, undermines not only its cost model but all industry activity during the study period, and is inappropriate. This is because the company's capital investment levels were based on its existing cost model and rates.

324. RCCI submitted that rates cannot be applied on a retroactive basis prior to 2016, since the cost studies filed by the company at that time do not reflect the technologies and costs of service that were in existence from December 2012 to April 2016. RCCI submitted that if the rates are applied retroactively, the new rates should apply only as of the start date of the filed cost studies, specifically, 1 April 2016.

325. Shaw submitted that in Telecom Order 2016-396, the Commission approved the transition of the company's aggregated wholesale HSA service offerings from the flat-rate billing model to the CBB model, enabling Shaw to complete the transition within 45 to 90 days of the date of that order. Shaw completed this transition on 1 January 2017, and, on that date, began charging its third-party Internet access (TPIA) customers using the interim approved CBB rates.

326. Shaw noted that while its monthly flat-rate-billing rates were made interim on 31 March 2016 in Telecom Decision 2016-117, its final TPIA rates could only reasonably be applied back to 1 January 2017, since it is impossible for Shaw or the Commission to determine what rates would be applicable for the time period between 31 March 2016 and 1 January 2017.

Commission's analysis and determinations

327. In Telecom Decision 2016-117, the Commission adopted a simplified cost-based approach to setting wholesale HSA service rates and made determinations that affected certain components of the cost studies used in setting those rates. In recognition of these changes, the Commission (i) directed the wholesale HSA service providers to file revised cost studies for their wholesale HSA services that incorporated these changes, and (ii) made interim, as of the date of that decision, all wholesale HSA service rates that had previously been approved on a final basis.

328. In addition, the Commission stated, in both Telecom Decision 2016-117 and Telecom Order 2016-396, that it would assess the extent to which, if at all, retroactive rates would apply when it set wholesale HSA service rates on a final basis.

329. The Commission considers that to the extent that the interim rates for aggregated wholesale HSA services were based on inappropriate costs and assumptions, those rates are not just and reasonable. Consequently, retroactive application of the final rates is necessary to ensure that wholesale HSA service providers use just and reasonable rates.

330. The Commission considers, however, that it would not be appropriate to apply rates for the aggregated wholesale HSA services resulting from this proceeding retroactively to a date that is earlier than those captured by the study periods that have informed this proceeding. This is due to the fact that the cost studies submitted in support of the proposed rates, and upon which the Commission is establishing tariffed rates, are based on assumptions that reflect the technologies, costs, and demand for the services over the study period.

331. In light of the above, the Commission determines that the final rates for aggregated wholesale HSA services should apply retroactively as of 31 March 2016 for Bell Canada, Bell MTS, Cogeco, Eastlink, SaskTel, TCI, and Videotron.

332. With respect to Shaw, given that the company undertook a transition from the flat-rate billing model to the CBB model, which was completed in January 2017, the Commission determines that it is reasonable for Shaw's final rates to apply retroactively as of 31 January 2017.

333. With respect to monthly access rates for speeds that have been destandardized/grandfathered, the Commission determines that the rates resulting from this order will be applied to those services in the same manner and for the same reasons as set out above.

Computation errors

334. In addition to the determinations and adjustments discussed above, the Commission has identified some incorrect inputs to cost models and computation errors that have been corrected and reflected in the final rates for wholesale aggregated HSA services. These errors and corrections are set out in Appendix 2 to this order.

Subsequent tariff applications

335. During the review process, the wholesale HSA service providers submitted a number of tariff notices (TNs) associated with their aggregated wholesale HSA services, which the Commission approved on interim basis. The Commission notes that the rates approved on a final basis in this order cover the service offerings at issue in those TNs. Accordingly, this order also disposes of the following TNs:

- Bell MTS TN 798;
- RCCI TNs 56, 56A, and 56B;
- Shaw TN 26B
- TCI TNs 539 and 539A;
- TCI TN 542; and
- Videotron TNs 55 and 55A.

Conclusion

336. In light of all the above, the Commission has adjusted the relevant proposed rates and **approves, on a final basis**, the wholesale HSA service providers' respective aggregated wholesale HSA service rates, as set out in Appendix 1 to this order.

337. A summary of the Commission's adjustments to each of these companies' cost elements is set out in Appendix 2 to this order.

338. The Commission **directs** Bell Canada, Bell MTS, Cogeco, Eastlink, RCCI, SaskTel, Shaw, TCI, and Videotron to issue, within **30 days** of the date of this order, revised tariffed pages for the provision of their respective aggregated wholesale HSA services that reflect the determinations set out in this order.[34]

Secretary General

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[34] Revised tariff pages can be submitted to the Commission without a description page or a request for approval; a tariff application is not required.

Related documents

- *Bragg Communications Incorporated, operating as Eastlink – Revised interim rates for aggregated wholesale high-speed access service*, Telecom Order CRTC 2016-448, 10 November 2016

- *Tariff notice applications concerning aggregated wholesale high-speed access services – Revised interim rates*, Telecom Order CRTC 2016-396, 6 October 2016

- *Review of costing inputs and the application process for wholesale high-speed access services*, Telecom Decision CRTC 2016-117, 31 March 2016

- *Review of wholesale wireline services and associated policies*, Telecom Regulatory Policy CRTC 2015-326, 22 July 2015; as amended by Telecom Regulatory Policy CRTC 2015-326-1, 9 October 2015

- *MTS Inc. – Revisions to Very High-Speed Digital Subscriber Line Data Access service*, Telecom Order CRTC 2014-390, 28 July 2014

- *Rogers Communications Partnership – Application to review and vary Telecom Regulatory Policy 2011-703*, Telecom Decision CRTC 2013-76, 21 February 2013

- *Canadian Network Operators Consortium Inc. – Application to review and vary Telecom Regulatory Policies 2011-703 and 2011-704*, Telecom Decision CRTC 2013-73, 21 February 2013

- *Billing practices for wholesale residential high-speed access services*, Telecom Regulatory Policy CRTC 2011-703, 15 November 2011; as amended by Telecom Regulatory Policy CRTC 2011-703-1, 22 December 2011

- *Wholesale high-speed access services proceeding*, Telecom Regulatory Policy CRTC 2010-632, 30 August 2010

- *Review of the use of company-specific working fill factors and the recovery of past introduction costs not fully recovered*, Telecom Regulatory Policy CRTC 2009-274, 14 May 2009

- *Regulatory Economic Studies Manuals – Follow-up proceeding to Telecom Decision 2008-14*, Telecom Order CRTC 2008-237, 25 August 2008

- *Cogeco, Rogers, Shaw, And Videotron – Third-party Internet access service rates*, Telecom Decision CRTC 2006-77, 21 December 2006

- *Competitor Digital Network Services*, Telecom Decision CRTC 2005-6, 3 February 2005; as amended by Telecom Decision CRTC 2005-6-1, 28 April 2006

- *Terms and rates approved for large cable carriers' higher speed access service*, Order CRTC 2000-789, 21 August 2000

- *Access rates for exempt programming undertakings*, Public Notice CRTC 1997-35, 2 April 1997

- *Inquiry into Telecommunications Carriers' Costing and Accounting Procedures Phase II: Information Requirements for New Service Tariff Filings*, Telecom Decision CRTC 79-16, 28 August 1979

Appendix 1 to Telecom Order CRTC 2019-288

CBB model – Final monthly capacity rate per 100 Mbps service

Company	Amount
RCCI	$224.32
Videotron	$227.05
Cogeco	$233.49
Shaw	$251.14
Eastlink	$212.10
Bell Canada	$102.48
Bell MTS	$57.81

Cable carriers: Final monthly access rate per end-user

RCCI

Speed band	Service speed	Amount
1	0-15 Mbps downstream / Up to 1 Mbps upstream	$13.44
2	16-30 Mbps downstream / Up to 5 Mbps upstream	
3	31-60 Mbps downstream / Up to 10 Mbps upstream	
4	61-100 Mbps downstream / Up to 10 Mbps upstream	
5	101-250 Mbps downstream / Up to 20 Mbps upstream	
6	251-500 Mbps downstream / Up to 20 Mbps upstream	
7	501-750 Mbps downstream / Up to 20 Mbps upstream	
8	751-1024 Mbps downstream / Up to 50 Mbps upstream	

Videotron

Speed band	Service speed	Amount
1	0-5 Mbps downstream / Up to 1 Mbps upstream	$14.30
2	6-10 Mbps downstream / Up to 1.5 Mbps upstream	
3	11-30 Mbps downstream / Up to 10 Mbps upstream	
4	31-60 Mbps downstream / Up to 10 Mbps upstream	

5	61-120 Mbps downstream / Up to 20 Mbps upstream	
6	121-200 Mbps downstream / Up to 20 Mbps upstream	
7	201-500 Mbps downstream / Up to 30 Mbps upstream	
8	501-1000 Mbps downstream / Up to 100 Mbps upstream	

Cogeco

Speed band	Service speed	Amount
1	1-6 Mbps downstream	$13.37
2	7-15 Mbps downstream	
3	16-40 Mbps downstream	
4	41-60 Mbps downstream	
5	61-120 Mbps downstream	
6	121-250 Mbps downstream	

Shaw

Speed band	Service speed	Amount
1	0-10 Mbps downstream / Up to 1 Mbps upstream	$11.47
2	11-29 Mbps downstream / Up to 5 Mbps upstream	
3	30-49 Mbps downstream / Up to 8 Mbps upstream	
4	50-99 Mbps downstream / Up to 10 Mbps upstream	
5	100-129 Mbps downstream / Up to 15 Mbps upstream	
6	130-250 Mbps downstream / Up to 20 Mbps upstream	
7	251-500 Mbps downstream / Up to 50 Mbps upstream	

Eastlink

Speed band	Service speed	Amount
1	0-5 Mbps downstream / Up to 1 Mbps upstream	$16.72
2	6-30 Mbps downstream / Up to 3 Mbps upstream	
3	31-50 Mbps downstream / Up to 5 Mbps upstream	
4	51-100 Mbps downstream / Up to 10 Mbps upstream	
5	101-150 Mbps downstream / Up to 10 Mbps upstream	
6	151-300 Mbps downstream / Up to 10 Mbps upstream	
7	301-400 Mbps downstream / Up to 10 Mbps upstream	
8	401-940 Mbps downstream / Up to 10 Mbps upstream	

ILECs: Final monthly access rate per end-user

Bell Canada

Service type	Service speed	Amount
Non-bonded	All	$14.78
Bonded	All	$23.22

Bell MTS

Service type	Service speed	Amount
VDAS 30 Mbps	VDAS 30 Mbps	$12.82
VDAS 50 Mbps	VDAS 50 Mbps	$16.22
VDAS 75 Mbps	VDAS 75 Mbps	$16.22
VDAS 100 Mbps	VDAS 100 Mbps	$16.22

Flat-rate model: Final banded access rates

TCI

Speed band	Service speed	Amount
15 Mbps	10-19 Mbps	$16.21
50 Mbps non-bonded	30-69 Mbps	$19.29
50 Mbps bonded	30-69 Mbps	$28.11
75 Mbps non-bonded	70-100 Mbps	$21.24
75 Mbps bonded	70-100 Mbps	$30.49
100 Mbps bonded	70-100 Mbps	$30.49
150 Mbps bonded	101-150 Mbps	$35.35

SaskTel

Service speed	Amount
VDSL 25 Mbps	$14.58

Final monthly interface rates

SaskTel

Monthly charge	Amount
VDSL Interface	$113.02

Final wholesale HSA service charges

Bell Canada

Service charge	Amount
FTTN bonded installation	$97.83

SaskTel

Service charge	Amount
VDSL access service charge	$147.57
VDSL Interface service charge (1000 Mbps)	$520.51

Diagnostic maintenance charge per hour	$117.88
Virtual local area network remapping charge per VDSL access	$58.08

Appendix 2 to Telecom Order CRTC 2019-288

Summary of the Commission's adjustments to RCCI's monthly capacity rate per 100 Mbps

Proposal	Commission adjustment	Rationale for adjustment
Proposed company-specific WFFs for node segmentation, CCAP, and router capital costs	Adjusted node segmentation and router capital costs to reflect appropriate WFFs	WFFs did not meet the five conditions in Telecom Regulatory Policy 2009-274 for company-specific WFFs
Proposed upstream forecasted usage growth rate	Adjusted upstream forecasted usage growth rate	Upstream forecasted usage growth rate was not substantiated by evidence
Proposed to include segmentation fibre costs in access portion of cost model	Adjusted segmentation fibre costs by including them in usage portion of cost model	Segmentation fibre is usage-sensitive
Proposed segmentation fibre costs as cost new	Calculated segmentation fibre costs based on cost factor method	Segmentation fibre costs should be calculated based on cost factor method
Proposed a cost factor of 7.5% for segmentation fibre facilities	Adjusted cost factor to 8.37%	Proposed cost factor included only labour portion of segmentation fibre capital expenditures
Proposed a 100% attribution factor for CCAP and optical nodes	Adjusted attribution factor for CCAP and optical nodes to 75%	Other services such as TV benefit from CCAP and optical node facilities
Proposed an annual capital unit cost change assumption of minus 9% for traffic-driven equipment	Applied the minus 26.4% annual capital unit cost change assumption	RCCI did not provide company-specific data supporting its proposed annual capital unit cost change assumption
Proposed inter-office fibre costs as cost new	Calculated inter-office fibre costs based on cost factor method	Inter-office fibre costs should be calculated based on cost factor method
Proposed redundancy for POI routers	Adjusted POI router costs by removing redundancy	Redundancy is not required for POI routers
Proposed non-usage-sensitive employee costs in usage portion of the cost model	Adjusted non-usage-sensitive employee costs by including them in access portion of cost model	Employee costs are non-usage-sensitive
Applied company's approach to calculate end of study terminal value and related capital cost allowance (CCA) tax shield	Adjusted calculation of end of study terminal value and related CCA tax shield	Errors were identified in proposed calculation

Summary of the Commission's adjustments to Videotron's monthly capacity rate per 100 Mbps

Proposal	Commission adjustment	Rationale for adjustment
Proposed company-specific WFFs for node segmentation, CCAP, and router capital costs	Adjusted node segmentation, CCAP, and router capital costs to reflect appropriate WFFs	WFFs did not meet the five conditions in Telecom Regulatory Policy 2009-274 for company-specific WFFs
Proposed to include segmentation fibre costs in access portion of cost model	Adjusted segmentation fibre costs by including them in usage portion of cost model	Segmentation fibre is usage-sensitive
Proposed segmentation fibre costs as cost new	Calculated segmentation fibre costs based on cost factor method	Segmentation fibre costs should be calculated based on cost factor method
Proposed a 100% attribution factor for CCAP and optical nodes	Adjusted attribution factor for CCAP and optical nodes to 75%	Other services such as TV benefit from CCAP and optical node facilities
Proposed an annual capital unit cost change assumption of minus 17% for traffic-driven equipment	Applied the minus 26.4% annual capital unit cost change assumption	Videotron did not provide company-specific data supporting its proposed annual capital unit cost change assumption
Proposed inter-office fibre costs as cost new	Calculated inter-office fibre costs based on the cost factor method	Inter-office fibre costs should be calculated based on the cost factor method
Proposed optical node unit cost based on 2015 data	Calculated the optical node unit cost based on 2016 data	Study period started in 2016
Proposed router costs based on the existing number of routers	Adjusted router costs using capacity costing	Shared facility costs are calculated based on capacity costing
Proposed to use economic life estimates for optical nodes and CCAPs	Adjusted life estimates to reflect accounting life estimates	Accounting life estimates should be used in regulatory economic studies
Proposed AT-WACC that excludes the tax impact	Adjusted AT-WACC to include tax impact	AT-WACC formula is clear that cost of capital should be after-tax
Proposed a CCAP unit cost by applying WFF twice	Adjusted CCAP unit cost by applying the WFF once	WFF should be applied once
Applied company's approach to calculate end of study terminal value and related CCA tax shield	Adjusted calculation of end of study terminal value and related CCA tax shield	Errors were identified in proposed calculation

Summary of the Commission's adjustments to Cogeco's monthly capacity rate per 100 Mbps

Proposal	Commission adjustment	Rationale for adjustment
Proposed company-specific WFFs for node segmentation, CCAP, and router capital costs	Adjusted node segmentation, CCAP, and router capital costs to reflect the appropriate WFFs	The WFFs did not meet the five conditions in Telecom Regulatory Policy 2009-274 for company-specific WFFs
Proposed upstream forecasted usage growth rate	Adjusted the upstream forecasted usage growth rate	Upstream forecasted usage growth rate was not substantiated by evidence
Proposed to include segmentation fibre costs in the access portion of the cost model	Adjusted segmentation fibre costs by including them in the usage portion of the cost model	Segmentation fibre is usage-sensitive
Proposed segmentation fibre costs as cost new	Calculated segmentation fibre costs based on the cost factor method	Segmentation fibre costs should be calculated based on the cost factor method
Proposed a 100% attribution factor for CCAP and optical nodes	Adjusted the attribution factor for CCAP and optical nodes to 75%	Other services such as TV benefit from CCAP and optical node facilities
Proposed an annual capital unit cost change assumption of minus 17% for traffic-driven equipment	Applied the minus 26.4% annual capital unit cost change assumption	Cogeco did not provide company-specific data supporting its proposed annual capital unit cost change assumption
Proposed to use economic life estimates for CCAPs	Adjusted life estimates to reflect accounting life estimates	Accounting life estimates should be used in regulatory economic studies
Proposed to apply a training and documentation factor to cumulative CCAP expenditures	Adjusted training and documentation factor so it is applied only to incremental CCAP expenditures	Training and documentation factor is to be applied to only incremental CCAP expenditures
Applied company's approach to calculate end of study terminal value and related CCA tax shield	Adjusted calculation of end of study terminal value and related CCA tax shield	Errors were identified in the proposed calculation

Summary of the Commission's adjustments to Shaw's monthly capacity rate per 100 Mbps

Proposal	Commission adjustment	Rationale for adjustment
Proposed company-specific WFFs for node segmentation, CCAP, and router capital costs	Adjusted node segmentation, CCAP, and router capital costs to reflect appropriate WFFs	The WFFs did not meet the five conditions in Telecom Regulatory Policy 2009-274 for company-specific WFFs
Proposed to include segmentation fibre costs in access portion of cost model	Adjusted segmentation fibre costs by including them in usage portion of cost model	Segmentation fibre is usage-sensitive
Proposed segmentation fibre costs as cost new	Calculated segmentation fibre costs based on cost factor method	Segmentation fibre costs should be calculated based on the cost factor method
Proposed a 100% attribution factor for CCAP and optical nodes	Adjusted attribution factor for CCAP and optical nodes to 75%	Other services such as TV benefit from CCAP and optical node facilities
Proposed an annual capital unit cost change assumption of minus 17% for traffic-driven equipment	Applied the minus 26.4% annual capital unit cost change assumption	Shaw did not provide company-specific data supporting its proposed annual capital unit cost change assumption
Applied company's approach to calculate end of study terminal value and related CCA tax shield	Adjusted calculation of end of study terminal value and related CCA tax shield	Errors were identified in proposed calculation

Summary of the Commission's adjustments to Eastlink's monthly capacity rate per 100 Mbps

Proposal	Commission adjustment	Rationale for adjustment
Proposed company-specific WFFs for node segmentation, CCAP, and router capital costs	Adjusted node segmentation, CCAP, and router capital costs to reflect appropriate WFFs	Did not meet the five conditions in Telecom Regulatory Policy 2009-274 for company-specific WFFs
Proposed to include segmentation fibre costs in access portion of cost model	Adjusted segmentation fibre costs by including them in usage portion of the cost model	Segmentation fibre is usage-sensitive
Proposed segmentation fibre costs as cost new	Calculated segmentation fibre costs based on cost factor method	Segmentation fibre costs should be calculated based on cost factor method
Proposed a 100% attribution factor for CCAP and optical nodes	Adjusted the attribution factor for CCAP and optical nodes to 75%	Other services such as TV benefit from CCAP and optical node facilities

Proposed an annual capital unit cost change assumption of minus 17% for traffic-driven equipment	Applied the minus 26.4% annual capital unit cost change assumption	Eastlink did not provide company-specific data supporting its proposed annual capital unit cost change assumption
Proposed non-growth technology (i.e. used CMTS instead of CCAP) costs	Adjusted CCAP costs to reflect growth technology	Growth technology costs should be included in cost study
Proposed transport equipment costs based on existing utilization of the equipment	Adjusted transport equipment costs by using proposed revised capital expenditures	Existing utilization is not appropriate in the capacity costing approach
Applied company's approach to calculate end of study terminal value and related CCA tax shield	Adjusted calculation of end of study terminal value and related CCA tax shield	Errors were identified in proposed calculation

Summary of the Commission's adjustments to Bell Canada's monthly capacity rate per 100 Mbps

Proposal	Commission adjustment	Rationale for adjustment
Proposed to use explicit costing approach	Applied capacity costing approach	Proposed methodology includes total costs of capital equipment, regardless of whether it is used at its full capacity or not, and therefore overestimated the costs
Proposed unrecovered costs	Removed unrecovered costs	Proposed methodology to estimate unrecovered costs did not take into consideration actual capital expenditures, and therefore overestimated the costs
Proposed productivity enhancement costs	Removed productivity enhancement costs	Proposed costs did not include associated cost benefits. In addition, the annual capital unit cost change assumption of minus 26.4% is due to supplier initiatives, not to any initiatives undertaken by the company.

Proposed company-specific WFFs for traffic-driven equipment (routers and switches) costs	Adjusted traffic-driven equipment (routers and switches) costs to reflect the appropriate WFFs	WFFs did not meet the five conditions in Telecom Regulatory Policy 2009-274 for company-specific WFFs
Proposed an annual capital unit cost change assumption of minus 15.7% for traffic-driven equipment	Applied the annual capital unit cost change assumption of minus 26.4%	Bell Canada did not provide company-specific data supporting its proposed annual capital unit cost change assumption
Proposed umbilical fibre costs in monthly capacity rate	Removed umbilical fibre costs	These costs are currently recovered in wholesale HSA access rate and are not usage-sensitive
Proposed a 10% supplementary markup on costs	Removed the supplementary markup	Investment risk associated with construction of FTTN facilities is no longer greater than risk associated with construction of other ILEC facilities

Summary of the Commission's adjustments to Bell MTS's monthly capacity rate per 100 Mbps

Proposal	Commission adjustment	Rationale for adjustment
Proposed company-specific WFFs for traffic-driven equipment (router chassis)	Adjusted router chassis costs to reflect appropriate WFFs	WFFs did not meet the five conditions in Telecom Regulatory Policy 2009-274 for company-specific WFFs
Proposed a 10% supplementary markup on costs	Removed supplementary markup	Investment risk associated with the construction of FTTN facilities is no longer greater than risk associated with construction of other ILEC facilities

Summary of the Commission's adjustments to RCCI's monthly access rate

Proposal	Commission adjustment	Rationale for adjustment
Proposed to use capacity costing approach to calculate coaxial cable costs	Adjusted coaxial cable costs to include depreciation, maintenance, and cost new for new coaxial builds	Capacity costing is not an appropriate costing approach for coaxial cable as there is no capacity that will lead to relief of the facility
Proposed development costs associated with wholesale HSA service	Adjusted proposed costs to include only year 1 development costs	Development costs normally occur at the start of a study period; no evidence was provided to support development costs in subsequent years
Proposed development costs associated with retail Internet and wholesale HSA services	Removed these development costs	No evidence was submitted to support these development costs

Proposed to include segmentation fibre costs in access portion of cost model	Adjusted segmentation fibre costs by including them in usage portion of cost model	Segmentation fibre is usage-sensitive
Applied company's approach to calculate end of study terminal value and related CCA tax shield	Adjusted calculation of the end of study terminal value and related CCA tax shield	Errors were identified in proposed calculation

Summary of the Commission's adjustments to Videotron's monthly access rate

Proposal	Commission adjustment	Rationale for adjustment
Proposed to use capacity costing approach to calculate coaxial cable costs	Adjusted coaxial cable costs to include depreciation, maintenance, and cost new for new coaxial builds	Capacity costing is not an appropriate costing approach for coaxial cable as there is no capacity that will lead to relief of the facility
Proposed to include segmentation fibre costs in access portion of cost model	Adjusted segmentation fibre costs by including them in the usage portion of the cost model	Segmentation fibre is usage-sensitive
Applied company's approach to calculate end of study terminal value and related CCA tax shield	Adjusted calculation of end of study terminal value and related CCA tax shield	Errors were identified in proposed calculation

Summary of the Commission's adjustments to Cogeco's monthly access rate

Proposal	Commission adjustment	Rationale for adjustment
Proposed to use capacity costing approach to calculate coaxial cable costs	Adjusted coaxial cable costs to include depreciation, maintenance, and cost new for new coaxial builds	Capacity costing is not an appropriate costing approach for coaxial cable as there is no capacity that will lead to relief of the facility
Proposed to include segmentation fibre costs in access portion of cost model	Adjusted segmentation fibre costs by including them in usage portion of cost model	Segmentation fibre is usage-sensitive
Applied company's approach to calculate end of study terminal value and related CCA tax shield	Adjusted calculation of end of study terminal value and related CCA tax shield	Errors were identified in proposed calculation

Summary of the Commission's adjustments to Shaw's monthly access rate

Proposal	Commission adjustment	Rationale for adjustment
Used the capacity costing approach to calculate coaxial cable costs	Adjusted coaxial cable costs to include depreciation, maintenance, and cost new	Capacity costing is not an appropriate costing approach for coaxial cable as there is no capacity

	for new coaxial builds	that will lead to relief of the facility
Proposed to include segmentation fibre costs in access portion of cost model	Adjusted segmentation fibre costs by including them in usage portion of cost model	Segmentation fibre is usage-sensitive
Applied company's approach to calculate end of study terminal value and related CCA tax shield	Adjusted calculation of end of study terminal value and related CCA tax shield	Errors were identified in proposed calculation

Summary of the Commission's adjustments to Eastlink's monthly access rate

Proposal	Commission adjustment	Rationale for adjustment
Used capacity costing approach to calculate coaxial cable costs	Adjusted coaxial cable costs to include depreciation, maintenance, and cost new for new coaxial builds	Capacity costing is not an appropriate costing approach for coaxial cable as there is no capacity that will lead to relief of the facility
Proposed to include segmentation fibre costs in access portion of cost model	Adjusted segmentation fibre costs by including them in usage portion of cost model	Segmentation fibre is usage-sensitive
Applied company's approach to calculate end of study terminal value and related CCA tax shield	Adjusted calculation of end of study terminal value and related CCA tax shield	Errors were identified in proposed calculation

Summary of the Commission's adjustments to Bell Canada's monthly non-bonded access rate

Proposal	Commission adjustment	Rationale for adjustment
Proposed to include unrecovered costs	Removed unrecovered costs	Proposed methodology to estimate unrecovered costs did not take into consideration actual capital expenditures and therefore overestimated the costs
Proposed to exclude umbilical fibre costs	Included umbilical fibre costs	No company-specific evidence was provided to demonstrate that there will be a need to add additional umbilical fibres due to traffic growth
Proposed to include uncapped DSLAM labour costs	Applied average DSLAM labour unit cost of the other ILECs	DSLAM equipment is a mature technology providing similar functionality and capacity across ILECs, so DSLAM labour costs should be similar across the ILECs
Proposed to exclude POTS splitter costs	Included POTS splitter costs	The POTS splitter provides a useful function over the life of FTTN access service for all speeds

Proposed to include project costs for disaggregated wholesale HSA service	Included additional project costs resulting from adjustment and re-allocation of total cost to FTTN and FTTP access rate elements	Majority of initiatives and systems to be implemented are associated with order fulfillment, billing, and reporting, whose costs are generally recovered on an end-user basis
Proposed to include productivity enhancement costs	Removed productivity enhancement costs	Proposed costs did not include the associated cost benefits. In addition, the annual capital unit cost change assumption of minus 26.4% is due to supplier initiatives, not to any initiatives undertaken by the company
Proposed a 100% attribution factor on access costs	Adjusted attribution factor on access costs to 68.8%	Other services such as TV benefit from the access.
Proposed a supplementary markup of 10%	Removed supplementary markup	Investment risk associated with construction of FTTN facilities is no longer greater than risk associated with construction of other ILEC facilities

Summary of the Commission's adjustments to Bell Canada's monthly bonded access rate

Proposal	Commission adjustment	Rationale for adjustment
Proposed to include unrecovered costs	Removed unrecovered costs	Proposed methodology to estimate unrecovered costs did not take into consideration actual capital expenditures and therefore overestimated the costs
Proposed to exclude umbilical fibre costs	Included umbilical fibre costs	No company-specific evidence was provided to demonstrate that there will be a need to add additional umbilical fibres due to traffic growth
Proposed to include uncapped DSLAM labour costs	Applied average DSLAM labour unit cost of the other ILECs	DSLAM equipment is a mature technology providing similar functionality and capacity across ILECs, so the DSLAM labour costs should be similar across the various ILECs
Proposed to exclude POTS splitter costs	Included POTS splitter costs	POTS splitter provides a useful function over life of FTTN access service for all speeds
Proposed to include software development costs associated with systems modifications	Adjusted software development costs to reflect non-bonded versus bonded access demand allocation	No company-specific evidence was provided to justify high software development costs

Proposed an occurrence rate for travel repair work activity that is higher than in FTTN non-bonded access	Adjusted the occurrence rate for travel repair work activity to align with FTTN non-bonded access	No company-specific evidence was provided to demonstrate why the occurrence rate deviated from what was provided in the same activity for FTTN non-bonded access
Proposed a 100% attribution factor on access costs	Adjusted attribution factor on access costs to 68.8%	Other services such as TV benefit from the access
Proposed a supplementary markup of 10%	Removed the supplementary markup	Investment risk associated with the construction of FTTN facilities is no longer greater than risk associated with construction of other ILEC facilities

Summary of the Commission's adjustments to Bell Canada's bonded access installation rate

Proposal	Commission adjustment	Rationale for adjustment
Proposed to include POTS splitter costs	Removed POTS splitter costs	POTS splitter provides a useful function over life of FTTN access service for all speeds
Proposed costs reflecting a high occurrence rate for travel time and Control Centre manual handling	Reduced occurrence rate by 80%	No company-specific evidence was provided to demonstrate why occurrence rate deviated from previous Commission-determined occurrence rate

Summary of the Commission's adjustments to Bell MTS's monthly access rate

Proposal	Commission adjustment	Rationale for adjustment
Proposed to include uncapped DSLAM labour costs	Applied average DSLAM labour unit cost of the other ILECs	DSLAM equipment is a mature technology providing similar functionality and capacity across ILECs, so DSLAM labour costs should be similar across the various ILECs
Proposed a 100% attribution factor on access costs	Adjusted attribution factor on access costs to 61.4%	Other services such as TV benefit from the access
Proposed a supplementary markup of 10%	Removed supplementary markup	Investment risk associated with the construction of FTTN facilities is no longer greater than risk associated with construction of other ILEC facilities

Summary of the Commission's adjustments to TCI's monthly access flat rate

Proposal	Commission adjustment	Rationale for adjustment
Proposed to apply an annual capital unit cost change assumption of minus 16.8% or router equipment and minus 8.7% for optical equipment	Applied the minus 26.4% annual capital unit cost change assumption to the applicable costs	Company-specific evidence used 2016 and 2018 company-specific data, which is not enough to result in a reliable forecast
Proposed to use a company-specific AT-WACC	Set AT-WACC using approved financial parameters	Financial parameters must be approved by the Commission
Proposed a one-time calculation of present worth for all capital costs	Set all causal to demand capital costs to ongoing	Capital expenditures are recurring throughout the year
Proposed start-up costs	Applied start-up costs based on input provided by TCI in its answer to a request for information	TCI updated its start-up costs in response to the request for information
Proposed a 100% attribution factor on access costs	Adjusted attribution factor on access costs to 59%	Other services such as TV benefit from the access
Proposed a supplementary markup of 10%	Removed supplementary markup	Investment risk associated with the construction of FTTN facilities is no longer greater than risk associated with construction of other ILEC facilities

Summary of the Commission's adjustments to SaskTel's monthly access flat rate

Proposal	Commission adjustment	Rationale for adjustment
Proposed to exclude line conditioning costs	Included line conditioning costs	These costs are causal to monthly access service, as determined in Telecom Regulatory Policy 2011-703
Proposed a 100% attribution factor on the access costs	Adjusted attribution factor on access costs to 63.1%	Other services such as TV benefit from the access

Summary of the Commission's adjustments to SaskTel's VDSL access service charge

Proposal	Commission adjustment	Rationale for adjustment
Proposed to include line conditioning costs	Removed line conditioning costs	These costs are causal to monthly access service, as determined in Telecom Regulatory Policy 2011-703
Proposed to include costs for installation of customer jack and inline filter, and testing line	Removed these costs	As per SaskTel's Competitor Access Tariff item 650.34, sub-item 3.2.9 – Conditions of Service, end-user or ISP is responsible for any customer premise equipment, filters, splitters, and inside wiring
Proposed costs reflecting a high occurrence rate for jumper wire work, line provisioning, and programming the DSLAM	Reduced occurrence rate by 40%	Adjustment is needed to take into account existing customer locations that had already been set up, as per determination in Telecom Regulatory Policy 2011-703

Summary of the Commission's adjustments to SaskTel's monthly VDSL interface rate

Proposal	Commission adjustment	Rationale for adjustment
Proposed to include ongoing product management costs	Removed product management costs	Forecasted level of service demand does not justify the proposed product management activities and claimed associated costs