BEFORE THE CANADIAN RADIO-TELEVISION AND TELECOMMUNICATIONS COMMISSION

IN THE MATTER OF TELECOM REGULATORY POLICY CRTC 2011-703 – BILLING PRACTICES FOR WHOLESALE RESIDENTIAL HIGH-SPEED ACCESS SERVICES

AMENDED APPLICATION BY ROGERS COMMUNICATIONS PARTNERSHIP FOR REVIEW AND VARIANCE OF TELECOM REGULATORY POLICY CRTC 2011-703

Filed: March 1, 2012

(Revised March 12, 2012 per March 7, 2012 CRTC Staff Letter)

ABRIDGED

Introduction

1. In this application, Rogers Communications Partnership ("Rogers") seeks orders pursuant to section 62 of the *Telecommunications Act* to review and vary certain determinations made by the Commission in Telecom Regulatory Policy CRTC 2011-703, *Billing practices for wholesale residential high-speed access services* ("TRP-703").

2. In TRP-703, the Commission decided on a new methodology for establishing a usage-based rate component for Third Party Internet Access ("TPIA") services. This new methodology separates costs into two categories; fixed access, and variable usage based on the cost of providing access to a carrier's internet access facilities measured in 100 Mbps increments during peak periods of network use.

3. In the same Decision, the Commission applied the new model to the Cable Carriers' costs, which had been filed in December of 2010 in support of new rates for TPIA service provided through an aggregated Point of Interconnection (POI). In so doing, the Commission adjusted certain of the cost estimates and assumptions used by Rogers in its Cost Studies and ultimately applied the new methodology to these adjusted costs to determine new TPIA rates, which the Commission also approved on a final basis in the same Decision. This was done without giving Rogers an opportunity to comment on either the cost adjustments.

4. In this application, Rogers is not questioning the Commission's primary determination to use a capacity-based model to establish TPIA rates, or the model itself. Rather Rogers objects to certain of the adjustments to Rogers' costs, specifically regarding, distribution plant segmentation, Cable Modem Terminating Systems (CMTS), trouble reporting and repairs, access plant productivity and the inconsistent application of a later study date. These errors by the Commission all reduce Rogers' rates for TPIA services and deny Rogers recovery of its full incremental costs of providing TPIA services. Rogers notes in

this regard that it was given no opportunity to comment on the proposed cost adjustments. This gives rise to the need to seek review and variance of these determinations after the issuance of the Decision.

5. The variations to TRP-703 that Rogers is seeking are simple to make, will not require new cost studies to be filed, and will still leave Rogers with rates that are considerably below those of its competitors and peers: Bell, Videotron and Cogeco. The calculations of the revised rates arising from the relief requested are provided in Appendix 1.

6. In addition, in this application, Rogers addresses the matter of the appropriate measure of 100 Mbps increments to which the capacity charge is applied. The charge must be applied to upstream and downstream increments in order for Rogers to fully recover its costs given the arithmetic manner in which the Commission derived the capacity charge. Rogers did not initially consider this to require a variance of the Decision. However, on February 23, 2012, Rogers received a letter from Commission staff stating that in staff's view the Decision did not create separate upstream and downstream 100 Mbps increments. Given staff's interpretation of the Decision and the fact that it would prevent recovery of costs associated with carriage of upstream traffic, Rogers has amended its application of February 10, 2012 to address this issue.

Grounds for Review and Variance

7. The Commission's tests for reviewing and varying a decision pursuant to section 62 of the *Telecommunications Act* are well-established. The applicant must demonstrate that there is substantial doubt as to the correctness of the original decision, for example due to:

   (i) an error in law or in fact;

   (ii) a fundamental change in circumstances or facts since the decision;

(iii) a failure to consider a basic principle which had been raised in the original proceeding; or

(iv) a new principle which has arisen as a result of the decision.

8. As discussed in the body of this application, the Commission has made a number of errors of fact and law in TRP-703, which demonstrate substantial doubt as to the correctness of the original decision. All of these errors affect Rogers' tariffed rates for TPIA service and deny Rogers the ability to fully recover its costs of providing TPIA services in contravention of sections 27 and 47 of the *Telecommunications Act*. The Commission has also reversed its previous policy of accepting economic life estimates of assets that are equal to their accounting life without justifying this change to the policy. The decision also violates subsection 1(b)(ii) of the *Policy Direction* which requires that economic regulatory measures neither deter economically efficient competitive entry nor promote economically inefficient entry, as well as subsection 1(b)(iv), which requires network access arrangements to be technologically and competitively neutral and not to artificially favour either Canadian carriers or resellers.[1] TRP-703 also discriminates against Cable Carriers vis à vis their ILEC competitors by applying a higher level of future access productivity for Cable Carriers while also denying them comparable markups on higher-speed fibre-based internet service costs. In this respect the decision violates subsection 1(b)(iii) of the *Policy Direction* which requires regulatory measures to be implemented in a symmetrical and competitively-neutral manner.

Relief Requested

9. Rogers requests the Commission to vary TRP-703 as follows:

Variances Specific to Rogers

[1] Direction to the CRTC on Implementing the Canadian Telecommunications Policy Objectives.

- Approve Rogers' use of a capital augmentation trigger of 60%, consistent with Rogers' practice of segmenting nodes and adding CMTS ports when volume reaches 60% of capacity during peak periods measured at the 95th percentile.

- Approve Rogers' use of a four year life cycle for CMTS cards, consistent with Rogers' practice and the Commission's previous decision on this issue when a four year life cycle was approved.

- If the Commission determines that the Staff determination regarding traffic increments in its February 10, 2012 letter is correct, vary the Decision such that the capacity charge will be applied to both upstream and downstream traffic increments in order that Rogers can recover its costs associated with total traffic.[2] Or alternatively, vary the capacity charge so that it recovers total costs based only on downstream increments where the capacity charge is calculated using a consistent denominator; namely, downstream gigabytes. If Rogers' interpretation is correct that the Decision intended the capacity charge be applied to upstream and downstream increments there is no need to vary the Decision in this respect. Rather, the Commission can approve the revised tariff page 97A filed on February 10, 2012, as amended. This issue is addressed in detail in paragraphs 65-77 of the Application.

Variances Applicable to All Cable Carriers

- Permit Rogers and the other companies to recover 100% of the expense that they incur to process and resolve trouble tickets related to TPIA service.

- Reduce the annual productivity assumed for Cable Carrier access capital costs of -10% to the -5% level assumed for the ILECs.

- Eliminate the singular variable change made by the Commission as a result of moving the start-date of the costing study forward by 9 months (i.e., the capital

[2] This variance may also apply to Cogeco and Videotron depending on how their usage charges were calculated.

cost reduction of 7.5%) and maintain the internal consistency of the costing models. Alternatively, adjust the rates that are effective on February 1, 2012 to reflect increased costs associated with increased traffic volumes and inflation for the nine month period that the Commission reduced unit capital costs by 7.5% – again to maintain the internal consistency of the model.

A. Variances Specific to Rogers

Capacity Augmentation

10. Capacity augmentation refers to the process of expanding Rogers' network capacity to keep pace with demand and to retain the level of service (measured in terms of traffic speed -megabits per second or Mbps) at peak periods that Rogers offers its customers under its various Internet service offerings, including its TPIA services. Since cable networks involve the shared use of facilities, Rogers augments its network by segmenting the nodes which serve groups of customers and by adding associated CMTS ports.

11. For the last several years Rogers has augmented its network when it reaches 60%[3] of theoretical capacity using a 95th percentile calculation (this is a mathematical equation which represents a utilisation rate that is close to but below the peak traffic load). It does so on a node by node basis. It should be noted that in the Rogers environment the equipment cannot operate at 100% capacity due to overhead and inefficiencies of the protocols. The utilisation level which triggers an augment is the primary determining factor in the speed and consistency of speed delivered to a customer. It would not be appropriate to compare the number used by Rogers to that used by other operators since the

[3] Rogers continues to introduce higher speeds into the marketplace and these higher speeds result in traffic that is in fact burstier and less predictable. To be able to consistently deliver these higher speeds, Rogers Engineering has recently changed its augmentation trigger standard to 55% utilization in recognition of these market factors and the removal of its technical Internet Traffic Management Practices. For purposes of the timely treatment of this Review and Vary Application, Rogers' proposed revised rates from the relief requested are based on the 60% augmentation trigger that it has used for the past several years and which is reflected in its filed Cost Studies.

technology, overhead, measurement methodology, and service targets are not comparable.

12. In TRP-703, the Commission rejected Rogers' use of a 60% capacity trigger and imposed a 75% capacity trigger on Rogers. In doing so, it stated that:

> Proposed node segmentation and CMTS capital costs are estimated based on working fill factors that are lower than those used in Telecom Decision 2006-77 cost determinations
>
> No evidence to justify inconsistency with the cost determinations in Telecom Decision 2006-77[4]

13. The Commission erred in stating that there was no evidence on the record to justify a departure from the capacity trigger used in Telecom Decision 2006-77. There was in fact considerable evidence filed by Rogers in support of the 60% capacity trigger. See, for example, responses to interrogatories Rogers(CRTC)15Sep10-107,Rogers(CRTC)4Feb11-103, Rogers(CNOC)11Feb11-3 and Rogers(CRTC)5Apr11-1003, which explain in considerable detail why Rogers augments its network capacity using a 60% trigger.

14. As explained in detail in the interrogatory responses, Rogers uses traffic volumes to calculate the number of traffic-sensitive capital units such as the number of segments and CMTS ports. Rogers currently turns up another downstream or upstream channel based on the utilisation rate of a CMTS port. Rogers uses a 4-week rolling average of the 95th percentile utilization of a port. Every port is monitored. If the average utilization reaches 60% on a downstream or upstream port this is the trigger for additional segmentation. This trigger ensures that the network consistently delivers high service speeds to our customers, given the continuous and unpredictable growth in traffic (on both a per-customer and total number-of-customers basis), that the network devices cannot possibly operate at

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[4] TRP-703, Appendix 3, Table 2

100%, and given that the 95th percentile calculation used does not, by definition, include the busiest 36 hours of the four-week period.

15. With respect to peak period usage, the relationship between traffic speed and volume is derived from the sampling of speeds by connecting testing devices on various downstream/upstream channels throughout the network. Rogers has learned from this sampling that it must begin to add capacity before the 95th percentile utilization on the downstream/upstream channel exceeds 60% of its capacity. In other words, if Rogers does not begin network segmentation when the number of bytes going across the downstream or upstream channel exceeds 60% of the available capacity for more than 72 minutes per day, Rogers has learned that individual customer experience will be less than the performance targets that Rogers sets and markets for its products. Therefore, Rogers adds another downstream/upstream channel through segmentation.

16. In order to understand the implications of this part of the Decision for Rogers, it is necessary to understand why Rogers' traffic engineers augment the network when it reaches 60% of capacity. Rogers has engineered its network to have the highest speeds in the Canadian market, relative to advertised speeds, at peak periods. This means that fewer Rogers customers experience lower speeds at peak periods. Rogers' network provides more throughput for the Internet service purchased by its customers than any other carrier. This produces a higher quality service for its customers and enables Rogers to offer a service that does not impose Internet Traffic Management Practices (ITMPs) on its downstream traffic. This makes Rogers a more attractive service for consumers and produces a much peakier network than Rogers' competitors and peers in terms of throughput at peak periods because Rogers has more capacity available at peak. TPIA customers benefit from this network provisioning in the same way as Rogers' own retail customers do.

17. The fact that Rogers' network provisioning policies result in a better service for consumers is validated by the report of Lemay-Yates Associates Inc. *Comparative Assessment of Broadband Performance and Cost for Consumers in G& and OECD Countries,* December 2011 attached to this application as Appendix 2. According to this report:

> …subscribers to Rogers' broadband service receive more speed for each dollar spent than the Canadian average, actually 25 percent more. Rogers' broadband subscribers also on average benefit from 35% more downstream speed than the Canadian average broadband user (at 15.6 Mbps measured average on a daily basis compared to 11.5 Mbps for the Canadian average.[5]

18. Rogers does not wait for the network to become congested before augmenting its network – it acts in advance of congestion to ensure service quality. As soon as 60% of capacity is achieved, Rogers will begin to add capacity by segmenting nodes and adding CMTS ports. This is extremely important for shared networks such as cable networks to maintain network speeds. The reason why Rogers does not augment at 75% capacity is because the volume of traffic presented to Rogers' network is "bursty". As a result, there are many periods of time when traffic levels are far higher than the 95th percentile calculation, not only the periods intrinsically omitted by the calculation, but also because of shorter term bursts of traffic within a sampling interval. A five- minute sample which averages 75% will contain periods where the traffic is far higher and far lower than 75%. This would mean there will be periods where service is impacted due to excess load.

19. There are also other affects that flow from use of a 60% trigger. First, by having a faster network, customers use it more which gives Rogers higher volumes per user than other ISPs. This is discussed further in the next section.

20. Second, use of a 60% trigger results in Rogers achieving a higher peak throughput and therefore having a higher peak conversion factor (kbps per

Gigabyte of Volume at the 95th percentile) which under the Commission's methodology for setting the capacity rates, produces a lower usage rate for Rogers TPIA service. This can be seen by looking at the rates for Cogeco and Videotron. In most instances, they have reasonably similar access rates to Rogers but Cogeco's usage rate is 115% higher and Videotron's is 51% higher. The only reason for this is that they have a lower peak conversion factor.

21. The problem for Rogers is that in the Decision, the Commission has used the higher conversion rate which is based on a capacity trigger of 60%, but denied Rogers the ability to recover the costs of using that 60% trigger. The Commission cannot have it both ways – either the conversion factor must be recalculated using a 75% capacity trigger – or Rogers must be permitted to recover the costs associated with the 60% trigger that produces these beneficial results.

22. Unless Rogers were to degrade customer service by changing the way it provisions its network to comply with the 75% trigger, it will have to forego recovery of the cost of using a 60% trigger – thereby giving TPIA users a free ride. Since degrading customer service is not a tenable option, Rogers will not recover its costs and this is not consistent with accepted rate setting principles. Rogers must be permitted to recover its costs associated with the 60% capacity trigger that it uses. This is the case for a number of reasons.

23. First, it makes no sense to "dumb down" Rogers' network. Rogers engineers its network in the way it does in order to improve service in a competitive market. To suggest that because a 75% trigger was used several years ago, Rogers should continue to use it going forward, would result in a poorer quality network for Rogers' customers, including TPIA customers, and a more uniform (albeit inferior) level of throughput across all networks. This would be antithetical to the national policy objective of improving Internet speeds and would effectively negate Rogers' competitive advantage.

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[5] At page 3.

24. This unintended result of the Commission's Decision is also at odds with the *Policy Direction*, which requires the Commission to regulate, when necessary, in a competitively and technologically neutral manner, and in a way that interferes as little as possible with competitive market forces. This does not mean penalizing carriers that spend more on their networks in order to provide a better quality service to users, and it does not mean lowering the quality of one carriers' network down to the level of its competitors. But that is in effect the choice that the Decision presents Rogers – either forego cost recovery or change its provisioning standards to align with the Commission's imposed trigger.

25. Second, Rogers' practice of augmenting its network at 60% capacity is not just a projection that has been included in a cost study. It is the company's policy and it is implemented on a daily basis. The Commission's rate-setting powers ought not to dictate that the quality of a carrier's network be diminished - especially when that quality is higher than that of its competitors. It is the Commission's regulatory policy that compels Rogers to provide TPIA service to competing ISPs and to offer the same Internet speeds and quality of service to TPIA end-users as it provides to its own customers. If Rogers offers a higher quality of service than its competitors in terms of throughput at peak periods, it should have the opportunity to recover those costs from its customers, including TPIA customers. Rogers should not be required to choose between giving TPIA customers a free ride for this network quality or lowering the quality of its network for all retail and wholesale customers.

26. Third, the CRTC costing model is inconsistent. It uses Rogers' actual conversion factor which is uniquely high because of Rogers' more "peaky" network (caused by earlier segmentation proving more peak period capacity). It uses Rogers' actual volumes (discussed more in the next section) which are higher because of the earlier augmentation and more rapid equipment replacement engaged in by Rogers. But the CRTC model denies Rogers the costs associated with the earlier augmentation and more rapid equipment replacement. The CRTC costing

model should not penalize Rogers' unusually high volumes and unusually high conversion factor by denying Rogers the costs which created these higher volumes and higher conversion factor.

CMTS Equipment Life

27. In TRP-703, the Commission erred in adjusting the CMTS costs to reflect a life cycle of 5 years, rather than the 4 year cycle used in Rogers' Cost Study.

28. Rogers' network provisioning practice is to replace CMTS every four years. This is not a cost projection - it is the network provisioning used by Rogers based on its experience as a provider of high-speed Internet services.

29. As discussed above, Rogers provisions its network to achieve higher speeds than other carriers during peak periods. One of the ways that Rogers achieves this result is by replacing CMTS every four years. It is Rogers' experience that the incremental advances in technology that are incorporated into CMTS in the manufacturing process make it cost effective to replace them every four years in order to handle increased traffic volume and to improve network productivity. This is one of the factors that contributes to Rogers' ability to deliver faster speed Internet services than its competitors during peak periods and carry more traffic overall.

30. The Commission's rationale for adjusting Rogers' CMTS life from 4 to 5 years was as follows:

> The proposed life estimate for CMTS capital is lower than for the other Cable Carriers, without evidence on the record demonstrating why this would be so.[6]

31. In fact, Rogers had a very good reason for using a four year life cycle in its Cost Studies. That was the life cycle used by Rogers in its previous cost studies and the Commission had explicitly approved it in prior decisions.

[6] TRP CRTC 2011-703, Table 2, RCP.

32. Moreover, Rogers did not seek to justify it use of a shorter life cycle than other Cable Carriers because the Commission did not ask Rogers to explain the difference. Rogers itself did not feel it necessary to explain since its use of a four year life was entirely consistent with the Commission's last ruling on the issue.

33. In the 2006 proceeding, in Response to Interrogatory Rogers(CRTC)9June06-6 (Follow-up to Telecom Decision CRTC 2004-28), Rogers indicated to the Commission that: "The economic life estimates used in Rogers' cost studies are the same as the accounting life estimates used in Rogers' Annual Financial Statements." Rogers went on to identify the life estimates of "CMTS Cards and Chassis" as 4 years.

34. In Telecom Decision CRTC 2006-77, at paragraph 47, the Commission expressly approved Rogers' approach on this issue, as well as the life estimates proposed by Rogers:

> The Commission considers it appropriate, in general, to use the economic life estimate of an asset equal to that asset's accounting life and concludes that the life estimates proposed by Cogeco and RCI are appropriate.

This view expressed in Telecom Decision 2006-77 is entirely consistent with the Commission's acceptance of financial accounting lives as appropriate asset life estimates for purposes of Phase II costing studies for ILECs. [7]

35. In this 2011 proceeding, the Commission only asked Rogers to comment on the appropriateness of assuming that the economic life estimate of these devices [CMTS] is seven years with supporting rationale in Rogers(CRTC)4Feb11-115. Rogers' response was:

[7] See: Telecom Decision CRTC 2008-14, Review of certain Phase II costing issues, para116: "The Commission considers that financial accounting lives are developed for audited financial reporting purposes and thus may be relied on to produce appropriate asset life estimates. The Commission therefore considers that it is generally appropriate for the ILECs to rely on their current estimates of accounting asset lives as appropriate asset lives for use in regulatory economic studies."

> Rogers' Economic Evaluations uses Rogers accounting lives. These lives are assessed on an annual basis by both Rogers and its external auditor. There is no justification for assuming that the economic life estimate of these devices is seven years.

36. Given that the Commission did not call on Rogers to justify the 4-year life estimate for CMTS in the process leading to TRP-703, Rogers had no reason to suppose that the Commission would want an explanation as to why the 4 years life previously approved was being used and in any event the answer was provided in response to Rogers(CRTC)4Feb11-115. Its use was fully consistent with Commission determinations and policy.

37. The Commission's decision to reverse its previous decision that it is appropriate to use the economic life estimate of an asset equal to that asset's accounting life, constitutes a new policy arising out of TRP-703, that was not explained or justified. In effect, this would be a new policy that was not addressed in the record of the proceeding.

38. Rogers' ability to achieve a higher throughput of traffic at peak periods is directly linked to its use of a 60% trigger for network segmentation and a four year life for CMTS equipment. If these variables are adjusted in the manner decided on by the Commission, they will have a direct impact on network performance – lowering throughput at peak periods and slowing down network speeds. In Rogers' experience, advances in CMTS equipment are taking place at a rapid rate, making it cost-effective to upgrade them every four years. Moreover, the higher volumes that Rogers handles at peak require the greater capacity enabled by leading edge-CMTS equipment.

39. By substituting its knowledge of network engineering for the collective experience of Rogers' network engineers, the Commission has put Rogers in a very difficult position. It has assumed that Rogers will be able to provide its higher throughput capacity at peak periods - but it has denied Rogers the ability to recover the capital expenditures that produce a higher speed network capable of carrying

larger volumes of traffic at peak periods and higher volumes overall than its competitors. Either the life cycle of the equipment must be reduced from the adjusted 5 years back to the previously approved 4 years - or the peak period conversion factor decreased. It is not appropriate to expect Rogers to provision the capacity and superior functionality without providing Rogers with the opportunity to recover the costs of equipment replacement every four years that is necessary to achieve such network quality. The fact that Rogers follows this network provisioning practice for its own retail customers, as well as TPIA end-users, provides all users with the benefits of a higher speed network.

40. As in the case of the capacity trigger used for network segmentation, the Commission's decision places Rogers in the untenable position of either having to reduce its network efficiency by using a five year CMTS life cycle - or forego recovery of its true costs from TPIA customers, thus giving them an unfair competitive advantage. Both results are contrary to public policy, the Policy Direction and the Commission's role in regulating service rates that are just and reasonable.

41. The correction of these two Rogers-specific adjustments, capacity augmentation and CMTS equipment life, result in the following changes to Rogers TPIA rates:

	.5 Mbps	3 Mbps	10 Mbps	15 Mbps	25 Mbps	50 Mbps
Revised Access Rate ($)	12.37	12.81	15.11	21.10	23.36	25.57

Approved in Decision ($)	11.97	12.31	14.25	19.06	21.00	22.69
Difference in Rates ($)	0.40	0.50	0.86	2.04	2.36	2.88
Percent Variation	3.3%	4.1%	6.0%	10.7%	11.3%	12.7%

	Rate/GB	Factor kbps/GB	Rate per Mbps	Rate per 100 Mbps
Revised Usage Rate ($)	0.083	5.75	14.32	1,432
Approved in Decision ($)	0.072		12.50	1,251
Difference in Rates ($)	0.011		1.82	181
Percent Variation	14.6%		14.6%	14.5%

With these adjustments, Rogers' access rates remain well below the rates approved for Cogeco and Videotron[8]. With regard to usage rates, Cogeco's rate remains 88% higher and Videotron remains 32% higher. Bell's usage rate remains 55% higher.

B. Variances Applicable to All Cable Carriers

Reduced Trouble Reporting and Repair Expense

42. In Table 2 of the TRP-703, the Commission indicated that it had reduced Rogers' costs of trouble reporting and repair activities "to be equal to 80% of the retail Internet access service" on the basis that there was "No evidence to justify inconsistency with the cost determinations in Telecom Decision 2006-77".[9] In Decision 2006-77, the Commission reasoned that a retail and repair expense equal to 80% of the retail and repair expense incurred for the Cable Carrier's retail Internet customers was appropriate because the Cable Carriers would achieve efficiencies in the provision of TPIA support activities over the study period due to the first-line support provided by the ISP:

> 129. The Commission considers that the cable carriers' proposed higher support-related costs per end-user for their TPIA services relative to their retail Internet access services reflect inefficiencies related to the start-up

[8] With the exception of Cogeco's 15 Mbps service
[9] The Decision applied similar reductions to Videotron and Cogeco

> of the TPIA service. The Commission further considers that as experience is gained in the provision of TPIA service, the cable carriers will achieve efficiencies in their TPIA service support activities over the study period and, due to first-line, support-related activities of ISPs, the support-related costs per end-user for the TPIA service are expected to be less than those of the support-related costs per end-user for their retail Internet access services. In light of the expected efficiencies and the level of end-user support provided by the ISPs, the Commission considers it appropriate to adjust the support-related costs per end-user for TPIA service to 80 percent of the support-related costs for the retail Internet access service.

43. Contrary to the Commission's assertion, that there was "[n]o evidence to justify inconsistency with the cost determinations in Telecom Decision 2006-77", Rogers presented a detailed analysis of actual rouble tickets for TPIA service and of the average cost of addressing a TPIA trouble ticket in response to Rogers(CRTC)15Sept10-108. This evidence in fact confirmed that Rogers' costs are higher for TPIA related support than for its own retail customer support.

44. Ten years after service launch TPIA is not a start-up service. Because the ISP deals only with the easy problems, TPIA trouble tickets that Rogers must deal with are significantly more complicated than the average trouble ticket received for Rogers' own retail Internet customers. Furthermore, resolution of a TPIA trouble ticket is more difficult because Rogers must deal with the wholesaler as a middleman in the process, rather than dealing directly with the end-user. Often, incorrect information is provided on the trouble ticket. In addition, Rogers often has to address DHCP trouble tickets caused by the lack of IP Addresses provided by a TPIA customer. These issues do not arise for Rogers' retail end-users.

45. By substituting its own assumptions of what the costs of trouble tickets should be in place of actual data, the Commission has put Rogers in a very difficult position of not recovering its costs.

46. When the full Trouble Reporting and Repair costs are added onto the corrected numbers calculated in paragraph 40 above, the rates become:

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	.5 Mbps	3 Mbps	10 Mbps	15 Mbps	25 Mbps	50 Mbps
Revised Access Rate ($)	13.06	13.51	15.72	21.76	24.02	26.20
Approved in Decision ($)	11.97	12.31	14.25	19.06	21.00	22.69
Difference in Rates ($)	1.09	1.20	1.47	2.70	3.02	3.51
Percent Variation	9.1%	9.8%	10.3%	14.1%	14.4%	15.5%

	Rate/GB	Factor kbps/GB	Rate per Mbps	Rate per 100 Mbps
Revised Usage Rate ($)	0.084	5.75	14.60	1,460
Approved in Decision ($)	0.072		12.50	1,251
Difference in Rates ($)	0.012		2.10	209
Percent Variation	16.8%		16.8%	16.8%

Discriminatory Treatment of Cable Carriers with respect to Productivity Improvements and Mark-ups

47. As indicated above, the Commission imposed a -10% productivity improvement on Cable Carriers with respect to both usage-sensitive and non-usage-sensitive (access) network components. At the same time, it imposed a -10% productivity improvement on the ILECs' usage-sensitive network components and only a -5% productivity improvement factor on their access network components. The reason provided by the Commission for this discriminatory treatment of Cable Carriers was that:

> 107. The Commission notes that the cable carriers' historical changes in capital unit costs are not broken down between access-driven and usage-driven capital. The Commission further notes that the majority of the cable carriers' equipment is usage-driven equipment.

> 108. Accordingly, for all cable carriers, the Commission has applied annual capital unit cost changes of minus 10 percent for all equipment over the study period.

48. Rogers notes that it did identify to the Commission which capital items were considered access-driven and which were considered usage-driven in response to Rogers(CRTC)20Apr11-1. In response to Rogers(CRTC)20Apr11-1, Rogers provided cost numbers broken down between access-driven and usage-driven costs. Contrary to the Commission's claim that the majority of cable carriers' equipment is usage-driven equipment, Rogers' numbers showed that the majority of the equipment was access-driven. Consequently, it does matter greatly to the Cable Carriers that they be treated equally to the ILECs with respect to access equipment costs and related access maintenance expenses.

49. Moreover, at the same time, that it imposed a higher -10 % productivity factor on the Cable Carriers' access costs, it denied them the same mark-up on fibre-based facilities that it permitted the ILECs' to recover in their rates. The rationale for the ILECs' additional 10% mark-up was described by the Commission as follows:

> 82. In 2010, in the high-speed access decision, the Commission decided that a supplementary 10 percent markup on new higher-speed FTTN-based services was reasonable to recognize the significant upfront investments needed for these services. No evidence was presented in the current proceeding to challenge this determination.

50. However, when it came to the issue of whether the Cable Carriers should be treated in an equivalent manner in respect of their fibre investments, the Commission denied them equal treatment.

> 84. The Commission notes the cable carriers' request that, for symmetry, they be allowed to apply the same additional 10 percent markup, since TPIA services are also provided on an FTTN network. In the high-speed access decision, the Commission did not allow cable carriers to apply the additional markup because it considered that the rates for the cable carriers' wholesale high-speed access services appropriately recognized the investments they had made to upgrade their networks. In making its

> decision, the Commission noted that the cable carriers' cost of capital used to establish the rates for these services was higher than that of the ILECs and that the rates therefore appropriately captured the cable carriers' risk. In the current proceeding, the cable carriers did not provide any evidence to demonstrate that circumstances have changed since the high-speed access decision was issued. Accordingly, the Commission denies the cable carriers' request for the additional 10 percent markup.

51. The Commission made this determination notwithstanding its finding in the Decision that subject to this one exception, "in accordance with the principles of competitive neutrality, it remains appropriate that mark-ups be comparable for all ILECs and Cable Carriers."

52. These two determinations by the Commission are inconsistent and discriminatory. If anything, the ILECs should be subject to a higher access productivity factor than the Cable Carriers. This is because they have yet to extend fibre into their networks to the same extent as the Cable Carriers and therefore stand to achieve higher productivity levels than the Cable Carriers who are much further along in this process and have already achieved considerable productivity gain associated with fibre upgrades.

53. At the same time that the Commission imposed a lower productivity factor on the ILECs' access costs, it incented them to build more fibre by granting an additional 10% mark-up for their fibre-based services. The combination of these two factors gives the ILECs the ability to generate significantly more revenue from their Internet Access Service than the Cable Carriers.

54. The Commission's attempt to justify its discriminatory mark-up treatment of Cable Carriers by reference to their superior rate of return is not justifiable since this difference is relatively minor and, in any event, is a legitimate cost element in determining the cost of providing a service. The Cable Carriers are permitted a 13% cost on the equity portion of their capital structure whereas the ILECs are permitted 11%. Rogers' higher cost of capital simply reflects the fact that it costs Rogers more money than the ILECs to acquire the capital required to expand its

network**.** The 10% additional mark-up on all costs afforded the ILECs generates revenue that swamps the additional revenue received by Cable Carriers from its marginally higher cost of capital. Rogers has calculated that it receives 2% more revenue from a 13% return on equity versus an 11% return on equity. In stark contrast, the ILECs receive approximately 8% more revenue from the additional 10% mark-up on costs, fully 6% more revenue than is generated by the Cable Carriers' higher cost of equity. Moreover the additional cost of equity is a cost to Rogers – not an addition to its mark-up over the service costs that are already explicitly included in the ILEC cost models, like the ILECs' additional 10% mark-up is.

55. Finally, despite the fact that Rogers and the other Cable Carriers have extended fibre further into their networks than have the ILECs, even the reduced traffic growth projections assumed by the Commission result in Internet traffic volumes that are many times greater than current levels. Whether these or higher traffic volumes occur, Rogers will continue to make significant additions to its fibre facilities to keep pace with demand.[10] To financially incent the ILECs to invest in fibre, while denying the same financial incentives to Rogers and other Cable Carriers, is blatantly discriminatory, as well as inconsistent with the *Policy Direction*, which requires the Commission to ensure the technological and competitive neutrality of network access arrangements.

56. Clearly in this case, the Commission has breached this requirement by financially incenting fibre investment by the ILECs – but not by their prime competitors, like Rogers. Competitive neutrality would dictate that any additional mark-up should

[10]With respect to traffic volumes, Rogers strongly disagrees with the Commission's assumption of 20% per annum growth after the second year. The Commission discounted historical evidence and the evidence of parties including external experts and used inexplicably low internet traffic growth rates to set wholesale rates substituting its judgment for that of external industry experts, without any apparent evidentiary basis. However, the usage-based capacity charge will allow Rogers to be compensated for usage costs of traffic in excess of the Commission's forecast. On the other hand, Rogers will not receive compensation for increased access costs imposed by greater volumes than assumed by the Commission and consequently, Rogers will carefully monitor traffic and file new studies should the Commission's forecast be proven wrong.

be applied equally to Cable Carriers' and ILECs' fibre facilities. At a minimum, the additional access productivity assumed for the Cable Carriers should be eliminated. In the Table below, the impact of reducing the Cable Carriers access productivity to the same -5% assumed for the ILECs is presented.

57. This Review and Vary Application directly addresses and seeks to rectify the inappropriate changes made to Rogers' Cost Studies. Rogers submits that the additional mark-up afforded the ILECs should either be eliminated for the ILECs or applied to the Cable Carriers as well (with such adjustments as necessary to recognize the higher cost of equity afforded the Cable Carriers). Both sets of industry participants should be placed on an equal footing. The present asymmetrical treatment violates subsection 1(b)(iii) of the Policy Direction which requires regulatory measures to be implemented in a symmetrical and competitively-neutral manner. The numbers set out below do not reflect any change in Rogers' mark-up.

58. When Cable Carrier access productivity for the access-driven capital components identified in responses to Rogers(CNOC)11Feb11-1and Rogers(CRTC)20Apr11-1 is reduced to the -5% level assumed for the ILECs and the impact of the revised costs is added onto the corrected numbers calculated in paragraph 45 above, the rates for Rogers become:

.

	.5 Mbps	3 Mbps	10 Mbps	15 Mbps	25 Mbps	50 Mbps
Revised Access Rate ($)	13.14	13.80	16.22	23.03	25.21	27.38

Approved in Decision ($)	11.97	12.31	14.25	19.06	21.00	22.69
Difference in Rates ($)	1.17	1.49	1.97	3.97	4.21	4.69
Percent Variation	9.8%	12.1%	13.9%	20.8%	20.1%	20.7%

	Rate/GB	Factor kbps/GB	Rate per Mbps	Rate per 100 Mbps
Revised Usage Rate ($)	0.090	5.75	15.69	1,569

Approved in Decision ($)	0.072		12.50	1,251
Difference in Rates ($)	0.018		3.19	318
Percent Variation	25.5%		25.5%	25.5%

With this adjustment, Rogers' access rates remain significantly lower than Bell's access rates below 15 Mbps and similar above that speed, with Bell's usage-rate remaining 41% higher than Rogers.

Adjustment to Study Period Start Date

59. In TRP-703, the Commission adjusted the study period start date to July 2011. While this would not be problematic if the studies had been accepted as time-neutral, the Commission has seen fit to adjust certain of the study assumptions to account for changes during the intervening period – but not others. These adjustments take account of cost reductions due to 9 months of productivity improvements – but fail to take account of increased costs (due to increased traffic volumes and inflation) during the same period. This uneven adjustment of costs results in unfairly low rates.

60. While the Commission indicated that it had reduced capital costs based on its application of a 10% annual productivity or annual unit capital cost factor, in the case of the Cable Carriers, -7.5%, to account for the 9 month delay in commencement of the study period, there is no indication that the Commission

made any adjustment to initial traffic volumes in light of the adjusted study period start date. In the case of Rogers, the CRTC-assumed new study start date is 9 months later than the date used by Rogers for its initial traffic volumes. Rogers traffic volume increased significantly over this period (about 30%) and its starting traffic volume should be adjusted to reflect this growth if other adjustments – such as productivity based capital cost reductions – are made in light of the adjusted study start date.

61. These volume increases over the 9 month period have increased capital and operating costs. Inflation has also increased capital and operating costs over this period. None of these cost increases appear to have been reflected in the Commission's rate calculations.

62. If productivity adjustments are applied to reduce capital costs for the changed study start date, then adjustments must also be made for increased traffic volumes and costs actually sustained in the 9 month period between the old and new study start date.

63. But there is no need to fully re-calculate the models. The internally consistent models that were presented calculate a time-independent rate that is to apply for the ten year study period. This rate remains appropriate notwithstanding that the service is introduced later in time. An internally consistent model must be used, not a model that arbitrarily reduces one cost item on the basis of a later start date and leaves all other items the same despite the obvious fact that they have changed with the passage of time. The unit capital cost reduction flowing from the revised study period start date must be removed.

64. When the Start Date adjustment is eliminated and the impact added onto the results calculated in paragraph 57 above, the rates become:

	.5 Mbps	3 Mbps	10 Mbps	15 Mbps	25 Mbps	50 Mbps
Revised Access Rate ($)	13.55	14.27	16.96	24.34	26.67	29.07
Approved in Decision ($)	11.97	12.31	14.25	19.06	21.00	22.69
Difference in Rates ($)	1.58	1.96	2.71	5.28	5.67	6.38
Percent Variation	13.2%	16.0%	19.0%	27.7%	27.0%	28.1%

	Rate/GB	Factor kbps/GB	Rate per Mbps	Rate per 100 Mbps
Revised Usage Rate ($)	0.096	5.75	16.75	1,675
Approved in Decision ($)	0.072		12.50	1,251
Difference in Rates ($)	0.024		4.25	424
Percent Variation	34.0%		34.0%	34.0%

As the Study Start adjustment would apply to all companies, the differences between Rogers' lower rates and the other companies would remain in place. Rogers notes that a $1,675 capacity rate remains significantly lower than the usage rates approved for each of the other companies in TRP 2011-703.

C. Application of the Capacity Charge

65. On February 10, 2012, Rogers filed a revised interim tariff page 97A pursuant to TRP 2011-703 as amended by Telecom Decision 2012-60. This page was to replace the corresponding page filed on December 19, 2011 pursuant to TRP 2011-703.

66. The revision related to the application of the Capacity Charge for Aggregated POI TPIA service. TRP 2011-703 established "a monthly capacity charge, offered in increments of 100Mbps"[11]. Since December 19th, Rogers had learned the precise manner in which the CRTC calculated the Capacity Charge. Rogers understood from the calculation that the Capacity Charge had to be applied to both Upstream and Downstream 100 Mbps increments in order to fully recover Rogers' costs. The revised wording for tariff page 97A, section 1.4 i) states that "The number of 100 Mbps capacity increments to be provisioned in the month is determined by the total number of upstream and downstream increments ordered on the 1st business day of the prior month." This new wording replaced the original wording which stated that "The number of 100 Mbps capacity increments to be provisioned in the month is determined by the number of increments ordered on the 1st business day of the prior month". The revised wording was filed to make it clear to customers that the number of increments was the sum of upstream and downstream increments and orders were required for both.

67. The cover letter that accompanied the revised tariff page explained the matter and is paraphrased in the following. As a first step in developing the capacity charge for its capacity model, the CRTC identified Rogers' total usage costs as adjusted by the CRTC. These costs were the product of the traffic forecasts, capital costs, capacity expansion triggers (up or down) and operating costs and reflect all the usage costs of providing the service over the local distribution plant. For cost recovery, a unit of measurement was then needed to which a rate would be applied. The CRTC chose to use a capacity unit of 100 Mbps measured at the interconnecting facility between the wholesale provider and the wholesale customer.

68. Having chosen 100 Mbps increments as the unit for cost recovery, the CRTC then had to derive a rate, or capacity charge, per 100 Mbps increment. For Rogers, the CRTC divided Rogers' total usage costs (as adjusted by the CRTC)

[11] TRP CRTC 2011-703, para 58.

by the total number of upstream and downstream gigabytes to obtain a cost per gigabyte (a "volume cost/rate"). Rogers provided its forecast of total gigabytes, the sum of upstream and downstream GB per end-user in response to Rogers(CRTC)20Apr11-1 c) Attachment. The denominator in the calculation was total gigabytes. Applying the volume rate to every upstream and downstream gigabyte would recover the total adjusted costs of carrying the aggregate volume of Internet traffic presented.

69. However, the CRTC had rejected the volume rate approach in favour of the capacity methodology, and chose to establish a capacity charge. Therefore, the second step in the derivation of the capacity charge was to multiply the volume rate per gigabyte as calculated above by a conversion factor of kbps per gigabyte at the peak period (i.e., the number of kbps at peak associated with a gigabyte of volume) to obtain a capacity rate/kbps that is then scaled up to a 100 Mbps rate.[12]

70. The derived capacity charge recovers Rogers' costs when it is applied to both upstream and downstream 100 Mbps increments because the gigabyte rate underpinning the 100 Mbps rate calculation includes both upstream and downstream bytes. In other words, since the denominator in the volume rate calculation upon which the Mbps rate is based is total gigabytes, including both upstream and downstream, the capacity rate must be applied to both upstream and downstream increments.

71. An analogy might be useful. Assume a company or government builds a toll road and sets the rate for the toll based on the total costs divided by total forecast traffic (east and west bound). If the company only collects the toll on east bound traffic at the peak, it will not fully recover its costs.

[12] See Rogers(CRTC)20Apr11-1 c) Attachment for conversion factor.

72. The illustrative example below explains why the capacity charge would under-recover costs if it is applied only to the downstream Mbps. A simple quantitative explanation is provided in Table 1.

Table 1

Cableco Costs ($)	(a)	1,000	
Downstream GB	*(b)*	*4,000*	
Upstream GB	*(c)*	*1,000*	
Total GB	(d)	5,000	(b) + (c)
Cost/GB ($)	(e)	0.20	(a)/(d)
Conversion Factor kbps/GB	(f)	5.00	
Cost/Mbps ($)	(g)	40.00	((1,000/(f))*(e)
Costs Recovered from Downstream Increments($)	(h)	800	20 Mbps x (g)*
Shortfall	(i)	200	1,000-800

* 200 GB of volume drives 1 Mbps at peak (1,000/(f)) which is (1,000/5).

20 Mbps accommodates downstream needs ((4,000GB/200GB)=20)
5 Mbps accommodates upstream needs ((1,000/200)=5)

Costs To Be Recovered from Upstream Increments($)	(j)	200	5 Mbps x (g)*

73. As seen in Table 1, when the denominator in the initial rate calculation includes both upstream and downstream gigabytes, under-recovery occurs when the Mbps rate is applied only to downstream increments. Rogers only recovers its costs when the Mbps rate is also applied to the upstream increments.

74. Now to continue the road analogy, if the total costs of the road were divided only by east bound traffic to derive a rate that fully recovers total costs only on east bound traffic then collecting toll only on the east bound traffic at peak would allow the company to fully recover its costs. Full costs are recovered because the unit

of collection (east bound traffic) is consistent with the denominator (east bound traffic) in the calculation.

75. Turning back to the capacity model, the under-recovery of costs can be eliminated by using downstream gigabytes as the denominator in the calculation of the rate when the unit of collection is downstream increments. To be specific, the Mbps rate can properly be applied only to downstream increments if downstream gigabytes only are used as the denominator in calculating the gigabyte (volume) charge (i.e., divide total costs by downstream gigabytes). This cost per downstream gigabyte can then be multiplied by the conversion factor to obtain a rate/Mbps applicable to downstream increments only that will recover Rogers' costs, as indicated in Table 2 below.

Table 2

Cableco Costs ($)	(a)	1,000	
Downstream GB	*(b)*	*4,000*	
Upstream GB	*(c)*	*1,000*	
Total GB	(d)	5,000	(b) + (c)
Cost/Downstream GB ($)	(e)	0.25	(a)/(b)
Conversion Factor kbps/GB	(f)	5.00	
Cost/Mbps ($)	(g)	50.00	((1,000/(f))*(e)
Costs Recovered from Downstream Increments($)	(h)	1,000	20 Mbps x (g)*

Revenues Equal Costs

* 200 GB of volume drives 1 Mbps at peak (1,000/5).

20 Mbps accommodates downstream needs ((4,000GB/200GB)=20)
5 Mbps accommodates upstream needs ((1,000/200)=5) No payment for upstream.

76. Rogers has calculated the revised Mbps rate that would apply to downstream increments only based on a consistent denominator of downstream gigabytes and the impact on the usage rate is presented in the table below. This impact does not include any impact from the five model assumptions adjustments requested by Rogers in the preceding sections of this Application. Rogers has simply deducted the upstream gigabytes that were included in the total GB figures presented in response to Rogers(CRTC)20Apr11-1 c) Attachment and input downstream gigabytes only into the table labeled "GB Usage" found in the Tab labeled "Usage Rate" in Appendix 3 to calculate the revised rate.

	Rate/GB	Factor kbps/GB	Rate per Mbps	Rate per 100 Mbps
Revised Usage Rate ($)	0.077	5.75	13.46	1,346

Approved in Decision ($)	0.072		12.50	1,251
Difference in Rates ($)	0.005		0.96	95
Percent Variation	7.6%		7.6%	7.6%

77. To summarize, Rogers submits that the application of the capacity charge to both upstream and downstream 100Mbps increments was intended by TRP 2011-703, or at a minimum is a necessary consequence of TRP 2011-703. However, should it be the case that TRP 2011-703 was intended to reflect staff's view, as expressed in its February 23, 2012 letter, that the Decision did not create separate upstream and downstream 100 Mbps increments then this matter becomes part of this Application. If the Decision did not create separate upstream and downstream increments then the Decision must be varied as it is in error and does not allow Rogers to recover its costs for the reason explained above. The capacity charge must be applied to both upstream and downstream

increments or alternatively, the capacity charge must be varied so that it recovers total costs based only on downstream increments where the capacity charge is calculated using a consistent denominator; namely, downstream gigabytes. Rogers submits that applying the capacity charge to both upstream and downstream 100Mbps increments is preferable to adjusting the charge to reflect full recovery on downstream increments alone because cost recovery would be based on the actual demand of the individual ISP rather than through the use of average traffic patterns.

Conclusion

78. For all of the foregoing reasons, Rogers respectfully requests the Commission to vary TRP-703 in the manner set forth below:

Variances Specific to Rogers

- Approve Rogers' use of a capital augmentation trigger of 60%, consistent with Rogers' practice of segmenting nodes and adding CMTS ports when volume reaches 60% of capacity during peak periods measured at the 95th percentile.

- Approve Rogers' use of a four year life cycle for CMTS cards, consistent with Rogers practice and the Commission's previous ruling on this issue when a four year life cycle was approved.

- If the Commission determines that the Staff determination regarding traffic increments in its February 23, 2012 letter is correct, vary the Decision such that the capacity charge will be applied to both upstream and downstream traffic increments in order that Rogers can recover its costs associated with total traffic. Or alternatively, vary the capacity charge so that it recovers total costs based only on downstream increments where the capacity charge is calculated using a consistent denominator; namely, downstream gigabytes. If Rogers' interpretation is correct that the Decision intended the capacity charge be applied to upstream

and downstream increments there is no need to vary the Decision in this respect. Rather, the Commission can approve the revised tariff page 97A filed on February 10, 2012, as amended.

Variances Applicable to All Cable Carriers

- Permit Rogers to recover 100% of the expense that it incurs to process trouble tickets related to TPIA service

- Reduce the annual productivity assumed for cable carrier access capital costs of -10% to the -5% level assumed for the ILECs.

- Eliminate the singular variable change made by the Commission as a result of moving the start-date of the costing study forward by 9 months (i.e., the capital cost reduction of 7.5%) and maintain the internal consistency of the costing models. Alternatively adjust the rates that are effective on February 1, 2012 to reflect increased costs associated with increased traffic volumes and inflation for the nine month period that the Commission reduced unit capital costs by 7.5% – again to maintain the internal consistency of the model.

79. Maintain Rogers' Aggregated POI TPIA Service rates on an interim basis, pending the Commission's final determination of this Application, and make any new rates approved as a result of this Application effective as February 10, 2012 (the date of filing).

80. All of which is respectfully submitted by Rogers Communications Partnership.

Appendix 1

Methodology For Calculating Revised Costs and Rates

1. Rogers calculated the revised rates presented in its Application using the Excel file provided by Commission staff to Rogers on January 9, 2012. This file contained the confidential costs and calculations used by the Commission to derive the rates approved for Rogers in TRP 2011-703.

2. Rogers submits a revised Excel file containing the cost and rate impacts of the relief requested by Rogers in our Application as Attachment 1 to this Appendix. The revisions are straightforward.

3. The adjustments related to capacity augmentation (labeled Working Fill Factors in CRTC Excel file), CMTS lives (labeled Life Estimate – CMTS), Trouble Reporting and Repair (labeled Customer Support-Related Expenses) and Study Start Date (labeled Study Star Date) were made by deleting the percentage cost reductions contained in the relevant Tables found in the Tab labeled “Cost Adjustments”.

4. The reduction of Access Network Productivity from 10% to 5% per annum was made by re-calculating the results provided in response to Rogers(CRTC)5Apr11-1002 a) iv) applying 5% annual productivity to the access network components (specifically segmentation fibre and CMTS chassis). The recalculated costs were then input to the Tables labeled “5-Apr-11 interrog 1002 iv Sensitivity Result” found in the Tab labeled “Traffic Growth & Cap Unit Cost”.

5. Attachment 1 presents the total impact of the relief requested. The specific and cumulative impacts of the individual revisions presented in the Application were calculated by sequential application of the revisions to the Excel file.

*****END OF DOCUMENT*****

Comparative Assessment of Broadband Performance and Cost for Consumers in G7 and OECD Countries

Canada always ranks in the top half or better

Report prepared for
Rogers Communications Inc.

FINAL REPORT
December 2011

11-38 Place du Commerce, Suite 529, Verdun, QC H3E 1T8 Canada / Tel: 514-288-6555 / lya@lya.com
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1. Executive Summary

1.1 Why was this Report developed?

This independent Report has been developed by LEMAY-YATES ASSOCIATES Inc. (LYA) on behalf of Rogers Communications Inc. (RCI) to compare key metrics of broadband Internet access services for consumers among G7 and OECD countries including Canada[1] as well as to compare these results, to the extent possible, with those published by the OECD in its Communications Outlook Report.[2] The OECD Communications Outlook Reports of recent years have usually ranked Canada well in the bottom half of OECD countries for a number of fixed broadband access metrics comparing advertised broadband speeds and pricing. These results are somewhat surprising as Canada boasts broadband networks providing services with broadband speeds from 25 Mbps to 250 Mbps downstream by both telecommunication carriers ("telcos") and cable distributors ("cablecos") with extensive population coverage.[3]

Thus, in this Report, LYA has strived to go further than the OECD report by assessing what is the real speed of broadband connections obtained by the average consumer among these countries based on a large number of user tests, using more than 52 million test results in total, reflecting the real market share of the various Internet Service providers (ISPs) in each country, and then estimating the real cost of a megabit per second (Mbps) of broadband speed as paid by consumers, based on the pricing plans offered by the various ISPs, again in each country.

[1] The 32 OECD countries covered in this Report are Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States.
[2] See the OECD Communications Outlook Report available at http://www.oecd.org/sti/telecom/outlook.
[3] In mid 2010, LYA concluded that more than 65% of Canadians already had access to broadband Internet services at advertised speeds equal to or exceeding 25 Mbps. See LYA Report entitled The Performance of Canada's Consumer Broadband Networks in 2010, July 2010, p. 3, available at www.lya.com.

LYA has used the latest statistical information available for the analyses in this Report. Sources of information used include public reporting from the European Union, the OECD broadband portal, public reporting from individual country regulators and public reporting of individual service providers. In the vast majority of cases, information is valid for year-end 2010 or the first half of 2011.

The key metrics benchmarked by LYA for this Report are:

1. The Household Penetration for Fixed Broadband Internet service, based on statistics reported by regulatory agencies.
2. The Average Cost of a Megabit per Second (Mbps) of Downstream Broadband Internet speed, as paid on a monthly basis by the average user, based on the Average Measured Fixed Broadband Speed per country.
3. The Average Measured Fixed Broadband Speed over a 24-hour period: this metric was developed based on more than 52 million actual downstream speed tests conducted by the end users themselves over a 3-month period in mid-2011,[4] taking into account the market share of each broadband Internet service provider to properly reflect the market structure and availability of fixed broadband access services in each of the 32 countries.
4. The Peak Hours Average Measured Fixed Broadband Speed was derived as the average downstream speed measured during peak daily consumer usage hours, defined for this Report as 6:00 pm to 11:00 pm local time.
5. The Average Monthly Broadband Subscription Cost is pricing paid by the average consumer in each country based on mid 2011 service plans, reflecting the market share of the various ISPs as well as the proportion of broadband users subscribing to broadband plans with advertised speeds below and above 10 Mbps.
6. The Household Broadband Benefit Index, reflecting the actual Average Measured Fixed Broadband Speed measured by end users as well as the fixed broadband

[4] Using the SpeedTest web site: http://www.speedtest.com.

penetration among households in each country, is a valuable metric to compare the total benefits of broadband Internet among countries.

A couple of other pricing metrics were also derived as part of the LYA methodology and are also compared among G7 and OECD countries in this Report.

Where appropriate, we have also highlighted the results obtained specifically for Rogers Communications Inc., on whose behalf this Report was developed. All prices discussed in this Report are expressed in US dollars converted from local currency on a Purchasing Power Parity (PPP) basis.

1.2 Main Conclusion

Our main conclusion is that based on actual measured broadband speed tests conducted by end users, and taking into account the market share of individual ISPs in our analysis to reflect the actual composition of the broadband market in each country, Canada always ranks in the top half or the top quartile when compared to G7 and OECD countries for all 6 broadband metrics assessed as part of this extensive study.

Rogers' broadband subscribers on average benefit from 35% more downstream speed than the Canadian average broadband user (at 15.6 Mbps measured average on a daily basis compared to 11.5 Mbps for the Canadian average).

Rogers' subscribers actually pay 25% less compared to the average Canadian broadband consumer for each Megabit per Second of Broadband Speed they receive.

We also highlight that during Peak Hours, Rogers subscribers experience a 4.6% decline in broadband downstream speed (from the average over a 24-hour period), compared to

an average decline of 5.8% for all Canadian broadband subscribers and an average decline of 6.6% for broadband subscribers in OECD countries.

The results achieved by Canada using our methodology based on real user speed tests indicate that Canada's ranking among OECD countries is always much better than rankings published by the OECD. We attribute these differences to the following characteristics of LYA's methodology:

- The LYA methodology is based on real end-user measured speeds as opposed to advertised speeds; the difference between actual and advertised broadband speeds can be significant.

- The LYA analyses reflects the market share of individual ISPs in each country, thus if a telco with mainly DSL based broadband offerings has the highest market share, this will be reflected in our analysis;

- The LYA pricing analysis incorporates the relative split of subscribers to broadband services below and above 10 Mbps downstream speed for each country, thereby implicitly reflecting the availability and relative affordability of all ranges of broadband services.

1.3 The Results: Canada's Performance among G7 Countries

Figure 1 demonstrates that Canada's results (as well as those of Rogers where appropriate) are always in the top 3 positions among G7 countries on the six key broadband metrics we have compared in this Report.

- Canada captures the top rank with the highest broadband penetration as a percentage of households among G7 countries at 74%, significantly ahead of the United Kingdom and France at 69.2% and 69%, respectively.[5]

- Canada ranks third (i.e. has the third lowest cost) for the real end user cost of a Megabit per Second (Mbps) of Downstream Speed among G7 countries. Rogers by itself would rank second along the same metric, indicating that Rogers' subscribers obtain more bandwidth for their money than the average Canadian consumer. We highlight that Rogers' subscribers actually pay 25% less compared to the average Canadian broadband consumer for each Megabit per Second of Broadband Speed they receive (see Figure 6 in the Report for details).

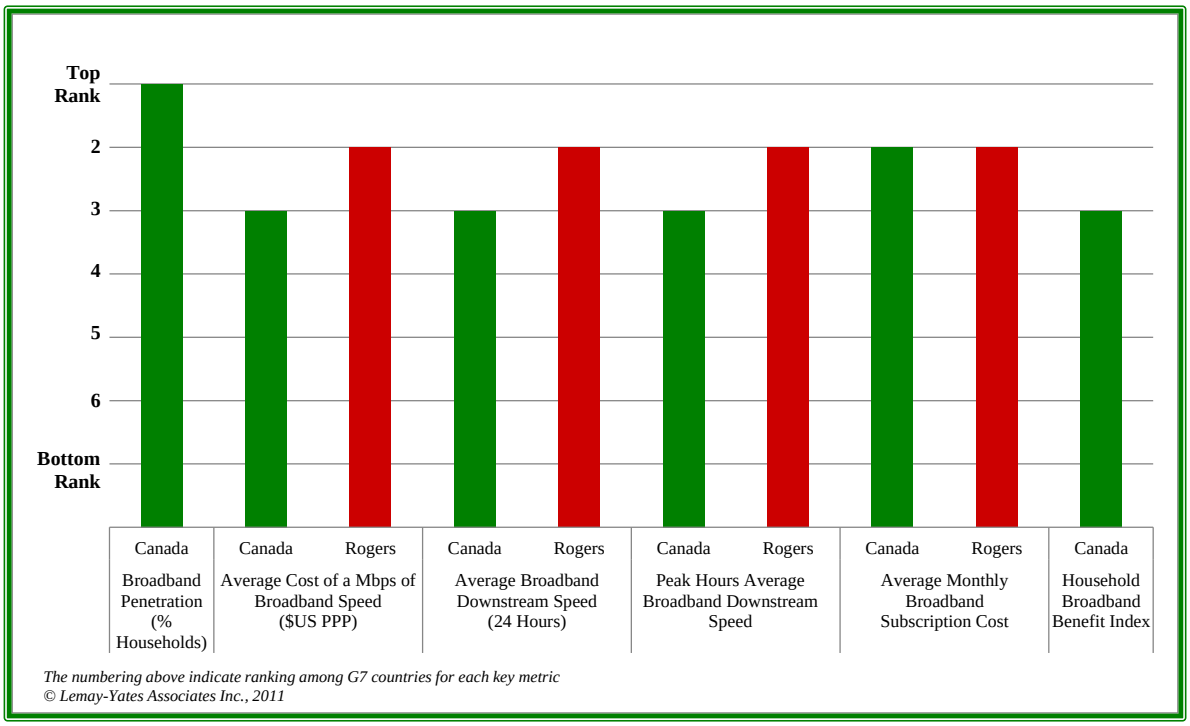
- Canada ranks third (and Rogers by itself ranks second) when compared to G7 countries for both 24-hour and Peak Hours Average Measured Fixed Broadband Speed, based on more than 52 million user speed tests. The 24-Hour Average Downstream Speed achieved by Rogers' subscribers is 35% better than the Canadian average.

- Canada (as well as Rogers) ranks second, slightly behind Italy, when comparing the Average Monthly Broadband Subscription Cost among G7 countries.

- Canada is in third position on our Household Broadband Benefit Index, which reflects the 24-hour Average Measured Fixed Broadband Speed multiplied by the Broadband Penetration among Households, behind Japan and Germany but ahead of France, the United States, United Kingdom and Italy.

[5] All data is valid for 2010 except for Japan (year-end 2009).

Figure 1 – Summary of Canada and Rogers' Broadband Metric Rankings among G7 Countries



The numbering above indicate ranking among G7 countries for each key metric
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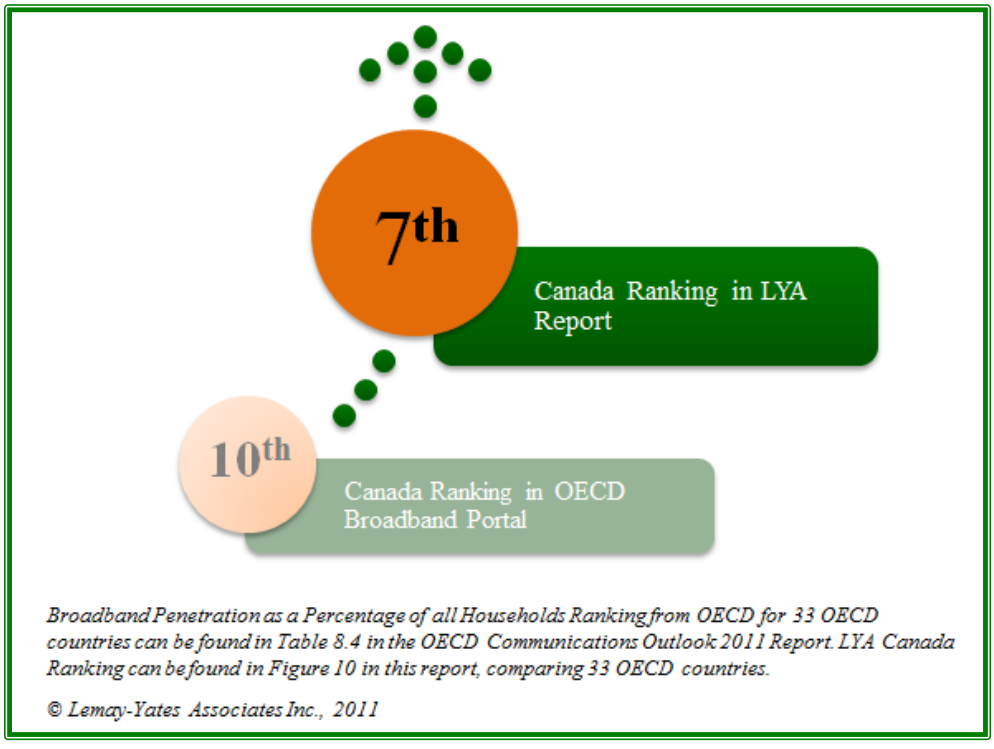
1.4 The Results: Comparison of Canada's Performance with that reported by the OECD

In terms of Broadband Penetration as a Percentage of Households, the latest available OECD data ranks Canada in 10th position among OECD countries while LYA's analysis ranks Canada in 7th position, thus in the top quartile of the 33 OECD countries included in our analysis.[6] The difference between the OECD and the LYA results is mostly due to the fact that many but not all country data points in the OECD analyses also include mobile broadband connections and that the data point used by OECD for Canada was older than that used for other countries.

Figure 2 – Canada's Ranking Comparison: Broadband Penetration as a Percentage of all Households



[6] The Broadband Penetration metric includes Iceland in addition to previously mentioned 32 OECD countries.

In terms of comparing the Average Cost of a Mbps of Downstream Speed to end users, the OECD ranks Canada in 25th position[7] using a simple average of advertised speeds per country, while LYA's analysis, based on real end user tests, ranks Canada in 12th position,[8] thus well in the top half of OECD countries.

We highlight that Rogers by itself comes in at eighth, in the top quartile of OECD countries when benchmarking the actual cost of a Mbps of downstream speed as paid by consumers.

Figure 3 – Canada's Ranking Comparison: the Average Cost of a Mbps of Downstream Speed

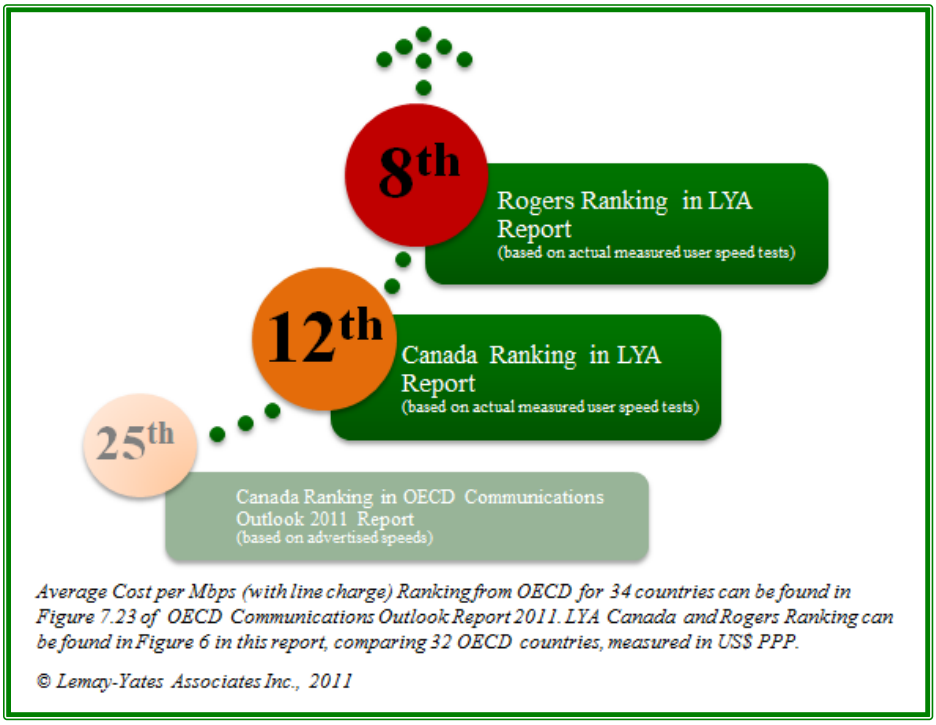


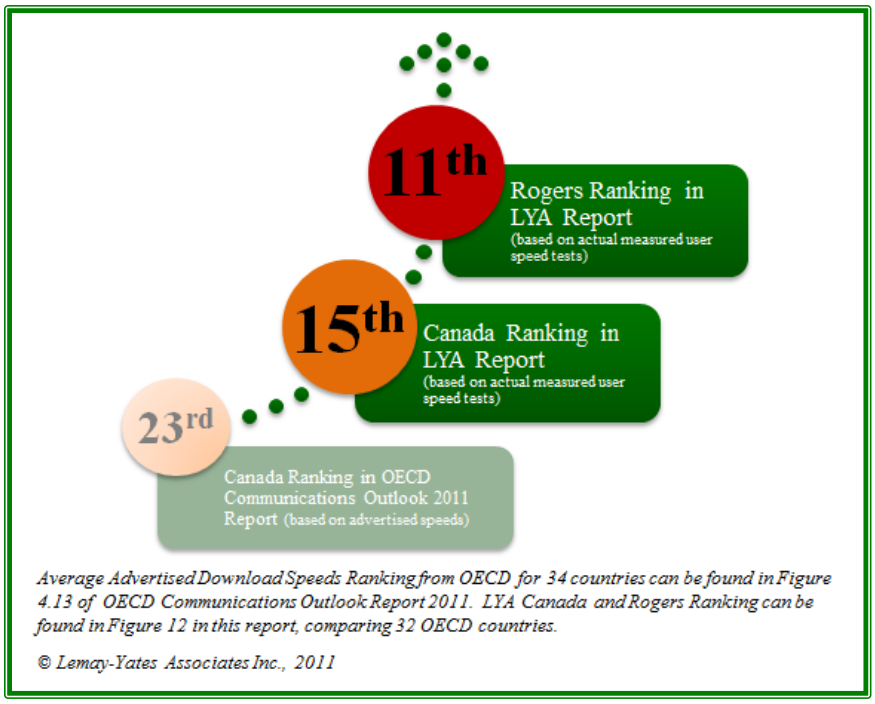
Figure 4 compares the OECD results for Canada as the average downstream speed based on advertised speeds with the LYA results based on actual measured speeds reflecting the market share of ISPs in each country. Again, Canada's position rises significantly from

[7] Out of 34 countries
[8] Out of 32 countries

23rd, in the OECD results based on advertised speeds, to 15th position based on measured speeds, thus in the top half of OECD countries.

On the same basis, Rogers comes in at eleventh, 4 positions better than the Canadian average.

Figure 4 – Canada's Ranking Comparison: Average Fixed Broadband Speed

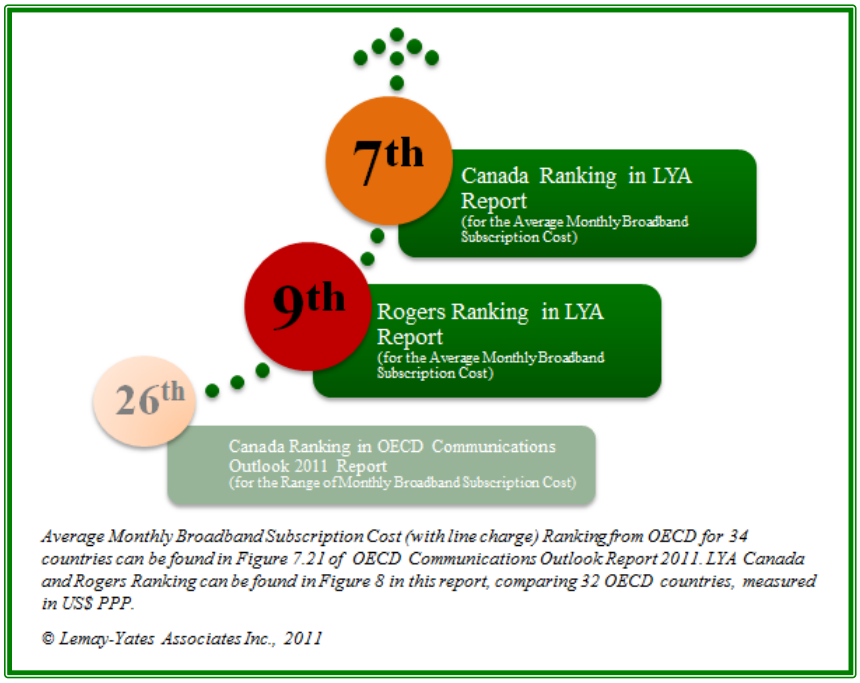


Our last point of comparison with OECD relates to the Average Monthly Broadband Subscription Cost, as shown in Figure 5. The improvement in Canada's overall position is very dramatic as it rises from 26th position in the OECD ranking to 7th position or in the top quartile among OECD countries in LYA's ranking.

We reiterate that this dramatic improvement in ranking essentially results from the fact that the LYA methodology uses more information than the average of advertised service

and price offers to derive the Average Monthly Broadband Subscription Cost for each country. It includes the market share of each ISP per country as well as the split of subscribers to broadband services below and above 10 Mbps, thus better reflecting the real monthly service cost paid by the average broadband subscriber in each country.

Figure 5 – Canada's Ranking Comparison: The Average Monthly Broadband Subscription Cost



In this case, Rogers' results is slightly below Canada and can be explained by the fact that Rogers offers few broadband service plans below 10 Mbps, thus moving the Rogers average monthly cost slightly higher than the Canadian average.

1.5 The Results: Details of Canada's Performance among OECD countries

1.5.1 Broadband Penetration per Household among OECD countries

Canada is 7th among 33 OECD countries or in the top 20%, when comparing penetration of broadband Internet per household.

The five countries reporting a broadband penetration among households higher than Canada's are (in decreasing order): The Netherlands (86%), Denmark (86%), Korea (82%), Iceland (80%), Luxembourg (78%) and Switzerland (77%). More details are provided in Section 2 of this Report.

1.5.2 The Real Cost of a Megabit per Second of Broadband Speed among OECD countries

The Average Cost of a Megabit per Second (Mbps) of Broadband Speed for consumer fixed broadband service varies from $0.87 per Mbps in Korea to $17.42 per Mbps in Mexico, based on third quarter 2011 pricing and on actual speeds measured by end users from May 1st to the end of July 2011.

Canada ranks 12th among the 32 OECD countries when comparing the Average Cost of a Megabit per Second of Broadband Speed among OECD countries, or well in the top half, as shown in the following Figure, while Rogers comes in at eighth, in the top quartile.

Subscribers to Rogers fixed broadband access service pay on average $1.99 for a Mbps of downstream speed, or 25% less than the Canadian average.

Figure 6 – Average Monthly Cost of a Mbps of Broadband Speed in OECD Countries ($US PPP)

1.5.3 Average Measured Fixed Broadband Speed among OECD countries

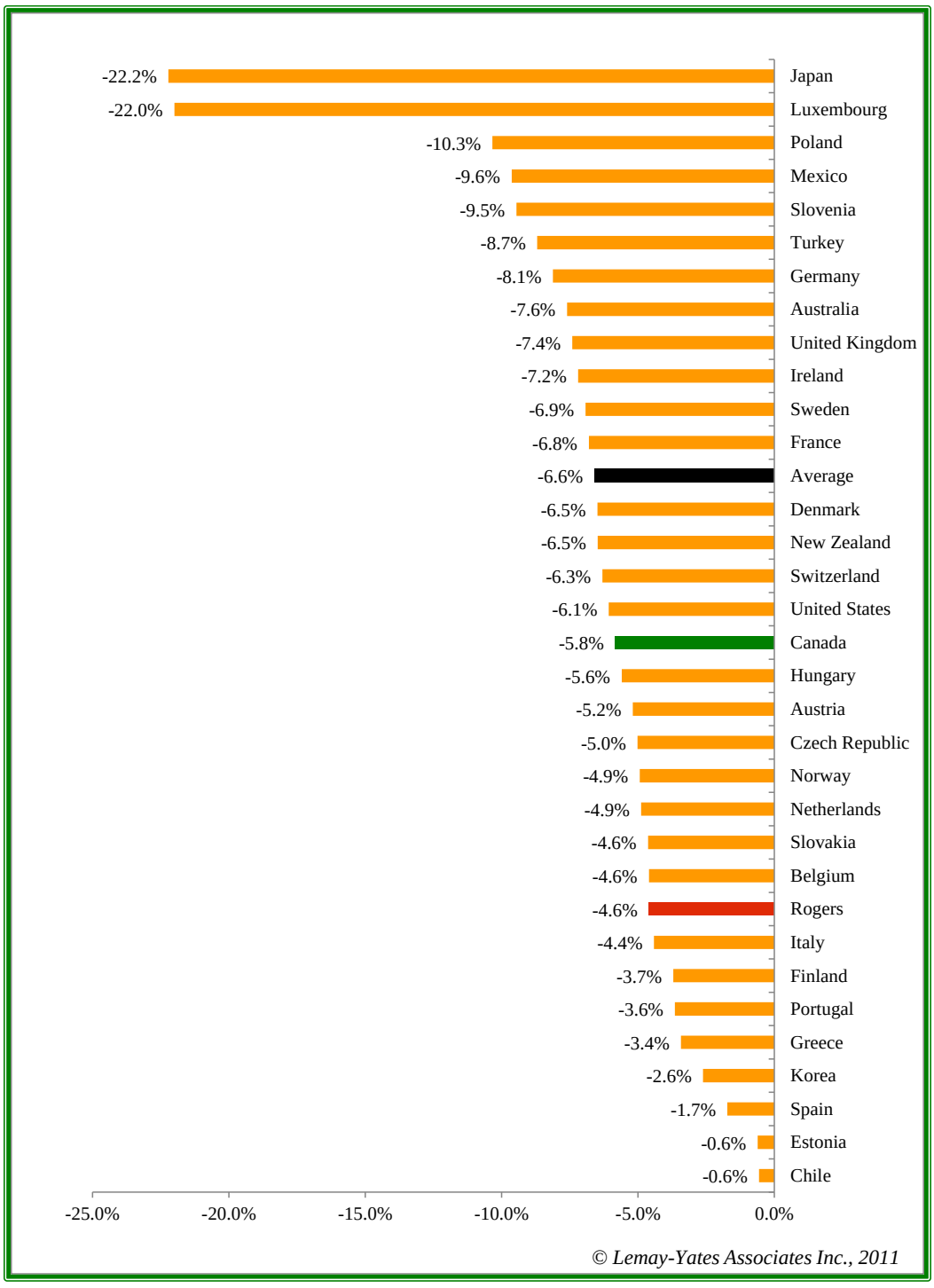
The Average Measured Fixed Broadband Speed per country varies from 2.6 Mbps (in Mexico) to 37.3 Mbps (in South Korea). Canada's performance comes in at the top half with 11.5 Mbps, in 15th place, just below the Czech Republic with 12.3 Mbps, and above the USA and France with 11.2 Mbps. Canada's overall performance remains in 15th place when comparing performance for the Peak Average Measured Fixed Broadband Speed.

The Average Measured Fixed Broadband Speed for subscribers to Rogers Communications broadband Internet service yielded an average downstream speed of 15.6 Mbps, or more than 35% better than the Canadian average.

Users in all countries experienced a decline in downstream performance during peak usage hours from 18:00 to 23:00 local time. This decline ranged from more than 22% in Japan to almost no decline for Chile and Estonia with a -0.6% difference.

The Peak Hours Average Measured Broadband Speed was 10.8 Mbps in Canada, down 5.8% from the overall average, better than the average decline in OECD countries which came in at 6.6%. In the case of Rogers Communications subscribers, measured broadband speed was 4.6 % slower at peak hours, a performance level which is 20% better than the overall Canadian average and 30% better than the OECD average, as shown in the following Figure.

Figure 7 – Percent Decrease from 24-hour Average Measured Broadband Speed to Peak Hours Average Measured Broadband Speed in OECD Countries



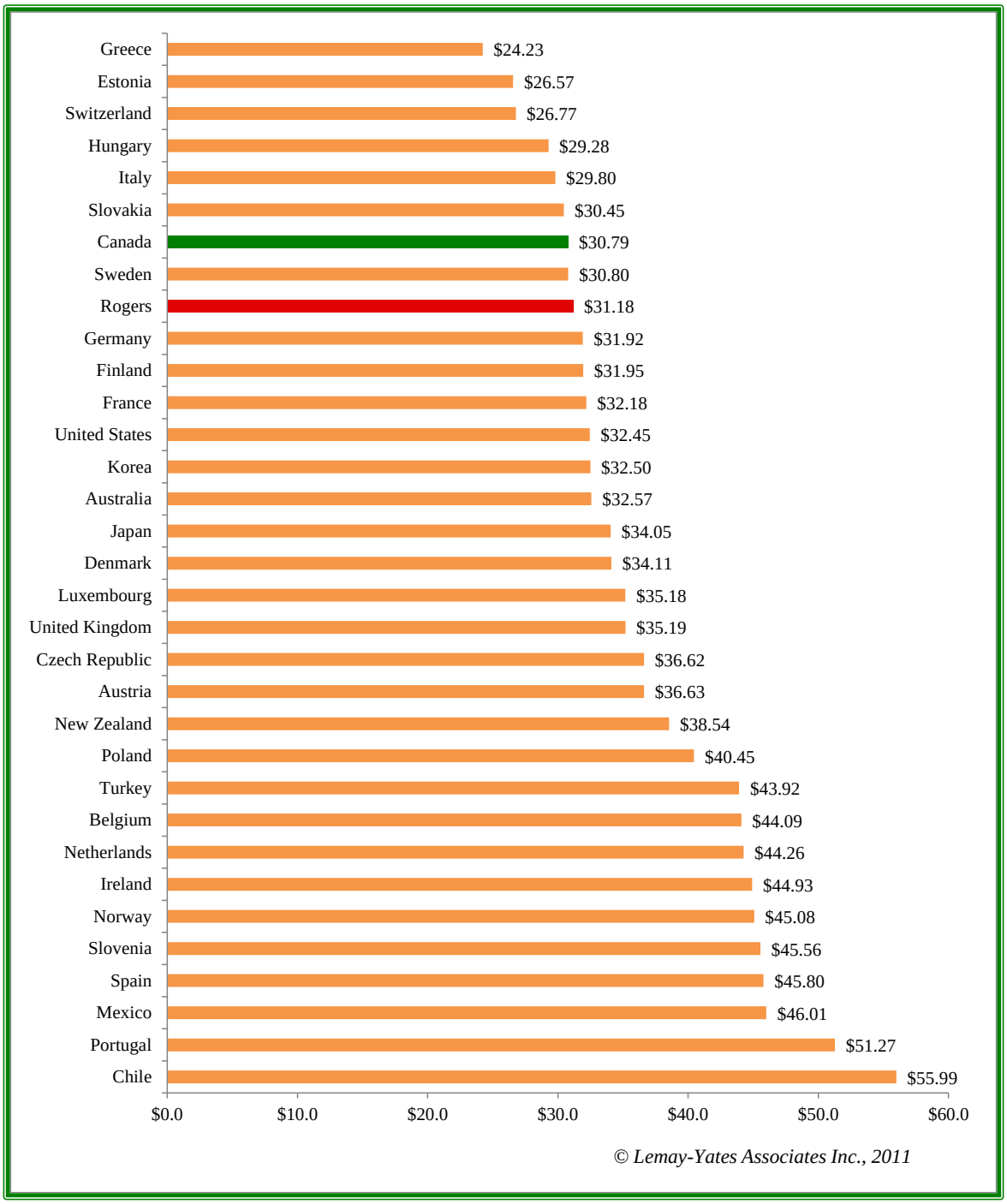
1.5.4 Average Monthly Broadband Subscription Cost among OECD countries

Canada ranks 7th among OECD countries, in the top quartile, when comparing the Average Monthly Broadband Subscription Cost paid by consumers, reflecting the relative market share of the various Internet Service providers as well as the split of subscribers to broadband services above and below 10 Mbps downstream speed.

On a USD PPP basis, the Average Monthly Broadband Subscription Cost for broadband Internet service ranges from $24.33 in Greece to $55.99 in Chile.

The Rogers average monthly cost is slightly above the Canadian average, reflecting the fact that Rogers offers only a few broadband plans below 10 Mbps, thus moving the Rogers average monthly cost slightly higher than the Canadian average.

Figure 8 – Average Monthly Broadband Subscription Cost in OECD Countries



1.5.5 Household Broadband Benefit Index

Canada ranks third among G7 countries in terms of Household Broadband Benefit Index, which measures both speed and penetration, at 8.50. Japan is first at 15.26 and Italy is last at 2.62.

Among 32 OECD countries, Canada ranks 12th in the overall Household Broadband Benefit Index. To highlight a few other results: Korea is first with an Index of 30.59, Japan is 5th, Belgium is 8th, Germany is 9th, France is 14th, the US is 15th, the United Kingdom is 18th, Australia is 19th, Italy is 29th, and Mexico is last with a Household Broadband Benefit Index of 0.36.

1.5.6 Other Observations and Conclusions from this Research

All rankings show Canada in the top half of the G7 or of the 32 OECD countries and often in the top quartile across all performance categories, displaying overall excellent positioning.

Rogers performance, on close to all metrics, is significantly better than the Canadian average, from the Average Measured Downstream Speed to the performance during peak usage periods to the real cost paid by users for a Megabit Per Second of Fixed Downstream Speed.

Canada's overall subscription rate to broadband services is especially notable – first among the G7 and seventh in the 33 OECD countries analysed.

Canada has the best performance with respect to broadband speeds and penetration when considering countries with very large geography, notably the United States and Australia.

The presence of extensive cable television networks, as is the case in Canada, is a major benefit to measured fixed broadband speeds. This is the case in all countries where cable distribution networks reach a significant percentage of the overall population.

Canada's performance, based on LYA's analyses, is always better – along every dimension analyzed – than what is reported by the most recent OECD Communications Outlook report.

The following Sections provide the detailed results with more Tables and Figures highlighting all key findings.

2. Penetration of Fixed Broadband Internet Services

Fixed household broadband penetration measures the proportion of households within a country who have subscribed to a fixed broadband Internet access service.

Fixed broadband Internet totals all broadband subscribers with a digital subscriber line, cable modem, or other high-speed technology. It also intrinsically reflects both the availability as well as the relative affordability of broadband service within a given country.

The definition of broadband Internet speeds varies among regulators. For this Report, the statistics used with respect to the penetration of broadband Internet in each country reflect the following downstream speeds defined as broadband:

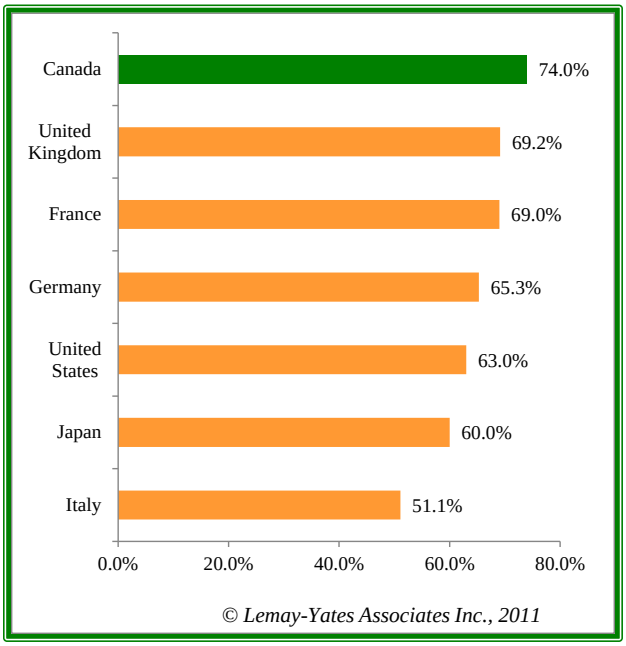
- For most EU countries: 144 kbps or higher;
- Australia and New Zealand: 256 kbps or higher;
- Canada: 128 kbps or higher;[9]
- The United-States: at 200 kbps or higher;
- Other OECD countries: downstream speeds ranging from 128 kbps, such as France, to 256 kbps.

Based on LYA's research of the broadband service offerings in 2011, the variations in the definition of broadband among the 33 countries has no impact on the results of our analyses as the service offerings that correspond to the slowest broadband services are always above 256 kbps for the lowest advertised downstream speed.[10]

[9] The Canadian Radio-Television and Telecommunications Commission (CRTC) defines high-speed Internet access as 128 kbps or faster and broadband Internet access starting at speeds of 1.5 Mbps.
[10] One Internet service provider in Poland offered a broadband service with speed up to 256 kbps.

Among all G7 countries, Canada has the highest fixed broadband penetration, at 74% of households. Fixed broadband penetration among other G7 countries ranges from 51% in Italy to 60% in Japan to close to 70% in the United Kingdom.[11]

Figure 9 – Fixed Broadband Penetration in G7 Countries (% of households)

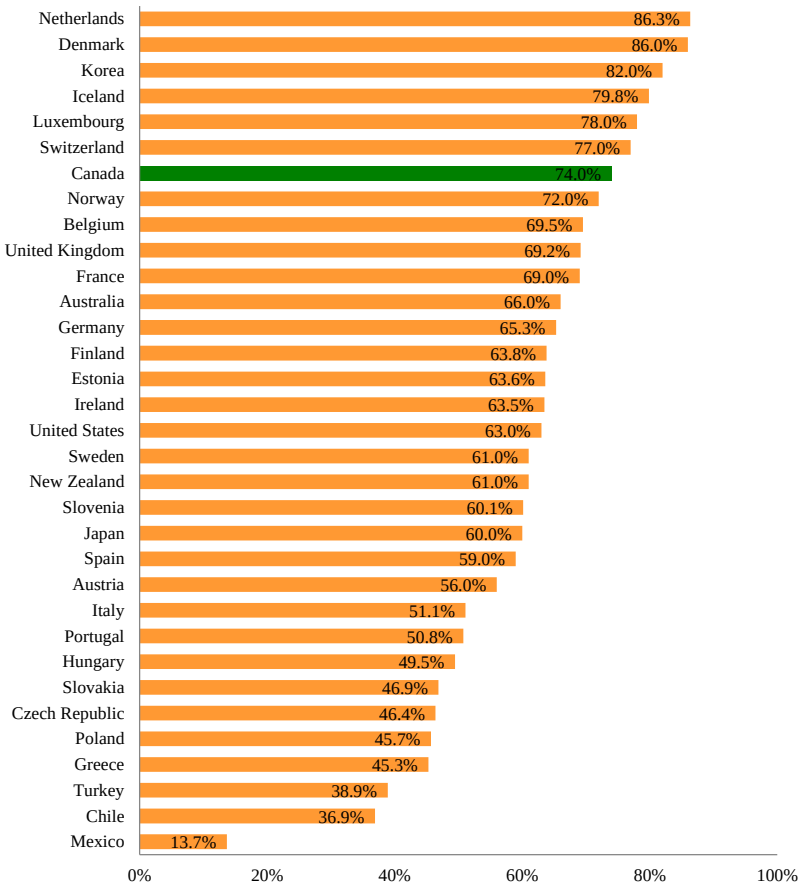


Among the 33 OECD countries surveyed, Canada ranks 7th in terms of household fixed broadband penetration, below the Netherlands reporting the highest level at more than 86% of households, as shown in Figure 10.

Mexico reports the lowest penetration of fixed broadband access penetration at less than 15% of households. The average fixed broadband penetration among these 33 OECD countries is 60.9% of households.

[11] This comparative assessment is focused on fixed broadband penetration among households. Some countries and regulators now report mobile broadband access in conjunction with fixed broadband access. This was not included in the current LYA analyses as our objective was to compare downstream speed and prices only for fixed broadband access services.

Figure 10 – Fixed Broadband Penetration in OECD Countries (% of households)



Source: All EU Countries - EU i2010 Benchmarking, from http://ec.europa.eu/information_society/eeurope/i2010/benchmarking/index_en.htm
Australia - Communications Report 1 - Australia in the digital economy: The shift to the online environment, Table 1, page 4
Canada - CRTC CMR Report 2011, page 137
Chile - Subtel Statistical Information - Series on Internet connections
France - ARCEP Electronic Communications in France: key figures - Figures for 2010, page 5
Iceland - Statistic Iceland indicate 107,011 connections for end of 2010
Japan/Mexico - OECD Communications Outlook 2011, Table 8.4 Households with broadband access
Korea - KISA Internet Usage Statistics, May 2010
New Zealand - ComCom Annual Telecom Monitoring Report 2010, p.11
Norway - Norwegian Post and Telecom Authority, "The Norwegian market for electronic communications services - 2010" report, page 20
Switzerland - Swiss Statistics 2010 from http://www.bfs.admin.ch/bfs/portal/fr/index/themen/16/04/key/approche_globale.indicator.30109.301.html?open=2#2
Turkey - ICTA, Electronic Communications market in Turkey, Quarterly Market Data report, Q1 2011, p. 38
US - FCC Report: Internet Access Services: Status as of June 30, 2010, page 9

3. Benchmarking the Average Measured Fixed Broadband Speed in G7 and OECD Countries

Many benchmarking or comparisons of broadband speeds between countries rely on general averages of advertised speeds. This approach does not reflect what consumers really obtain, since advertised and actual speeds are often quite different. Furthermore, a general average of advertised speeds by various ISPS does not reflect the differences in market share of various ISPs in each country. For example, the incumbent telecommunications carrier may have a majority market share of the broadband market which is being offered on a DSL platform while smaller all-fibre based ISPs may offer much higher speeds but have low population coverage and hence market share. Thus, an average of advertised speeds would also not reflect these differences in service availability and market share.

LYA has developed a methodology based on using consumer conducted speed tests,[12] a total of 52 million speed tests conducted over 92 days by the end users themselves in 32 OECD countries,[13] using the www.speedtest.com web site. Our objective was to assess the real fixed broadband speeds obtained in each country, reflecting not only a measured downstream speed of broadband connections but a weighted average of all broadband connection speeds along the relative market share of the Internet Services Providers in each country, yielding the Average Measured Fixed Broadband Speed in each country, as obtained by the average broadband consumer. We believe this approach provides a much better estimation of the quality of broadband service for the average consumer in each country, and thus a better methodology for benchmarking among countries.

[12] LYA acquired and analyzed raw data of user conducted speed tests from Ookla, the organisation behind the www.speedtest.com website.
[13] The only OECD countries not covered with our speed tests data are Iceland and Israel.

The results of our analyses were compared on a per country basis for 32 OECD countries as well as for G7 countries, which are the United States, France, Germany, the United Kingdom, Italy, Japan, and Canada.[14]

The following Table summarizes the number of data points for each of the 32 countries that are included in LYA's analyses.

[14] Note: the OECD includes 34 countries. LYA's data excluded Iceland and Israel and this Report thus covers 32 countries. The G8 includes Russia, but LYA's data set excluded Russia, and thus results for the G7 were assessed.

Table 1 – Geographic Distribution of Speedtest Data from OECD Countries (May 1st to July 31st, 2011)

Country	Number of Data Points Used	% of Total Data Points
Australia	2,217,551	4.3%
Austria	360,283	0.7%
Belgium	440,206	0.8%
Canada	2,440,055	4.7%
Chile	810,010	1.6%
Czech Republic	479,534	0.9%
Denmark	230,279	0.4%
Estonia	105,521	0.2%
Finland	994,558	1.9%
France	719,596	1.4%
Germany	992,326	1.9%
Greece	680,109	1.3%
Hungary	1,468,848	2.8%
Ireland	495,068	1.0%
Italy	3,040,437	5.8%
Japan	378,445	0.7%
Korea (Republic of)	129,876	0.2%
Luxembourg	40,277	0.1%
Mexico	2,228,434	4.3%
Netherlands	1,030,140	2.0%
New Zealand	305,796	0.6%
Norway	368,653	0.7%
Poland	1,566,925	3.0%
Portugal	646,832	1.2%
Slovakia	204,235	0.4%
Slovenia	234,143	0.5%
Spain	756,473	1.5%
Sweden	146,497	0.3%
Switzerland	271,221	0.5%
Turkey	741,420	1.4%
United Kingdom	6,127,761	11.8%
United States	21,379,683	41.1%
Total	**52,031,192**	**100%**

© Lemay-Yates Associates Inc., 2011
Number of data points used from May 1 to July 31, 2011, totalling 92 days worth of data

While the Table above highlights that the US represents approximately 40% of all the end user speed tests conducted, the lowest number of tests per country recorded during that period was for Luxembourg at more than 40,000 unique speed tests.

The identity of the service provider corresponding to each end user test was used in conjunction with market share, based on LYA's research, to develop the Average Measured Fixed Broadband Speed for each country as detailed in Sections 3.1 and 3.2.

3.1 Benchmarking the 24-Hour Average Measured Fixed Broadband Speed

The following Figures highlight the Average Measured Fixed Broadband Speed in G7 and 32 OECD countries, as well as differences in the results recorded between telcos and cablecos in Canada.

Canada is the 3rd fastest among G7 countries and 15th among 32 OECD countries, or in the top half of the 32 OECD countries, averaging 11.5 Mbps, as its Average Measured Fixed Broadband Speed. These results cover all 24 hours of user tests in any given day.

Results for Canada, the United States and France fall within a similar range from 11 to 12 Mbps. South Korea, with an Average Measured Broadband Speed of 37.3 Mbps, ranks first among 32 OECD countries, ahead of Japan at second with more than 25 Mbps, with Sweden close in third place with 24.8 Mbps.

Rogers' performance comes in at 15.6 Mbps, 35% better than the Canadian average.

When compared to major telcos in Canada, Bell and Telus, Rogers achieves an average measured downstream speed of more than double that of the major telcos in Canada.[15] On average, it was found that cablecos perform much better in Canada than telcos, averaging 15.1 Mbps for the former compared to 7.1 Mbps for the latter.

[15] Similar differences were also recorded from the speed test results in other countries. Telcos with more extensive fiber the home deployment also report better average downstream speed results than those with limited or no deployment.

Figure 11 – 24-Hour Average Measured Fixed Broadband Speed in G7 Countries

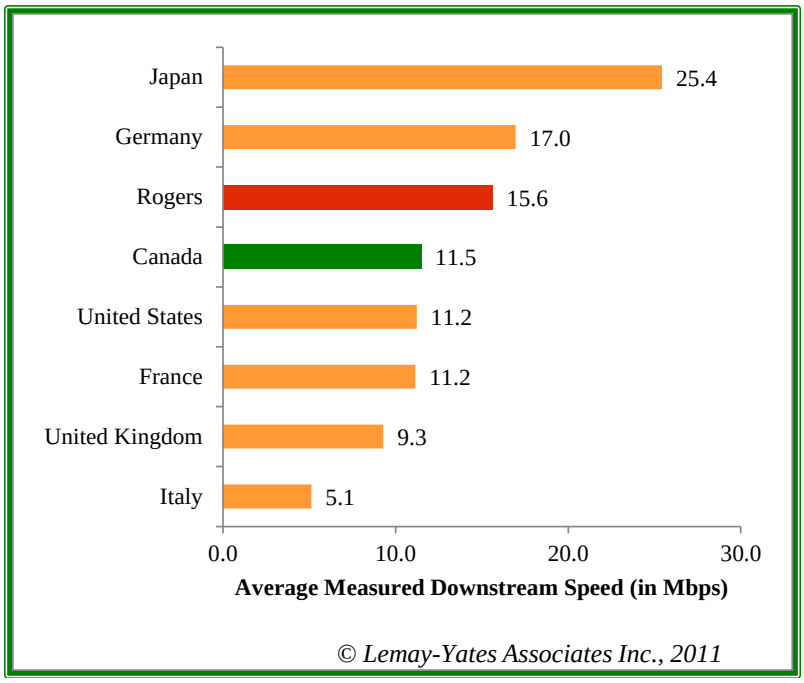


Figure 12 – 24-Hour Average Measured Fixed Broadband Speed in OECD Countries

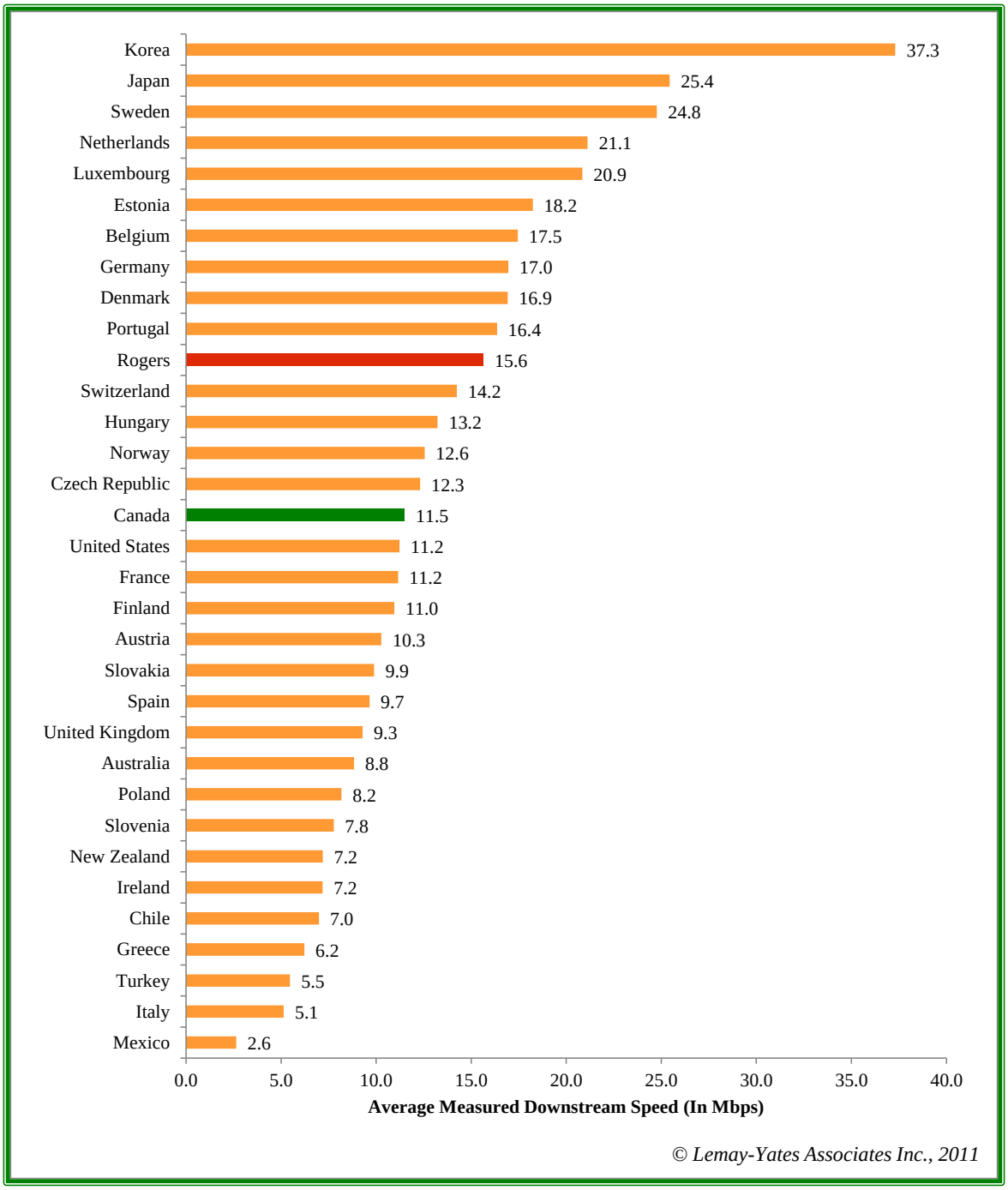


Figure 13 – 24-Hour Average Measured Fixed Broadband Speed of Major Canadians ISPs

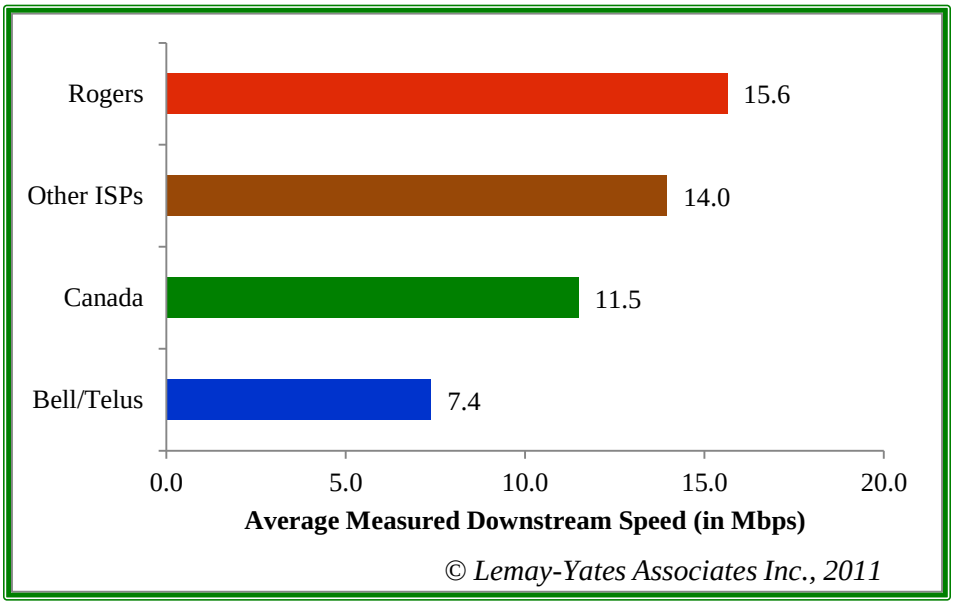
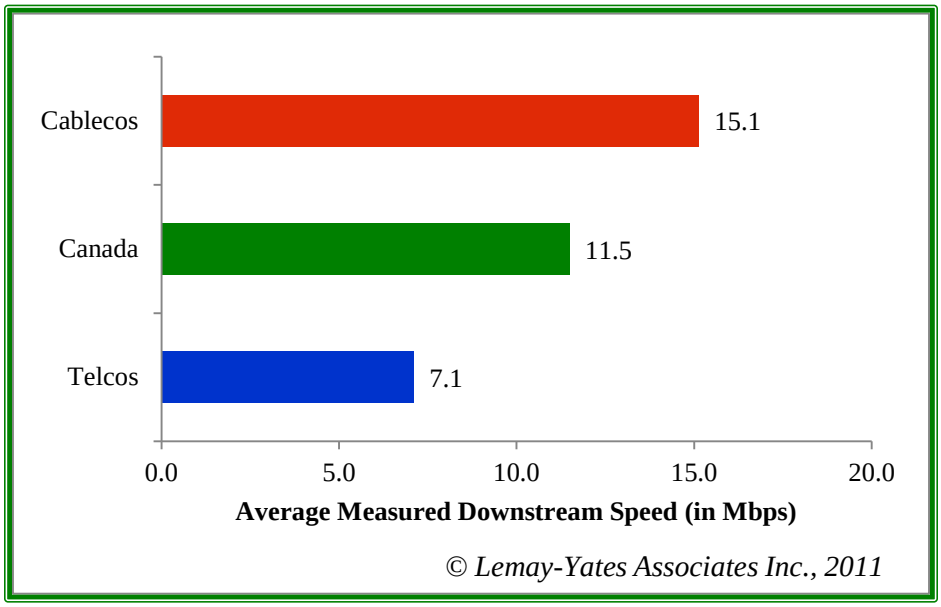


Figure 14 – 24-Hour Average Measured Fixed Broadband Speeds of Canadian Cablecos and Telcos



3.2 Benchmarking the Peak Hours Average Measured Fixed Broadband Speed

LYA has also compared the impact of increased usage on the broadband speed available to end-users during peak usage hours (assumed to be in the evenings between 6 pm and 11 pm based on typical Internet traffic profiles). This is the time of day when broadband networks are being used heavily and are under the most strain. For each country, the number of end-user speed tests conducted during these peak hours represented from close to 30% to more than 35% of all data points from that country.

Users in all countries experience a decrease in Peak Hours Average Measured Fixed Broadband speed, ranging from slightly less than 1% to a maximum of 22%, when compared to the 24-hour average. The average decrease among 32 OECD countries is 6.6%.

In terms of ranking, Canada remains at the same position in terms of measured downstream speed at peak hours, when compared to both G7 and OECD group of countries, at 3rd out of 7 and 15th out of 32, compared to the 24-hour average.

When considering percentage of decrease, Canada ranks 16th among all OECD countries, with a 5.8% decrease from overall download speeds to peak hours download speeds.

However, Rogers speed test results exhibited a lower percentage decrease when comparing Average 24-Hour Measured Broadband Speeds to Peak Hours Average Measured Broadband Speed versus the Canadian average, with only a 4.6% decrease. This represents a 20% improvement over the Canadian average. Rogers' performance is followed closely by the combined performance of Bell/TELUS with a combined average decrease of 4.8% while other Canadian ISPs see a 7.1% decrease from average to peak hours speeds.

When comparing peak hours average measured fixed broadband speeds among major Canadian ISPs, main cablecos drop from an average downstream speed of 15.1 Mbps to 14.2 Mbps and main telcos drop from 7.1 Mbps to 6.7 Mbps.

Details of the data used and of the LYA analyses are highlighted in the following Table and Figures for G7 and 32 OECD countries as well as among telcos and cablecos in Canada.

Table 2 – Geographic Distribution of Speedtest Data from OECD Countries for Peak Hours Analysis

Country	Total Peak Hours Data Points	% of Total Peak Hours Data Points	Proportion of Country Data Points
Australia	815,179	4.5%	36.8%
Austria	127,634	0.7%	35.4%
Belgium	147,323	0.8%	33.5%
Canada	785,833	4.4%	32.2%
Chile	275,152	1.5%	34.0%
Czech Republic	164,025	0.9%	34.2%
Denmark	77,623	0.4%	33.7%
Estonia	34,182	0.2%	32.4%
Finland	364,371	2.0%	36.6%
France	246,578	1.4%	34.3%
Germany	348,533	1.9%	35.1%
Greece	228,036	1.3%	33.5%
Hungary	498,061	2.8%	33.9%
Ireland	183,443	1.0%	37.1%
Italy	1,015,272	5.7%	33.4%
Japan	110,042	0.6%	29.1%
Korea (Republic of)	39,548	0.2%	30.5%
Luxembourg	12,109	0.1%	30.1%
Mexico	707,736	3.9%	31.8%
Netherlands	362,656	2.0%	35.2%
New Zealand	89,398	0.5%	29.2%
Norway	136,269	0.8%	37.0%
Poland	556,438	3.1%	35.5%
Portugal	234,180	1.3%	36.2%
Slovakia	72,562	0.4%	35.5%
Slovenia	80,316	0.4%	34.3%
Spain	253,400	1.4%	33.5%
Sweden	53,766	0.3%	36.7%
Switzerland	100,176	0.6%	36.9%
Turkey	239,441	1.3%	32.3%
United Kingdom	2,175,637	12.1%	35.5%
United States	7,420,563	41.3%	34.7%
Total	**17,955,482**		

Number of data points used from May 1 to July 31, 2011, totalling 92 days worth of data

Figure 15 – Peak Hours Average Measured Fixed Broadband Speed in G7 Countries

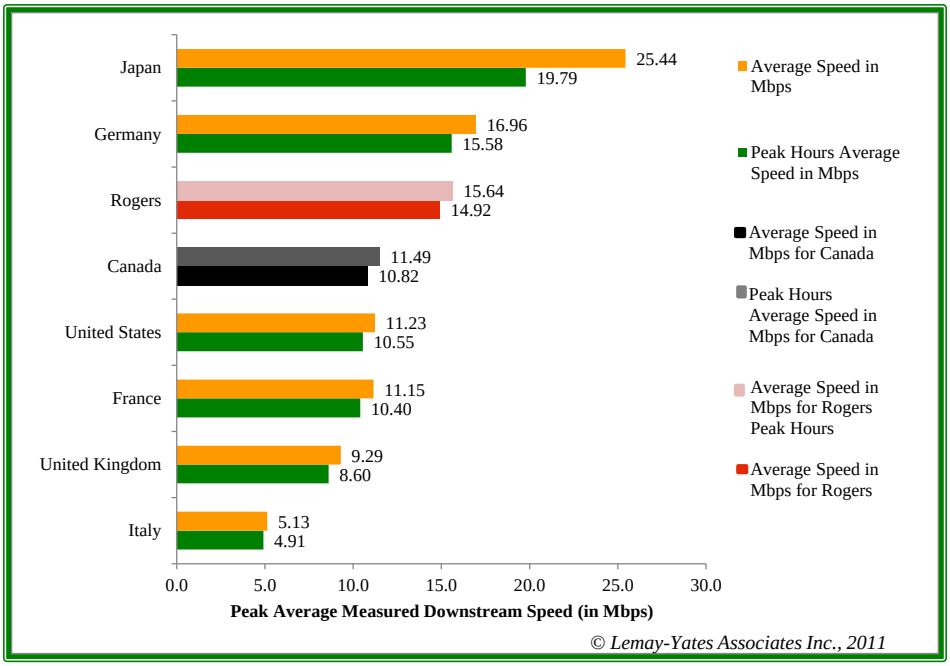


Figure 16 – Average Peak Hours Measured Fixed Broadband Speed in OECD Countries

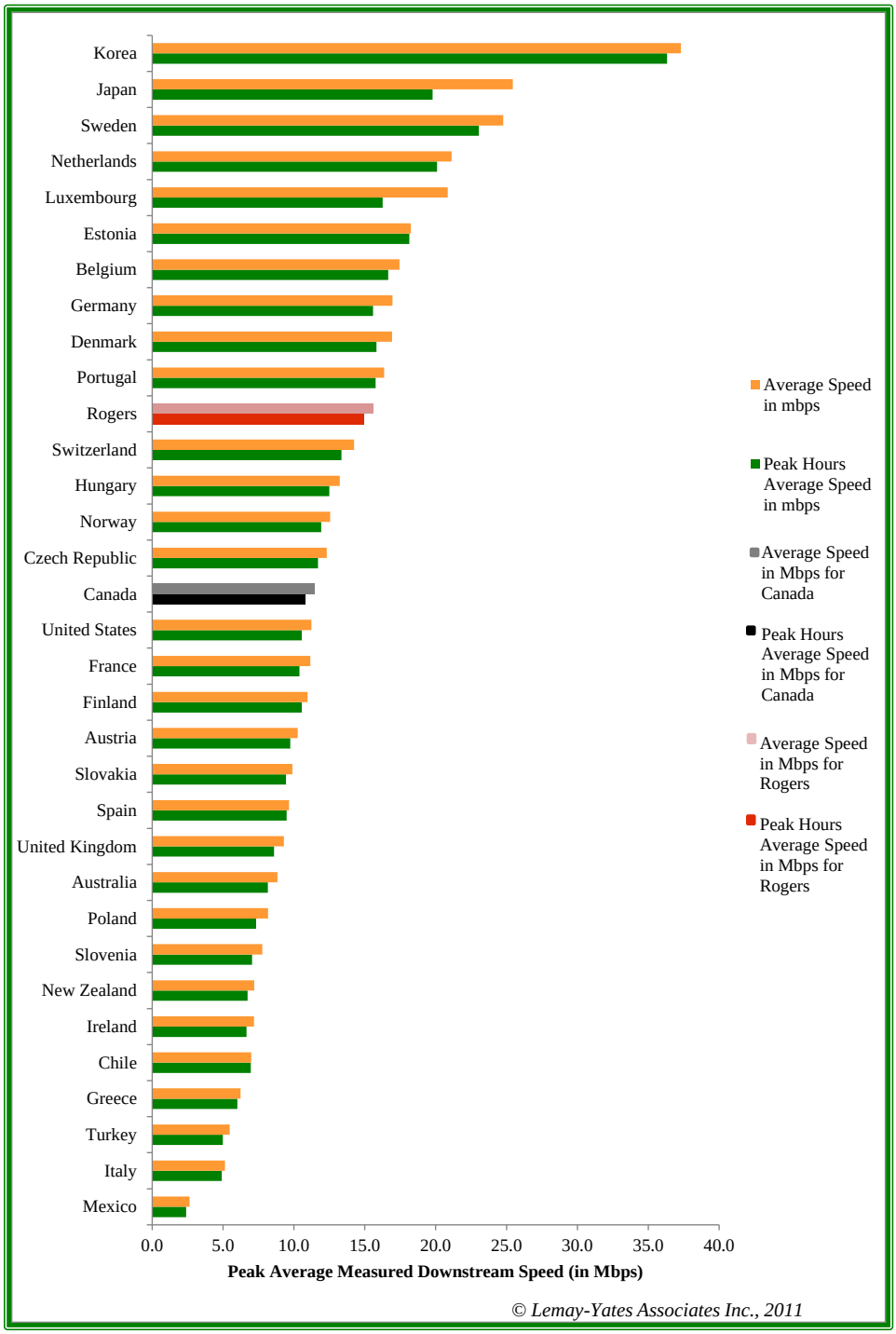
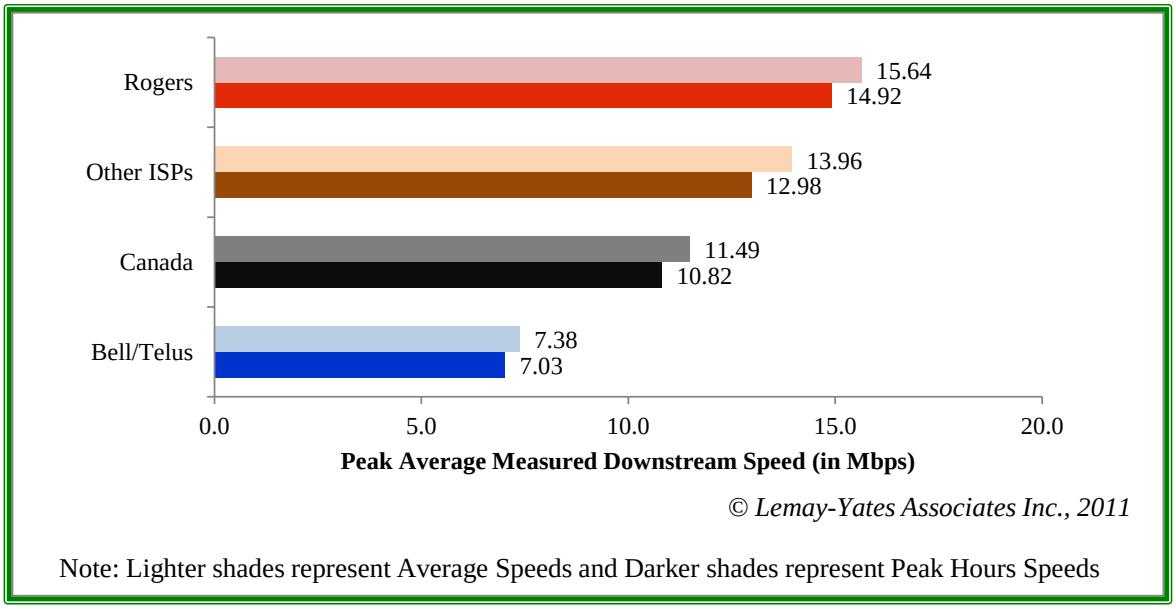
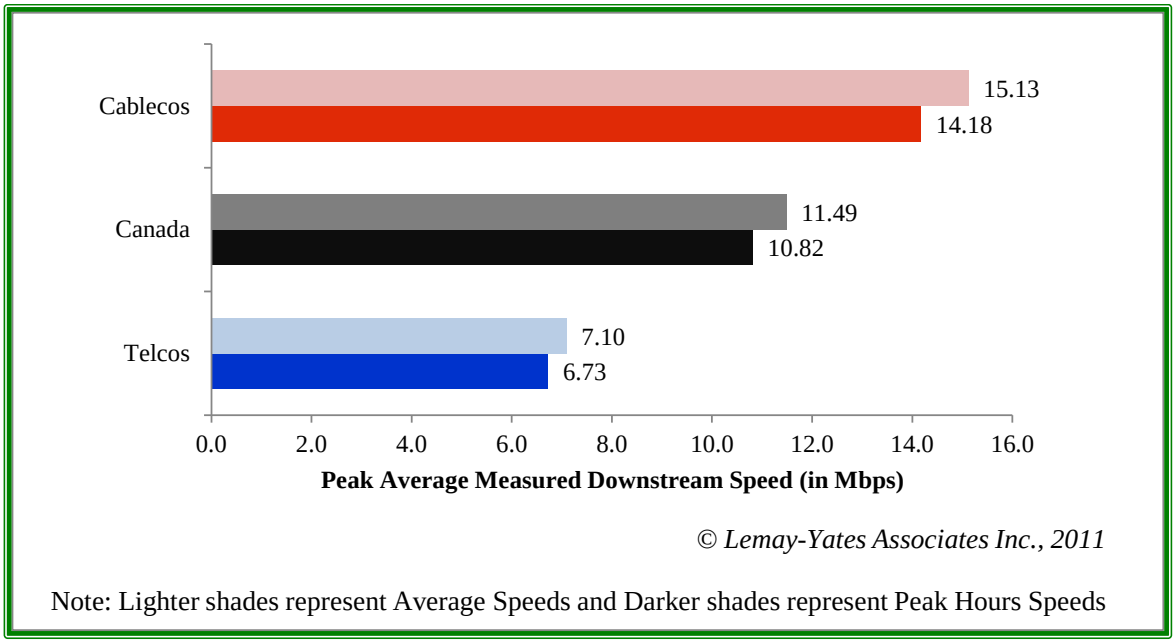


Figure 17 – Average Peak Hours Measured Fixed Broadband Speed comparing Major Canadian ISPs



Note: Lighter shades represent Average Speeds and Darker shades represent Peak Hours Speeds

Figure 18 – Average Peak Hours Measured Fixed Broadband Speed of Canadian Telcos and Cablecos



Note: Lighter shades represent Average Speeds and Darker shades represent Peak Hours Speeds

Figure 19 – Percent Decrease from 24-Hour Average Measured Broadband Speed to Peak Hours Average Measured Broadband Speed in G7 Countries

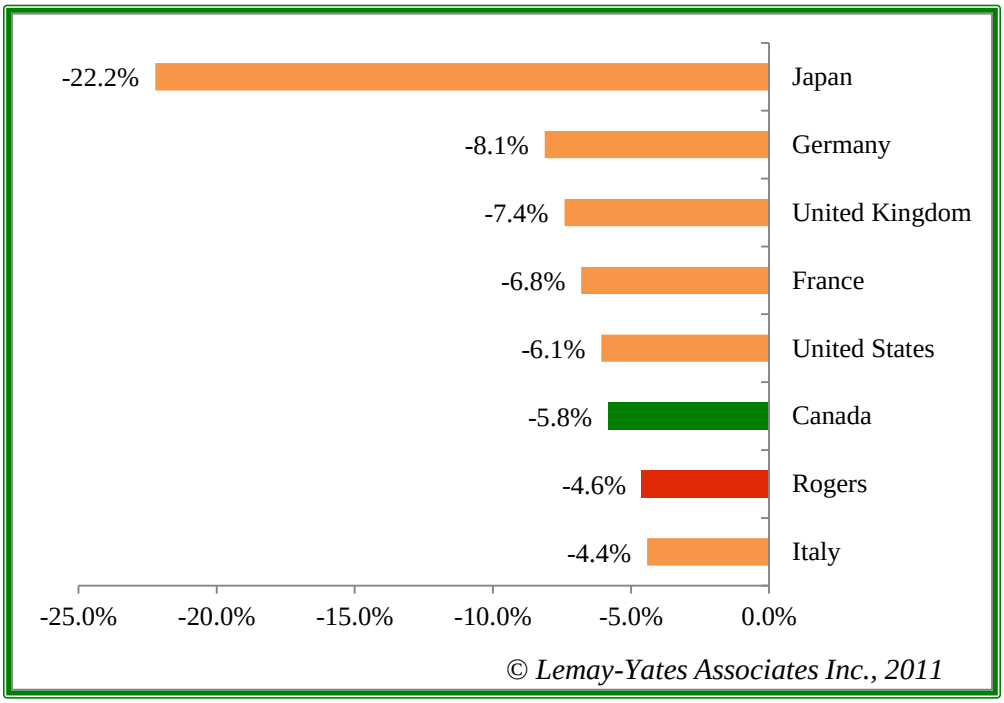


Figure 20 – Percent Decrease from 24-hour Average Measured Broadband Speed to Peak Hours Average Measured Broadband Speed comparing Major Canadian ISPs

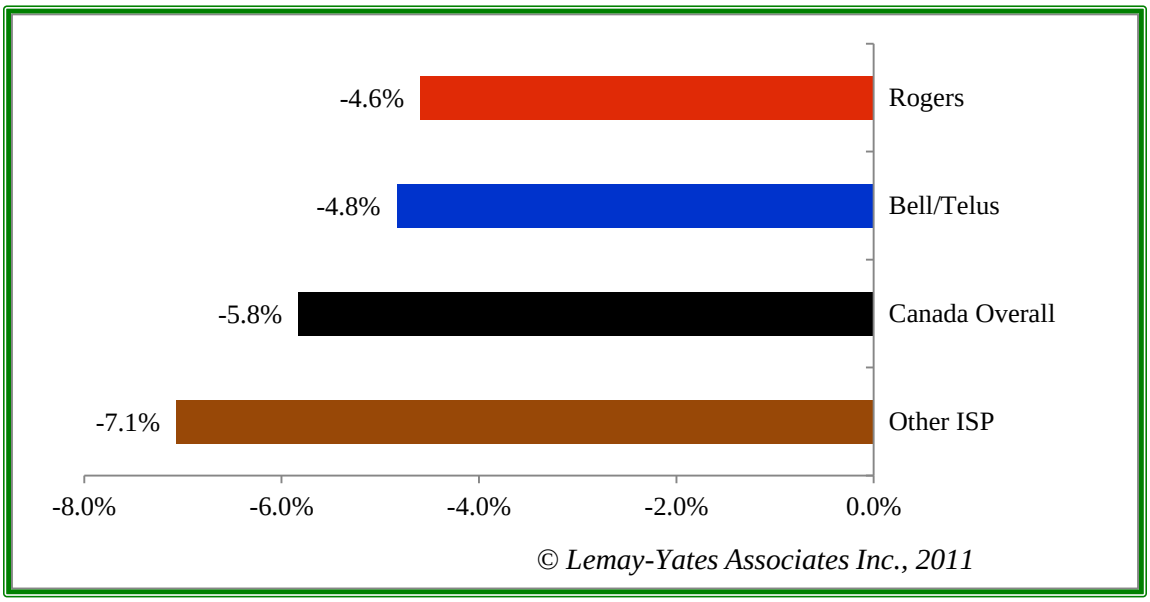
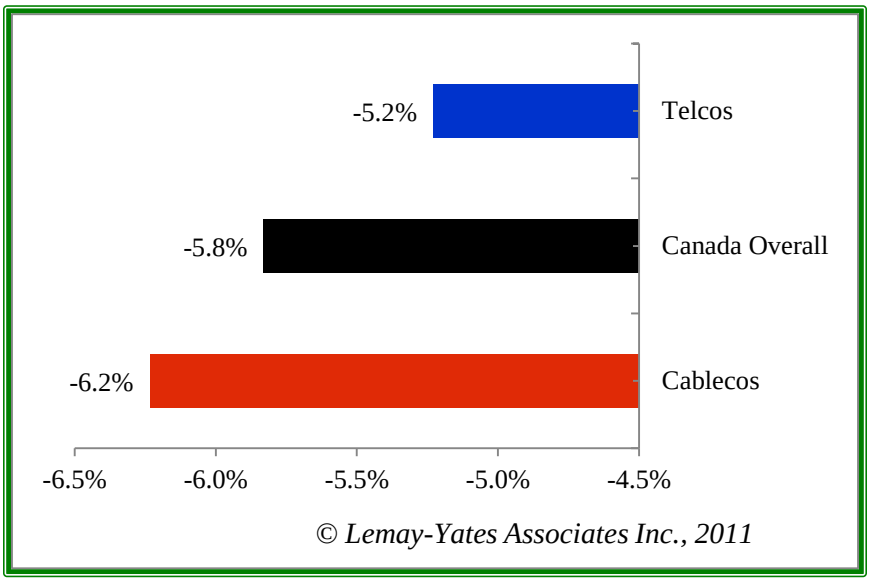


Figure 21 – Percent Decrease from 24-hour Average Measured Broadband Speed to Peak Hours Average Measured Broadband Speed for Canadian Telcos and Cablecos



4. Household Broadband Benefit Index

The Household Broadband Benefit Index aggregates two separate indicators to assess the benefits of broadband Internet in a given country to measure the real benefits of Internet to a country – broadband speed and subscription rates – by multiplying household broadband penetration by the Average Measured Broadband yielding the Household Broadband Benefit Index, per average household in a given country.

According to this Index, Canada ranks 3rd among G7 countries and 12th among 32 OECD countries. Compared to the rankings of Average Measured Broadband Speed alone, Canada's position among G7 remains unchanged, but Canada increases three places within the group of 32 OECD countries since countries such as Portugal, Hungary and Czech Republic drop in rankings due to lower broadband penetration compared to Canada despite a higher overall Average Measured Broadband Speed.

Figure 22 – Household Broadband Benefit Index in G7 Countries

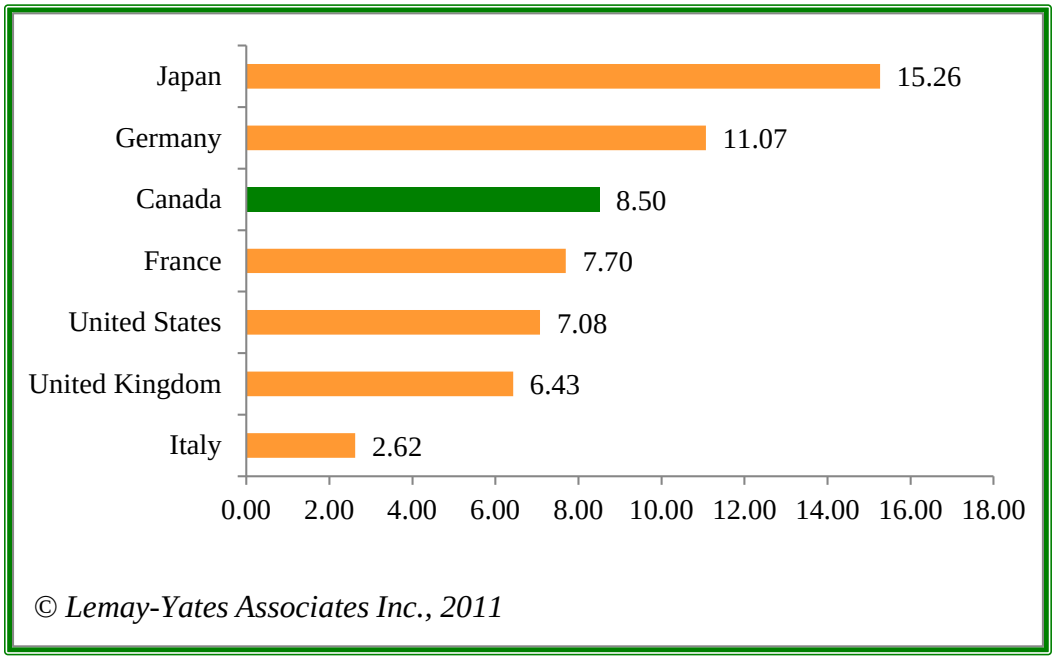
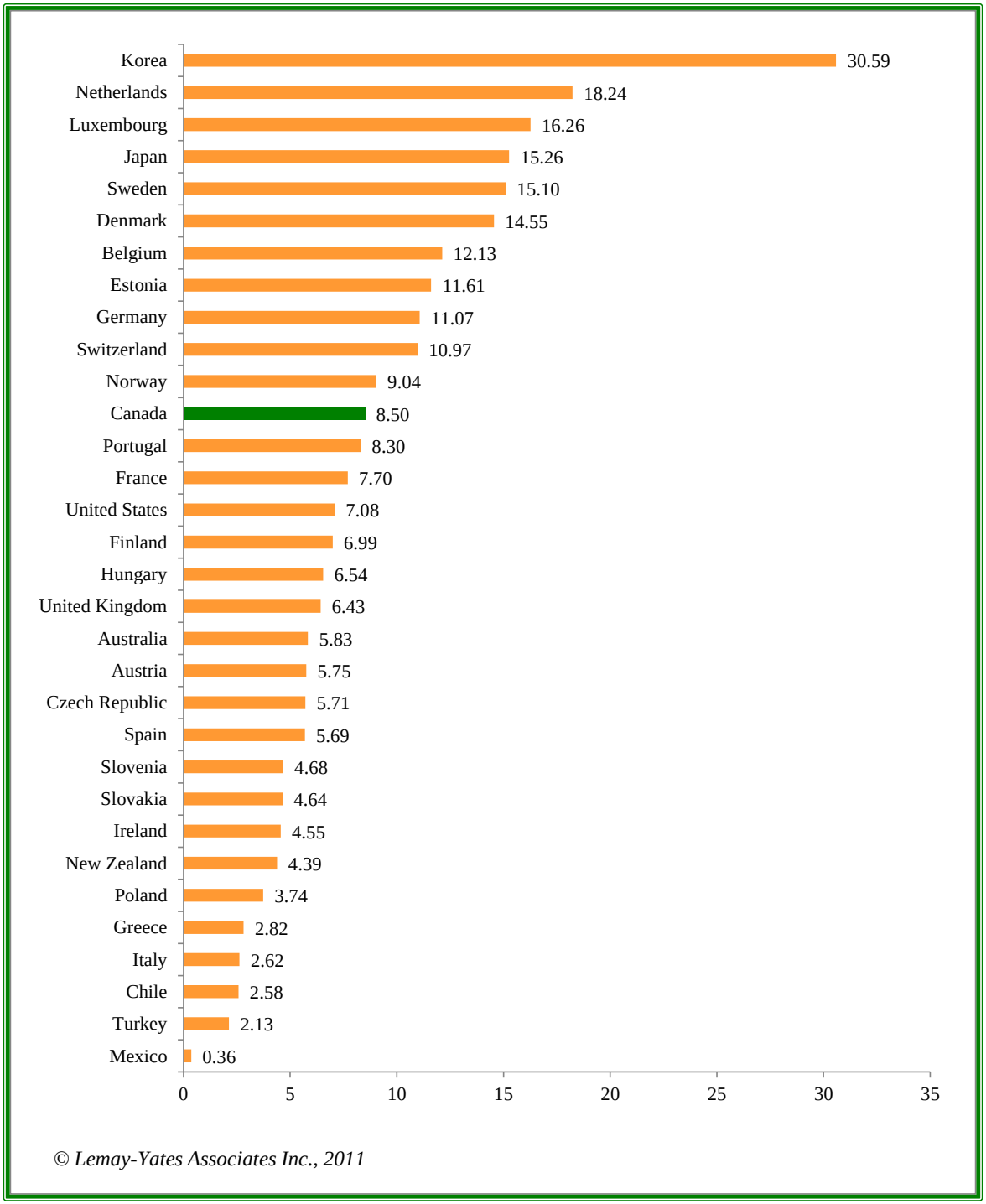


Figure 23 – Household Broadband Benefit Index in OECD countries



The Household Broadband Benefit Index intrinsically reflects both the availability as well as the relative affordability of broadband service in a given country, as lower subscription rates should normally follow high relative subscription prices, excluding the impact of any direct subsidies to consumers.

We also highlight the results of an analysis conducted by LYA in 2010 assessing the availability of high speed and very high speed broadband across a number of countries.[16] This Report highlighted that in mid-2010, 66% of Canadian households had access to very high-speed broadband services with peak downstream speeds in excess of 25 Mbps.

[16] The Performance of Canada's Consumer Broadband Networks in 2010, prepared for Rogers Communications Inc., July 2010 available at http://www.lya.com/en/spotlight/public_reports.php.

5. Benchmarking the Average Cost of a Megabit per Second of Real Broadband Speed

In this section, the average monthly subscription costs for broadband Internet services are first examined, based on LYA's detailed pricing research. In order to compare pricing from each country, the OECD's PPP Actual Individual Consumption rate in 2010 for conversion to US dollars was applied to all pricing comparative analyses.[17]

Then, the Average Cost of a Megabit per Second of broadband speed is calculated for each country, taking into account both the average monthly cost for service paid by the end user, which is then divided by the measured download speeds to assess the real cost of a Megabit per second of fixed downstream speed for each country for consumers.

Lastly, average monthly subscription cost is further divided into pricing for fixed broadband services with advertised downstream speeds above and below 10 Mbps, to determine the relative country rankings for higher and lower speed broadband internet.

5.1 The Average Monthly Broadband Subscription Cost

Overall, the range of average monthly subscription costs for fixed broadband Internet ranges from $24.23 to $55.99 in OECD countries, and $29.80 to $35.19 in G7 countries. Canada fares well relative to its international peers. Canada's average monthly subscription cost for fixed broadband service is $30.79, ranking 2nd among G7 countries, with only Italy possessing lower average monthly pricing.

[17] "Purchasing Power Parities (PPP) for Actual Individual Consumption covers all household consumption expenditure and that part of government final expenditure which covers services it supplies to individual households, for example housing, health, education, social protection etc. ... (in other words, it does not include government final expenditure on those services it supplies to households collectively such as defense, police, environment protection)", as sourced from OECD's Statistics Directorate, Price and Purchasing Parities (PPP), Frequently Asked Questions (FAQs). PPP Actual Individual Consumption rates were used in this Report since PPP for GDP covers expenditures for both households and government, whereas PPP for Actual Individual Consumption covers only expenditures relating to households, which should be more applicable to residential broadband monthly subscription prices.

On the same basis, Canada ranks 7th among 32 OECD countries. These rankings contrast drastically to the recently published OECD Communications Outlook 2011, where Canada is ranked 26th among 34 countries in terms of broadband pricing for monthly subscription with line charge.[18] In our view, this difference is mainly due to the fact that the OECD data uses a simple average across a vast range of service offerings in each country.[19] The OECD methodology does not reflect the market share of individual ISPs nor of the proportion of broadband below and above 10 Mbps, in each country, which LYA uses in its approach and which we believe provides a much closer estimate of the costs incurred by the average subscriber in each country.

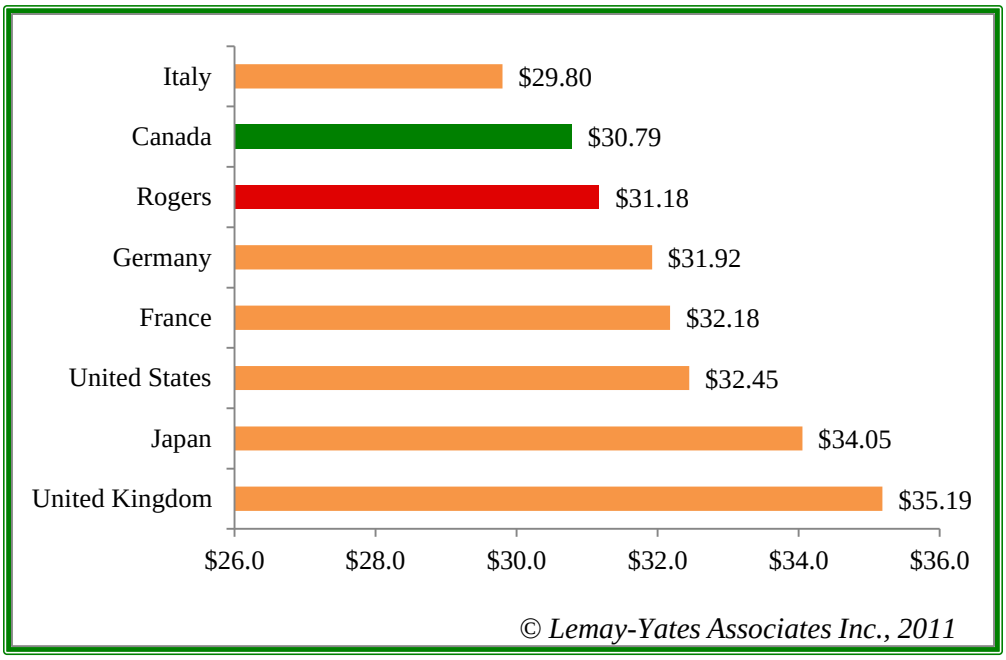
Rogers' overall monthly subscription price is slightly higher than the Canadian average, at $31.18 per month.[20] The following figure highlights the average monthly subscription cost in the G7 countries.

[18] See Figure 7.21 of 2011 OECD Communications Outlook Report, *op. cit.*

[19] See OECD Communications Outlook 2011 Report, Table 7.19, p. 295 and Statlink reference. In addition, the OECD has compiled pricing from 2-3 ISPs per country, where LYA uses pricing from all major ISPs, with an average of close to 5 ISPs per country.

[20] Rogers' results is slightly below Canada and can be explained by the fact that Rogers offers few broadband service plans below 10 Mbps, thus moving the Rogers average monthly cost slightly higher than the Canadian average.

Figure 24 – Average Monthly Subscription Cost (G7 Countries - $US PPP)



5.2 The Average Cost of a Megabit per Second of Broadband Speed

The Average Cost of a Megabit per Second of Broadband Speed to consumers in each country is provided in the following Figure for G7 countries. This cost is derived by dividing the average monthly subscription cost collected for all major ISPs in each country – expressed in US Dollar PPP – by the Average Measured Fixed Broadband Speed, reflecting the real performance of fixed broadband services in any country.

Canada's real Cost of a Megabit per Second of Fixed Broadband Speed is $2.68, while the total range among G7 countries varies from $1.34 to $5.81.

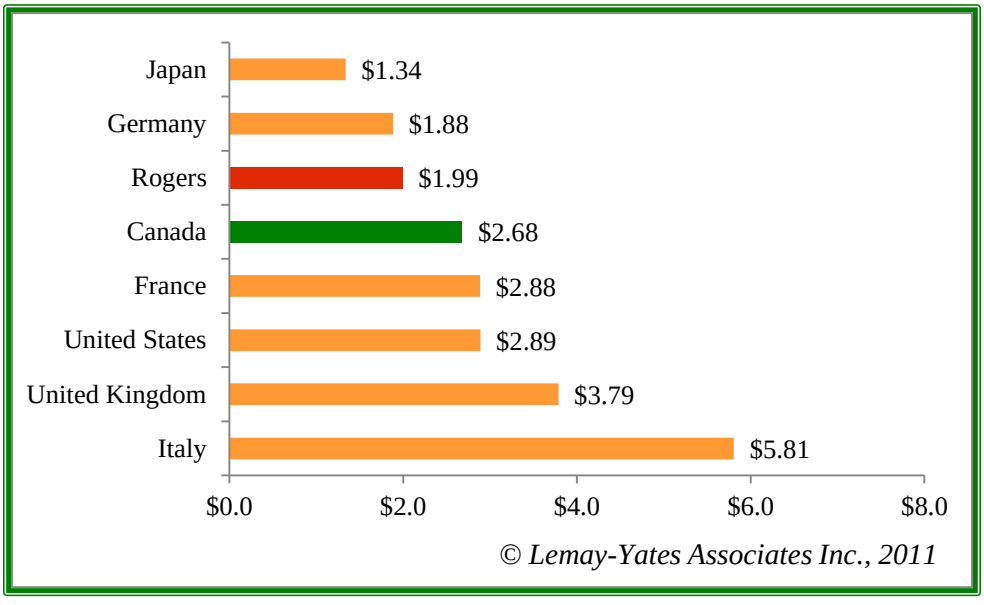
On the other hand, the range among OECD countries is from $0.87 to $17.42, a much wider than that observed for G7 countries, mainly due to Mexico scoring a Cost of a Mbps of Broadband Speed of $17.42.

Canada's ranking in terms of the Cost of a Megabit of Broadband Speed is 3rd among G7 countries after Japan and Germany, and 12th among 32 OECD countries.

In the OECD's Communications Outlook 2011 report, a similar metric ranks Canada at the 25th position among 34 OECD countries.[21] The reasons for the difference in rankings between the LYA and the OECD data are the same as those listed in Section 5.1 in addition to the fact that the LYA methodology is based on actual average measured speeds while OECD uses an average of advertised downstream speeds.

The Cost of a Megabit of Broadband Speed for subscribers to Rogers Communications fixed broadband services is $1.99, close to 25% lower than the Canadian average, reflecting the higher measured broadband speeds of Rogers' customers.

Figure 25 – Average Monthly Cost of a Megabit per Second of Broadband Speed in G7 Countries ($US PPP)



[21] See Figure 7.23 of 2011 OECD Communications Outlook Report, *op. cit.*

5.3 The Average Monthly Subscription Cost for Advertised Fixed Broadband Speeds below 10 Mbps

As part of the methodology to derive the Average Monthly Broadband Subscription Cost for each country, LYA assessed the average cost to end users for entry-level fixed broadband Internet services with advertised speeds below 10 Mbps, taking into account the relative market share of each of the most significant ISPs in each country.[22]

Canada ranks second among G7 countries on this metric with an average monthly cost of $28.42, and eleventh among 31 OECD countries, as shown on the following two Figures. Note that South Korea is not included in this comparison, as close to all broadband Internet plans reviewed had advertised broadband speeds in excess of 10 Mbps. An indicator in the OECD Communications Outlook Report calculating the average monthly subscription for broadband speeds ranging from 2.5 to 15 Mbps ranks Canada at position number 25 out of 33 countries.[23]

For Rogers Communications, the average monthly cost for advertised broadband speeds below 10 Mbps is $24.06, lower than the Canadian average.[24]

[22] Distinguishing connection speeds based on being below vs. above 10 Mbps is often used by reporting agencies in assessing broadband performance. It should be kept in mind that pricing plans vary considerably from one country to another and do not typically "break" at 10 Mbps. Most ISPs offer many pricing packages, each with a qualifier "up to" speed. For this Report, for each country, a low, medium and high plan was chosen for each major ISP – "low" being for the lowest speed offered, "high" for the highest speed offered to consumers and "medium" for the median speed among all plans. In some cases the "medium" plan was for speeds lower than 10 Mbps and so was included in calculating the average <10 Mbps. In other cases, the medium plan provides for more than 10 Mbps and in those cases it was included for the >10 Mbps analysis.

[23] See Figure 7.25 of 2011 OECD Communications Outlook Report, *op.cit.*

[24] However, we note that Rogers currently offers only two Internet plans with downstream plans below 10 Mbps, with one at up to 500 kbps and the other at up to 3 Mbps, while other Canadian ISPs tend to offer a plan in the 6 to 8 Mbps range, which has been included in these averages.

Figure 26 – Average Monthly Cost for Broadband Services with Advertised Speeds below 10 Mbps in G7 Countries ($US PPP)

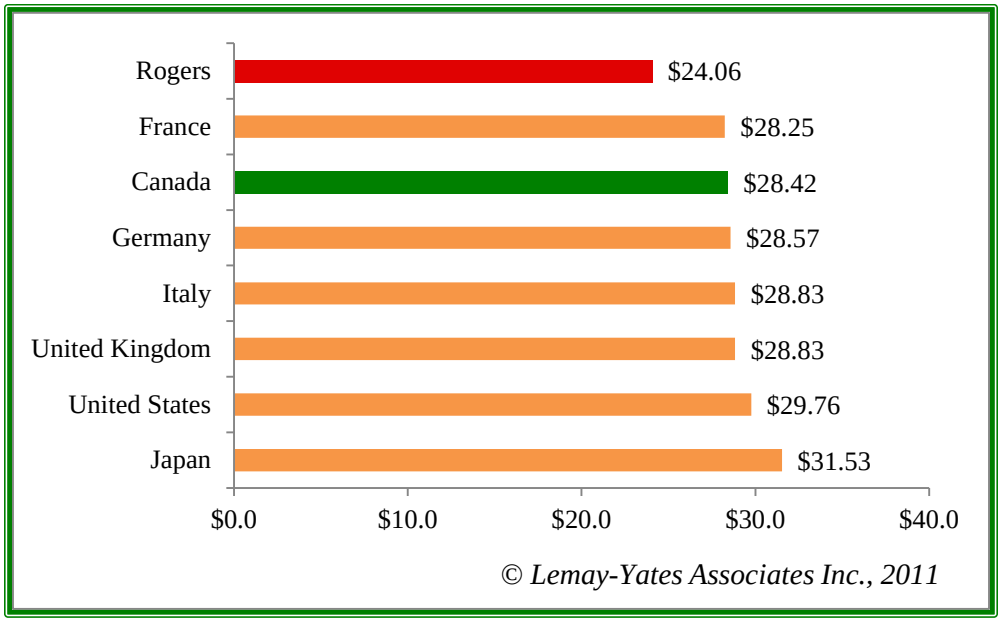
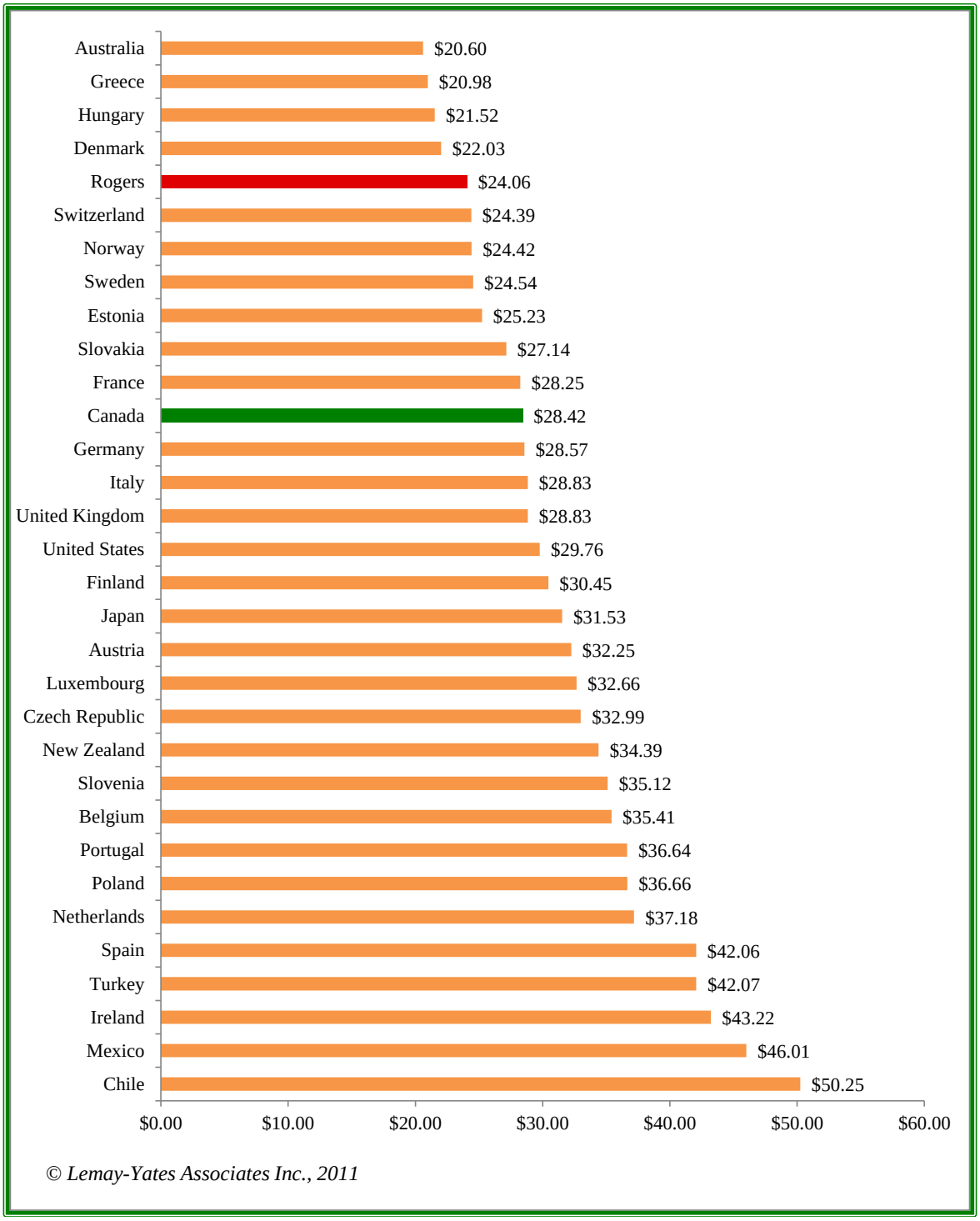


Figure 27 – Average Monthly Cost for Advertised Broadband Speeds below 10 Mbps in OECD Countries ($US PPP)

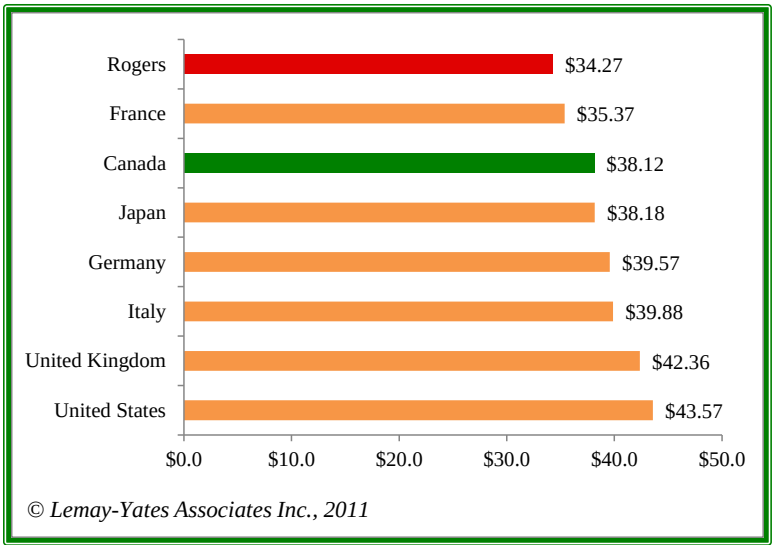


5.4 The Average Monthly Subscription Cost for Advertised Broadband Speeds above 10 Mbps

In the case of broadband Internet access service with advertised speeds above 10 Mbps, the average monthly comes in Canada is $38.12, ranking second among G7 countries and sixth among 31 OECD countries. Mexico has not been included in the analysis of OECD countries, since close to all broadband Internet offerings reviewed for this analysis were offered with speeds of only up to 10 Mbps.

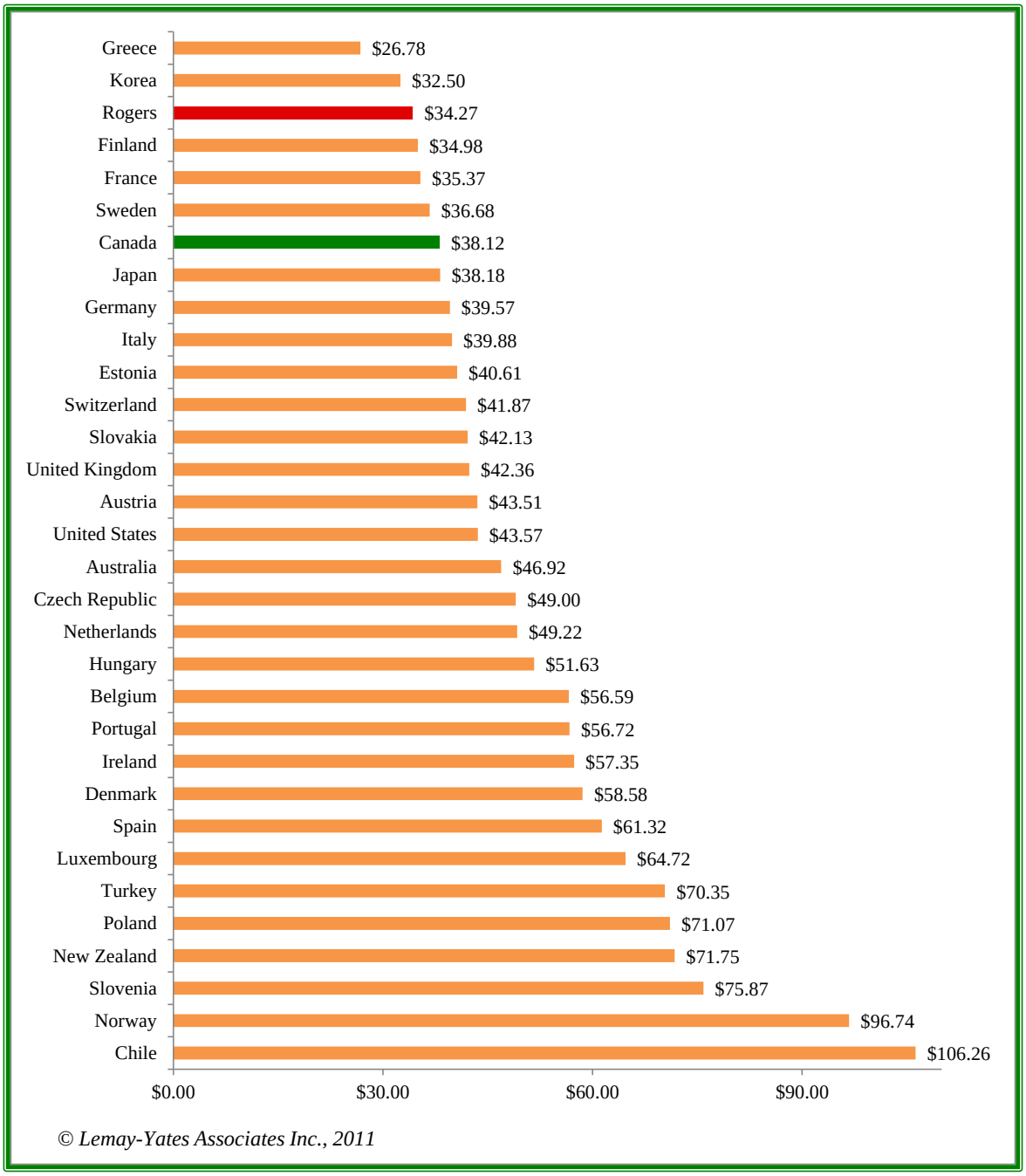
A similar indicator in the OECD 2011 Communications Outlook Report ranks Canada at 26th among 33 OECD countries, calculating the average monthly subscription for broadband speeds ranging from 15 to 30 Mbps.[25] In the case of subscribers to the fixed broadband services of Rogers Communications with advertised speeds above 10 Mbps, the monthly cost has been estimated at $34.27, 10% lower than the Canadian average, scoring an impressive first place among G7 countries and third place among 31 OECD countries.

Figure 28 – Average Monthly Cost for Broadband Services with Advertised Speeds above 10 Mbps in G7 Countries ($US PPP)



[25] See Figure 7.26 of OECD Communications Outlook Report 2011, *op.cit.*

Figure 29 – Average Monthly Cost for Broadband Services with Advertised Speeds > 10 Mbps in OECD countries ($US PPP)



6. Notes on Methodology

The key hypothesis underlying LYA's approach, which was validated by analysis of user conducted speed tests, is that the raw data of end-user speed tests does not reflect the actual market share of the various service providers; for example some Internet Service providers may cover only a small geographic portion of the country, or subscribers to providers of very high-speed broadband Internet access services may have a stronger propensity to test the actual speed delivered by their service provider, or vice versa.

Thus, an analysis of all end-user speed tests conducted in a given country, calculating the weighted average broadband Internet speed based on the market share of the various broadband Internet service providers, as done herein, provides a better perspective on the average broadband Internet speed as experienced by the average user in each country, or the Average Measured Fixed Broadband Speed per country.

The Average Measured Fixed Broadband Speed metric was multiplied by the penetration of broadband among households in each country to yield the Household Broadband Benefit Index, intrinsically reflecting both availability and affordability of fixed broadband Internet service in each country.

The Average Cost of a Mbps – expressed in US dollars on a Purchasing Power Parity (PPP) basis to facilitate comparison of many countries – for fixed Internet service for each country, was calculated based on the average end-user cost of broadband service in a given country divided by the Average Measured Fixed Broadband Speed for that country.[26]

[26] For all major Internet Service Providers (ISPs) in each of the 32 countries surveyed, three price points were researched for each provider's fixed, high-speed broadband Internet offerings, at the lowest, mid-range and highest of available plans. Their respective advertised speeds and monthly data cap, if applicable, were researched as well. In order to account for differences between OECD countries in terms of broadband plan offerings, prices are assumed to be on a two-year contract basis, including promotional pricing for applicable months. As well, 50% of the total additional line charge was added to listed monthly

It thus reflects the real cost of a megabit per second of broadband speed as paid by consumers in each country.

The analyses developed herein are based on five key sets of data:

A. More than 52 million end-user speed tests conducted by the users themselves on www.speedtest.com during the months of May, June and July 2011, thus covering 92 days in total.[27] The analysis for peak hours usage reflects more than 17 million end-user tests.
B. Research on the market share of the various Internet Service Providers in each of the 32 countries included in this analysis,[28]
C. Research on the penetration of broadband Internet per household for each country,
D. Research on the proportion of households with broadband Internet access services below and above downstream speeds of 10 Mbps,[29] and
E. Research on pricing for different broadband services offered by Internet service providers in each of the 32 countries covered. LYA researched broadband prices as offered by 155 service providers across the 32 OECD countries included in this Report with an average of 5 service providers per country. For these service providers, a total of 505 price plans were assessed, yielding an average of close to

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subscription prices, only where applicable. The average end-user cost of broadband service in each country was calculated reflecting the services offerings of the service providers coupled with the market share of each service provider as well as the proportion of end users subscribing to broadband services with advertised speeds below and above 10 Mbps, to properly reflect, to the extent possible, the composition of the broadband subscriber base.

[27] LYA acquired and analyzed the raw data of user-conducted speed tests from Ookla, the organization behind the www.speedtest.com web site.

[28] The market share for various ISPs collected total at least 80% of the broadband market in each country, as measured by number of subscribers.

[29] LYA used the split of subscribers to fixed broadband Internet access services in each country to derive the average monthly cost of Internet access services based on the service offers of the various service providers. For example, if 20% of households in a given country subscribe to services of 10 Mbps or higher, then a relative weight of 20% was given to the prices for service plans above 10 Mbps in that country. The statistic of the proportion of broadband subscribers to service plans below and above 10 Mbps was available for all countries considered in this Report. For the US and Canada, more detailed information regarding the split of subscribers according to downstream speed was available from the regulators and was used our analyses.

16 price plans per country that were included in our analysis. The pricing research was conducted from August to October 2011 and reflects pricing for that period for each service provider.[30]

[30] The pricing for all major ISPs with known market share information was collected. For each ISP surveyed, the objective was to include at least three price points related to the monthly cost of the service in the analysis – the lowest, the mid-point and the highest, as to represent the full range of prices offered by all ISPs. Discounts on the monthly fee service (for example 50% off for the first 6 months) were included in the analyses which assessed the average monthly cost to the subscriber over a 2-year period.

7. Background – Lemay-Yates Associates Inc.

Development and implementation of business strategy has been at the heart of Lemay-Yates Associates Inc. (LYA®) services since 1993, providing us with a unique ability to integrate market, technical, network, economic, regulatory and investment analyses – helping address all the Strategic **C**'s – across the blurring lines of mobile-telecom-cable, as well as carriage-content, in a competitive environment that is increasingly dynamic, complex and risky.

LYA® is a key advisor to the telecom industry, helping to drive major investment decisions and strategy. LYA® also does independent strategic research and has published a number of reports on telecom markets with topics covering Local Competition, CLECs, Foreign Investment, Mobile 911, Consumer Telecom, Mobile Broadband Services and others.

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Our research, experience and capabilities are resources for you to see ahead, see clearly, see changes and get results to support addressing all the ***c***'s of business strategy…

LYA® focuses on providing timely, accurate and actionable insight about your ***c***ustomers and ***c***ompetitors via ***c***-Ahead® Research Reports and ***c***-Sharp database products. Our ***c***-Sharp databases of business information let you focus clearly on the quantitative to help build competitive advantage by providing business intelligence and insight.

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In concert with our research, our strategy consulting services support the other Strategic **C**'s – assessment of the ***c***apabilities required to implement strategy and evaluation of the ***c***ost of investing to do so. You will ***c***-Change and ***c***-Results. ***c***-Change means consulting services to help see change coming and to support making a ***c***-change in your business. LYA® helps you move to the next level… you will ***c***-Results from us and from the implementation of your new plans, products and services.

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