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Pamela Miller  
Director General  
Telecommunications and Internet Policy Branch  
Innovation, Science and Economic Development Canada  
235 Queen Street, 10th Floor  
Ottawa, Ontario K1A 0H5

**Re: March 9, 2019 notice Canada Gazette, Part 1, Volume 153, Number 10: Order Issuing a Direction to the CRTC on Implementing the Canadian Telecommunications Policy Objectives to Promote Competition, Affordability, Consumer Interests and Innovation**

Dear Director General Miller:

Corning Incorporated (“Corning”) hereby respectfully submits the following comments in response to the consultation on the pending Canadian Radio-television and Telecommunications Commission (“CRTC”) *Order Issuing a Direction to the CRTC on Implementing the Canadian Telecommunications Policy Objectives to Promote Competition, Affordability Consumer Interests and Innovation*, as published in the *Canada Gazette*, Part One, Volume 153, No. 10 (Mar. 9, 2019) (“*Order*”).

The *Order* proposes formally directing the CRTC to consider promotion of competition, affordability, consumer interests, and innovation when implementing Canadian telecommunications policy. While these considerations are laudable, the challenge facing the CRTC is to give consumers the benefit of affordable broadband services without imposing burdensome regulation on network providers that will inhibit investment in next generation broadband networks. Investment is critical to delivering the robust broadband services consumers currently demand as well as the yet-to-be developed services consumers undoubtedly will crave in the future.

The United States faced a similar challenge. In the early 2000s, as U.S. providers began transitioning their networks from copper to fiber, the Federal Communications Commission (“FCC”) declined to impose onerous regulatory obligations on fiber network providers, concluding that light-touch regulation was more likely to promote fiber investment and benefit consumers. In the intervening years, fiber investment has increased exponentially in the United States, and U.S. consumers currently enjoy vibrant broadband services on fixed and mobile broadband networks.

The Canadian government should embrace a similar light-touch regulatory regime to promote investment in fiber networks. This approach is more likely to facilitate competition, encourage innovation, and benefit consumers consistent with the *Order*.

## **Background on Corning**

Corning invented the first low-loss optical fiber for telecommunications in 1970 and today is the world's largest manufacturer of optical fiber. Corning has been granted over 350 patents in the field of optical fiber technology, and Corning's fiber has been deployed in hundreds of thousands of networks around the globe.

In September 2017, Corning produced its one billionth kilometer of optical fiber.<sup>1</sup> Because optical fiber has unique information-carrying capacity, it has revolutionized the way the world creates, shares, and uses information in all its forms. A single optical fiber link can carry 20 terabits of data per second, enough to support four million simultaneous HD video streams. Fiber technology enables both existing services of the present and undiscovered services of the future. Today's services supported by fiber communications networks include instantaneous video downloads, online gaming, and high-speed consumer interactions, as well as life-changing applications for telemedicine, telelearning, telecommuting, and smart cities. In the near future, fiber will enable the Internet of Things, a suite of innovative and transformative services that are likely to be life changing. In addition, fiber is increasingly essential to meeting existing mobile broadband network needs as well as for supporting 5G.

Due to its deep knowledge in optical fiber technology, Corning serves as a critical source of information in a full range of proceedings at the FCC that affect the deployment of broadband services. Corning has a reputation among regulators for providing reliable analysis and modeling to demonstrate the impact of different regulatory regimes on the deployment of next generation networks, including Fiber-to-the-Home ("FTTH") and 5G technologies.

## **The Canadian Government Should Adopt Regulatory Policies That Promote Rather Than Stifle Fiber Network Investment**

In crafting regulatory policy in Canada, the Government can only give consumers the benefit of affordable next generation broadband services by encouraging investment in next generation fiber networks. The FCC learned this lesson in implementing the Telecommunications Act of 1996.<sup>2</sup> The FCC found that intrusive regulation which obligated network providers to unbundle their networks into discrete elements and to lease those elements to competitors at deep discounts undermined competition and harmed consumers. Because expansive unbundling had the effect of discouraging network providers from investing in the high-speed broadband networks needed to serve consumers, the FCC relieved incumbent carriers of the obligation to unbundle fiber loops – a decision that had profoundly positive impacts on the deployment of FTTH in the

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<sup>1</sup> See Corning, Press Release, Corning Celebrates Delivering its 1 Billionth Kilometer of Optical Fiber, <https://www.corning.com/worldwide/en/products/communication-networks/products/fiber/milestone.html> (Sept. 28, 2017). This is enough fiber to wrap around the earth 25,000 times, or, stated differently, enough fiber to make 1,300 round trips to the moon.

<sup>2</sup> Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 ("1996 Act"). The 1996 Act amended the Communications Act of 1934.

United States. Likewise, the Canadian Government should avoid regulatory policies that obligate incumbent carriers to lease unbundled network elements or resell their retail services to competitors at a deep discount.

As background, prior to the passage of the 1996 Act, the U.S. telecom market was dominated by one large nationwide long-distance carrier – AT&T – and seven regional Bell operating companies (“RBOCs”). AT&T and the seven RBOCs were the product of the settlement of the Department of Justice’s antitrust suit to break up the Bell System, which resulted in the structural separation of the vertically integrated AT&T.<sup>3</sup> In an effort to promote competition, the settlement established line-of-business restrictions on AT&T and the RBOCs.<sup>4</sup>

It was clear by 1996 that the line-of-business restrictions were disserving consumers. The restrictions resulted in less competition, and the experiment with structural separation had failed. The 1996 Act eliminated the line-of-business restrictions but imposed network unbundling requirements on incumbent telecommunications carriers to facilitate competition in the local telecommunications market.<sup>5</sup> Under this new regulatory regime, the RBOCs were required to unbundle their network elements and lease them to competitors at a deep discount to enable competitors to provide services on profitable terms.

This unbundling regulatory regime impeded network investment in two ways. First, it gave incumbent carriers a disincentive to upgrade their networks because they could not capture the revenue streams that such upgrades would otherwise enable. Second, it allowed competing carriers to serve customers profitably without investing in their own networks. Under an unbundling regime, the competitor had the ability to capture 100% of the revenue from the retail customers they served using the incumbent’s network, while the incumbent stood to capture only substantially reduced revenue generated by payments from the competitor leasing the unbundled network elements at artificially low rates. Investment in U.S. communications networks suffered as a result of unbundling requirements.<sup>6</sup>

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<sup>3</sup> See *United States v. Western Elec. Co.*, 552 F. Supp. 131 (D.D.C. 1982), *aff’d sub nom.*, *Maryland v. United States*, 460 U.S. 1001 (1983).

<sup>4</sup> Specifically, AT&T was prohibited from providing local, intrastate telecom services, and the RBOCs were restricted from providing long-distance, interstate telecom services. See 552 F. Supp. at 141.

<sup>5</sup> 47 U.S.C. § 251(c)(3).

<sup>6</sup> See J. A. Hausman, W. E. Taylor, *Telecommunications Deregulation, The American Economic Review: Papers and Proceedings* 382-90 (2012) (concluding that “only after artificial competition was rolled back from both voice and broadband services did facilities-based competition begin to replace regulation in residential telecommunications markets”); Robert W. Crandall, Allan T. Ingraham, Hal J. Singer, *Do Unbundling Policies Discourage CLEC Facilities-Based Investment*, *The B.E. Journals in Economic Analysis & Policy* 20 (2004) (finding “facilities-based investment over time indicates that facilities-based lines growth relative to UNE growth was faster in states where the cost of UNEs was higher relative to the cost of

In reviewing the effectiveness of the 1996 Act in 2001, the FCC sought comment on the impact of unbundling on investment in next generation FTTH networks.<sup>7</sup> In that proceeding, Corning recommended that the FCC exclude FTTH from mandatory unbundling requirements based on a study which demonstrated that unbundling at deep discounts would adversely impact FTTH deployment.<sup>8</sup> According to the study, unbundling could reduce by 80% the number of households that incumbent carriers could service economically with FTTH. Under this scenario, incumbent investment in FTTH deployment could be reduced by \$39 billion.

The FCC ultimately decided to relieve fiber loops from unbundling requirements, while continuing to require that incumbent carriers unbundle their copper loops.<sup>9</sup> The immediate impact of this decision was dramatic. As indicated in *Figure 1* below, FTTH deployment grew from 52,000 homes-passed in 2002 (the year before the FCC's order declining to require the unbundling of fiber loops went into effect), to 3.6 million homes-passed in 2007.

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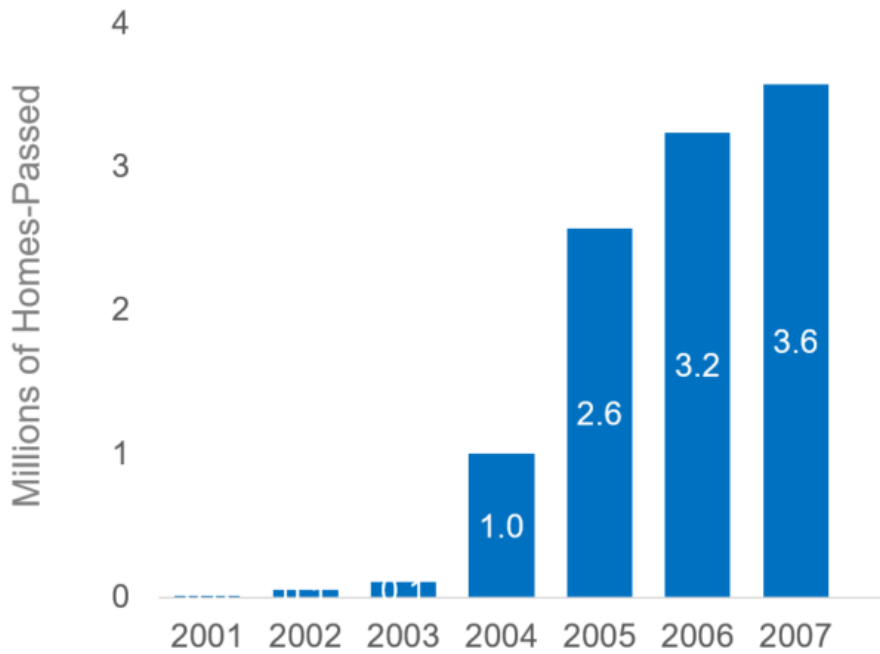
facilities-based investment”); Clifford Winston, U.S. Industry Adjustment to Economic Deregulation, *Journal of Economic Perspectives* 103-05 (Vol. 12, No. 3, Summer 1998).

<sup>7</sup> *Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, Deployment of Wireline Services Offering Advanced Telecommunications Capability*, Notice of Proposed Rulemaking, 16 FCC Rcd 22781 (2001).

<sup>8</sup> *See* Comments of Corning, Inc., CC Docket Nos. 01-338, 96-98, 98-147 (filed Apr. 5, 2002). The study used a net present value (“NPV”) model to estimate the base case of homes passed and served with FTTH absent the unbundling requirement, which allowed the incumbent carrier to capture all the revenue generated from its investment in next generation FTTH. Using the NPV model, the study estimated the deployment and investment in FTTH in an alternative scenario by which the incumbent carrier would be required to unbundle the local fiber loop and lease it to competitors at a deep discounted rate based on the long run incremental cost of the fiber loop.

<sup>9</sup> *Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers; Implementation of the Local Competition Provisions of the Telecommunications Act of 1996; Deployment of Wireline Services Offering Advanced Telecommunications Capability*, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 FCC Rcd 16978, ¶ 200 (2003).

**Figure 1 - Annual Fiber-to-the-Home (FTTH) Deployment in the United States 2001-08**



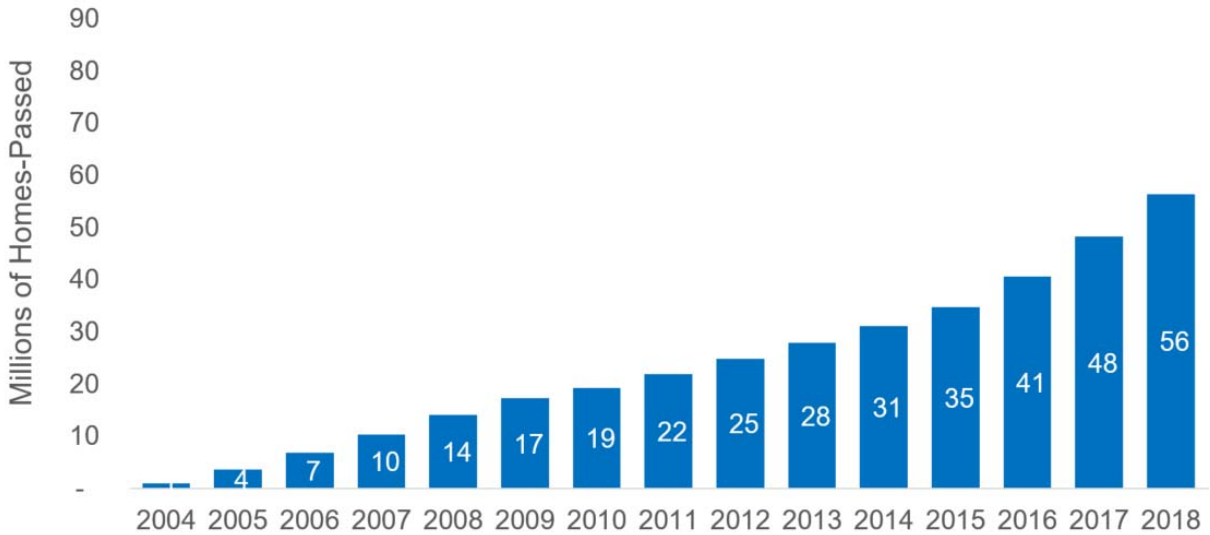
Source: Corning Data Analysis

During this same time period, overall fiber demand increased by 122%, from 11.9 million kilometers to 26.4 million kilometers. This increased demand was driven to a large degree by the FCC’s decision to exempt fiber loops from the unbundling obligation. Verizon, for example, committed \$23 billion during this period to launch its revolutionary FTTH service under the brand name of FiOS – a commitment based to a large extent on the FCC’s decision not to subject fiber loops to unbundling obligations.<sup>10</sup>

The reduced regulatory burden on fiber loops has continued to incentivize investment in FTTH, a futureproof technology with virtually unlimited information-carrying capacity. As indicated in **Figure 2** below, the cumulative FTTH deployment in the United States has continued to skyrocket, with more than 56 million homes passed in 2018.

<sup>10</sup> See TVTechnology, *Verizon to Spend Nearly \$23 Billion on Fiber Network*, <https://www.tvtechnology.com/news/verizon-to-spend-nearly-23-billion-on-fiber-network> (Oct. 2, 2006).

**Figure 2 - Cumulative Fiber-to-the-Home (FTTH) Deployment in the United States, 2004-2018**



Source: Corning Data Analysis

Consumers in the U.S. have benefited from FTTH investment, as average fixed broadband speeds have increased exponentially. For example, according to the most current data available from the FCC, between 2014 and 2016, the median weighted broadband download speed in the United States increased from 28.29 Mbps to 55.44 Mbps, and the United States’ ranking improved from 14th to 10th out of 28 comparison countries during this time period.<sup>11</sup>

Finally, consumers also will benefit from increased fiber investment as fiber buildout will be necessary to support 5G services. Connecting the small cells that will comprise 5G networks will require a substantial amount of fiber – by one estimate, 1,390,816 miles of fiber cable would be required to provide full 5G service to the top 25 metropolitan areas in the U.S.<sup>12</sup> Further, recent Corning-sponsored NPV modeling demonstrates how heavy-handed regulation can inhibit investment in the next generation fixed 5G wireless networks.<sup>13</sup> For example, modeling showed

<sup>11</sup> See *International Comparison Requirements Pursuant to the Broadband Data Improvement Act*, Sixth Report, 33 FCC Rcd 978, Table 3 – Median (Weighted) Fixed Download Speed by Country (2014-2016) (2018).

<sup>12</sup> Fiber Broadband Association, White Paper, *The Road to 5G is Paved with Fiber*, (Dec. 2017) <https://www.fiberbroadband.org/blog/fiber-broadband-association-releases-white-paper-on-fiber-and-5g>.

<sup>13</sup> The model estimated the impact of certain regulatory conditions from a base case. This base case estimated the number of homes served and the associated capital expenditures under a

that increasing the fees charged by local governments for 5G equipment deployment by \$500 per pole could result in 7.9 million fewer homes served and \$11.6 million less in capital that could be expended when compared to the base case.<sup>14</sup> Imposing a regulated franchise fee of 5% could reduce deployment of fixed 5G by 9.4 million homes and reduce capital expenditures by \$13.6 billion when compared to the base case.<sup>15</sup> Rather than promulgate burdensome regulation, the Canadian government should encourage network investment in fiber to unlock the great potential of 5G for consumers in Canada and the Canadian economy.

### **Conclusion**

As the U.S. experience has confirmed, a light-touch regulatory approach to fiber networks in Canada will promote network investment, which will facilitate competition, encourage innovation, and benefit consumers. If the *Order* is adopted, the Canadian government should refrain from requiring that incumbent carriers unbundle their fiber networks or resell fiber-based services to competitors at a deep discount. Such heavy-handed regulatory requirements would eliminate incentives for fiber investment and undermine innovation in new technologies, including 5G services.

Respectfully Submitted,



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regulatory regime for fixed 5G that existed in 2017. To demonstrate the adverse impact of increased regulation, the base case model was rerun with changes in several regulatory conditions. See Letter from Thomas J. Navin, Counsel to Corning, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 17-79 at Attachment A (filed Jan. 25, 2018).

<sup>14</sup> *Id.* at 9.

<sup>15</sup> *Id.*