



CORNING

Maximizing Your Fiber Network ROI

The questions about the critical nature and essential need for broadband everywhere have been answered. The COVID-19 pandemic has helped unify the call for universal broadband to ensure that no child, frontline worker, small business, or community is ever left behind without connectivity again. In fact, many existing service providers have enacted free or low-cost connection options to support the radical shift to home-based learning, working, and telehealth. Although this article focuses on the financial bottom line, we acknowledge that many of you are choosing to do the right thing, even if it is counter to traditional financial goals. The question going forward for communications service providers (CSPs) and communities is which long-term broadband network strategy ensures ubiquitous high-speed broadband is available to everyone.

Fiber broadband networks provide the best answer. No other technology matches fiber's ability to enable any bandwidth application, both now and in the future. All-fiber networks have proven their ability to scale over time and have a useful life well beyond comparable copper or wireless technologies. Before we delve into the levers one can pull to affect the ROI in total, CSPs may want to challenge their expectations with respect to the time to recoup their investment, given the lifespan of a fiber infrastructure. An underlying fiber broadband network empowers CSPs and communities to meet the challenge of bringing ultra-broadband capability for both fixed and mobile networks, leaving no one behind. Significant investment is required to achieve this goal. With proper planning, CSPs and communities can maximize the return on this investment, giving their customers and constituents the broadband network that best prepares them for whatever the future may hold.

Build it Once

As CSPs and communities plot their technology future for the next 50 years or more, a lot can be learned from the previous 50 years. A key lesson learned is to take the build-it-once approach. The last thing any CSP wants to do is make an investment in an underlying communications network, only to find out 3, 5, or 20 years later that a significant network investment is required to keep pace with innovation and customer demand.

Historically, networks were built in this way – one network was built, only to learn years later that an additional network infrastructure investment was necessary to meet the demands of different customer segments or evolving applications. The end result has often been multiple interconnected networks. A patchwork of networks that may include copper or coax networks, feeding homes and small- to medium-size businesses (SMBs), complemented by fiber networks feeding large business/enterprise and wholesale customers. This patchwork is rounded out by mobile networks using a combination of wired and wireless transport solutions. The interconnected network or networks are incredibly complex and expensive to operate and maintain. We can do better.

Considering the total cost of a build is heavily influenced by installation labor, in some cases upwards of 60%, building a network that requires little to no new outside plant construction after initial build to expand or upgrade will minimize the total cost of ownership. To realize a better ROI, implementing a strategy to build one underlying fiber broadband network enabling various applications is prudent. As fiber technologies advance throughout, think XGS-PON or NG-PON2, the fiber infrastructure they ride on largely remains

unchanged. Building an all-fiber network gives CSPs the ability to converge customer demands – residential, SMB, enterprise/wholesale, and mobile – on a single unified network. Revenue models multiply as a result, delivering an enhanced ROI.

The build-it-once approach also extends to mobile demand and smart cities. If communities want to ensure they participate in a 5G future, an underlying fiber-rich network is not just desirable, it's required. Fiber-fed small cells will power both 5G and Wi-Fi, making a wireless ultra-broadband experience possible. Tangentially, the thousands, or even millions, of sensors needed to deliver on the promise of the smart city will need fiber connectivity to function properly.

The choice is clear – one network foundation for whatever the future holds. Build it once and leverage it several times over. Whether it's utilizing wave-division multiplexing (WDM) on an optical transport network (OTN) segment for 5G transport or employing NG-PON2 to meet increasing residential, SMB, or enterprise demands, CSPs can truly maximize their revenue opportunity from a foundational fiber-based network.

Verizon outlined this very approach with its One Fiber program. Several years ago, Verizon embarked on building one fiber infrastructure that would serve all its technology needs. Launched in 2016, the program currently reaches 60 major U.S. cities. According to one report, it involves deploying 1,000 miles of fiber and spending as much as \$30 million per month.¹

Verizon's Fiber One strategy includes laying up to 1,728-count fiber strands as well as never lower than 864-count fiber strands on major routes. Although their decisions on fiber counts may not be practical for every CSP or in certain rural applications, the underlying strategy of build it once to maximize the return is sound.



Key ROI Factors

As CSPs embrace a fiber broadband strategy, there are several factors that can improve ROI. Among all key strategies, noteworthy options include leveraging existing network assets and considering all network design options. If minimizing CapEx is a primary concern, considering “lean fiber” architectures may also be an option to explore.

Leveraging Existing Network Assets

Today’s modern CSP consists of a very diverse group of providers. Ranging from traditional TELCOs and cable companies, to electric cooperatives and municipalities, and even the communities themselves, these providers all have a common goal of bringing the best broadband possible to the marketplace. Regardless of type, all CSPs share a common characteristic – existing network assets that can be leveraged for fiber network builds.

Traditional TELCOs and cable companies have obvious network assets that they’ve learned to leverage for decades. These assets allow long-standing CSPs to bring fiber deeper into their networks, with fiber-to-the-premise (FTTP) networks now flourishing across the country. Newer CSP entrants, such as electric cooperatives and municipalities, are fortunate to have similar network assets that traditionally were used for delivering electricity. Those same assets can be easily repurposed for a fiber network. These assets go beyond the obvious poles and rights-of-way infrastructure critical to a fiber build, to include assets like huts, substations, towers, trucks, and technicians. Technology enhancements that shrink fiber terminals and drops may allow existing handholes or pedestals to be leveraged, reducing upfront costs even further.

Electric cooperatives have been particularly adept at leveraging these assets for fiber networks. A recent study by the National Rural Electric Cooperative Association (NRECA) highlighted that fiber was the overwhelming technology of choice for cooperatives who have moved into broadband.² The NRECA cites the amount of fiber investment made by electric cooperatives in just the last few years as “remarkable.” Indeed, electric utilities, be they cooperatives or municipalities, have extensive network assets that can contribute to a better ROI for their fiber network builds.



Fiber Network Design Strategies

Important decisions made during the design phase have lasting implications for fiber network ROI. Upfront planning is necessary to maximize future revenue opportunities. That includes ensuring fiber network designs anticipate economic or real estate expansions, dark fiber demand, or other unforeseen opportunities. This is of particular interest for those who are pursuing funding through the FCC's Rural Digital Opportunity Fund (RDOF) or USDA's ReConnect program, both of which can augment investments in fiber broadband builds.

Funding programs target specific unserved and underserved territories, but through proper design and planning, CSPs can build networks that are conducive to future expansion into neighboring markets, creating additional revenue opportunities and contributing to a better ROI.

Additionally, if smart city or 5G-capable future is a part of the vision, network designs should consider higher fiber counts than what current conditions may indicate. More fiber capacity from the beginning creates potential for dark fiber leasing and other wholesale opportunities, as well as for taking advantage of unforeseen future demand to generate additional revenue opportunities. Fiber is unique in this regard because it's the underlying infrastructure that best enables expansion to address market opportunities that may present themselves. Designing a network with these factors in mind is critical for maximizing fiber broadband ROI.

Lean Fiber Architecture

For certain CSPs serving remote and very rural territories, turning to a lean fiber architecture strategy can positively impact a fiber network ROI by lowering upfront CapEx and splice labor during construction. A lean fiber strategy relies on distributed split architectures, also referred to as distributed split or optical tap. This approach puts less fiber facilities in the network, while still providing FTTP services. Ideally, all CSPs would follow a more fiber-rich home-run or centralized split architecture, both of which offer a high degree of flexibility,

bandwidth capacity, and room for future network expansion. But these also require higher levels of upfront CapEx, which can be a drag on fiber network ROI – particularly in lower-density markets.

Adopting distributed split or optical tap architectures lessens feeder and distribution fiber cable requirements, thus lowering fiber management material and fiber splicing construction costs. This can improve the ROI calculations for less dense markets. However, the trade-off of these leaner architecture options limits bandwidth flexibility to discrete locations and future expansion as a result. This approach should be used in service areas where significant expansion and growth are not expected. Adding capacity for business or enterprise growth, or 5G small cells, or a new housing development, could require an expensive network overbuild.

The lean fiber approach can make sense in certain applications. Some of the downside risk can be mitigated by using a higher-capacity main distribution fiber cable that serves as surplus dark fiber. This approach takes advantage of the lower-cost lean architecture strategy, while including additional capacity in the network for future growth.

The Best ROI Path

Any good broadband business strategy should aim to utilize an underlying technology that can best enable any and all applications, regardless of bandwidth demand or latency requirement. That capability gives CSPs an ROI advantage. It allows them to maximize their revenue opportunity. This is where fiber broadband excels. No other technology can more easily handle the bandwidth and latency requirements of not only today's applications, but tomorrow's as well.

With proper planning and a build-it-once vision, CSPs are not only positioning their companies and the communities they serve for the next 50 years, they are also maximizing their ROI opportunity. By embracing some of the strategies outlined above, the investment in the network yields returns well beyond what can be found on a balance sheet.

¹The Story Behind Verizon's 5G Secret Weapon. <https://www.lightreading.com/mobile/5g/the-story-behind-verizon-s-5g-secret-weapon/d/d-id/752625>

²Electric Cooperatives Bring High-Speed Communications to Underserved Areas. <https://www.cooperative.com/programs-services/bts/Documents/Reports/Report-Broadband-Case-Studies-Summary-Updated-Feb-2020.pdf>

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For more information visit corning.com/FTTP

Corning Optical Communications LLC • 4200 Corning Place • Charlotte, NC 28216 USA
800-743-2675 • FAX: 828-325-5060 • International: +1-828-901-5000 • www.corning.com/opcomm

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