Build Broadband Better

FIBER: THE GREENEST BROADBAND TECHNOLOGY

Broadband provided through fiber-optic cable is the most environmentally sustainable and highest performing technology of today and tomorrow. A fiber-to-the-premise (FTTP) connection has the highest download and upload speeds, is scalable for future technological demands, and remains the most efficient, resilient, and sustainable technology. Fiber's environmental and climate footprint is substantially lower than other broadband technologies in use today. Universal deployment and adoption of FTTP would also significantly reduce greenhouse gas emissions (GHG) by enabling more remote activities.

WHAT IS FIBER?

Fiber strands are made of plastic or glass and are about the diameter of a strand of human hair. Each fiber strand is capable of transmitting information (e.g. voice, data, and video services) as pulses of light over long distances. A fiber-optic cable contains anywhere from a few to hundreds of optical fibers within a plastic casing.[1]

LOW ENERGY CONSUMPTION

Data transmission over fiber networks requires much less power to operate than wireless technologies, coaxial cable, and copper networks.[2] Light signal transmitted through a fiber strand does not degrade as quickly as electrical signals traveling over copper cables, reducing the amount of networking equipment needed, whereas coaxial cable requires amplifiers to be placed approximately every 1000 feet. Studies comparing the energy consumption and CO2 emissions of FTTP with wireless, traditional copper or coaxial cable-based technologies find FTTP to be more sustainable than other technologies in almost all speeds and capacity rates. For example:

- A study comparing power consumption of broadband networks in Germany estimated that a last-mile copper-based network uses more than three times the amount of power as a FTTP GPON network and more than four times the power for each Gbps of data transferred.[3]
- A 2022 white paper by consultancy IDATE DigiWorld estimated that fiber consumes three times less energy than xDSL and 10 times less than 4G access technology.[4]
- The Fiber Broadband Association estimates the carbon footprint of an FTTH network that takes into account transportation expenses in addition to the electricity used for network operations to be 18 percent less than DSL and 39 percent less than an HFC cable network.[5]
- And a study by cable manufacturers' association Europacable concluded that a fiber GPON network transmitting a minimum of 50 Mbps consumes three times less energy than a Fixed Wireless Access network.[6] The same study also concluded that fiber is more energy efficient than networks using microwave, millimeter wave, copper, satellite, and laser for the transport of the fronthaul and backhaul in 4G and 5G mobile networks.[7]

MORE RELIABLE SERVICE, AND LOWER MAINTENANCE NEEDS

Fiber cable is more sustainable than other technologies due to its much longer lifespan of over 50 years without a need for recabling.[8] This in turn lowers the cost of ownership and limits the waste from disposal of old cabling. FTTP networks are also more reliable than copper-based alternatives because of the absence of electrical equipment, such as amplifiers in the outside plant, reducing the frequency of outages and the need for technician field visits.[9] ISPs can operate a greener FTTP service because of the reduced need for field maintenance that requires deploying trucks, diesel generators, and other equipment.

FIBER DEPLOYMENT REDUCES FOSSIL FUEL USE IN TRANSPORTATION

A number of studies have pointed out that universal broadband access is a key part of the transition to a clean energy economy.[10] FTTP enables increased use of telecommuting, telemedicine, and remote learning which substantially reduce transportation-related fossil fuel consumption. An analysis published by the Southern California Association of Governments (SCAG) found that "there is a strong case for providing broadband as a means to reduce transportation demand, vehicle miles traveled (VMT), and greenhouse gas (GHG) emissions."[11] The report concluded that if universal fiber broadband enabled widespread remote work, "telecommuting would yield between 2% and 15% reduction in VMT and GHG" in the SCAG region.[12]

1. Verizon, "Fiber Optics", https://www.verizon.com/info/definitions/fiber-optics/.
2. Jean-Luc Lemmens, "Fiber for a sustainable future, a key enabler to a lower carbon emissions", IDATE DIGIWORLD (Feb 2022), https://fr.idate.org/produit/fiber-for-a-sustainable-future/; Michael C. Render, "A detailed review: The status of U.S. broadband and the impact of fiber broadband", Fiber Broadband Association (July 25, 2022), https://www.fiberbroadband.org/d/do/4444; Europacable, "Fibre: the most energy-efficient solution to Europe's bandwidth needs" (July 2022), https://europacable.eu/wp-content/uploads/2022/07/Europacable-Whitepaper-on-Energy-Efficiency-of-Fiber-networks-05-July-2022.pdf; Prof. Dr. -Ing. Kristof Obermann, "Sustainability Comparison of FTTC and FTTH Access Network Technologies", the University of Applied Sciences (Technische Hochschule) Mittelhessen from BREKO, p2, (May 2020), https://brekoverband.de/gutachten-nachhaltigkeitsvergleich-von-ftth-und-fttc; FTTH Council Europe, "Contribution of fibre to sustainability" available at https://www.ftthcouncil.eu/committees/policy-regulation/contribution-of-fibre-to-sustainability.
3. Prof. Dr. -Ing. Kristof Obermann, "Sustainability Comparison of FTTC and FTTH Access Network Technologies", the University of Applied Sciences (Technische Hochschule) Mittelhessen from BREKO, p2, (May 2020), https://brekoverband.de/gutachten-nachhaltigkeitsvergleich-von-ftth-und-fttc.
4. Jean-Luc Lemmens, "Fiber for a sustainable future, a key enabler to a lower carbon emmissions", IDATE DIGIWORLD (Feb 2022), https://fr.idate.org/produit/fiber-for-a-sustainable-future/.
5. Michael C. Render, "A detailed review: The status of U.S. broadband and the impact of fiber broadband", Fiber Broadband Association (July 25, 2022), https://www.fiberbroadband.org/d/do/4444.
6. Europacable, "Fibre: the most energy-efficient solution to Europe's bandwidth needs" (July 2022),https://europacable.eu/wp-content/uploads/2022/07/Europacable-Whitepaper-on-Energy-Efficiency-of-Fiber-networks-05-July-2022.pdf.
7. *Id*.
8. Andrew Afflerbach, Ph.D., P.E., "Fixed Wireless Technologies and Their Suitability for Broadband Delivery", Benton Institute for Broadband & Society (June 2022), p2, fn2 https://www.benton.org/sites/default/files/FixedWireless.pdf ("While fiber networks have not yet existed for 50 years, a lifespan of at least that long is conservative based on the lifetime of copper infrastructure (which is less survivable) and the performance of fiber in a range of rugged conditions.").
9. FTTH Council Europe, "Contribution of fibre to sustainability", available at https://www.ftthcouncil.eu/committees/policy-regulation/contribution-of-fibre-to-sustainability.
10. See for example, ILR Worker Institute, "Combatting Climate Change, Reversing Inequality: A Climate Jobs Program for Texas", July 2021, https://static1.squarespace.com/static/60e76bd34e5317302f87f357/t/60fb7a01c70a9b41e8ddfeb3/1627093525030/Final+Texas+Climate+Jobs+Report.pdf; Robert Pollin, Jeannette Wicks-Lim, Shouvik Chakraborty, Caitlin Kline, and Gregor Semieniuk, Department of Economics and Political Economy Research Institute (PERI), University of Massachusetts-Amherst, "A Program for Economic Recovery and Clean Energy Transition in California," June 2021, https://static1.squarespace.com/static/60b43a18079fdd42c6d01286/t/60c18578a87f6318ff2a5a1a/1623295356282/Pollin+et+al--CA+Economic+Recovery--Clean+Energy+Transition---6-8-21.pdf.
11. Southern California Association of Governments, "Transportation Broadband Strategies to Reduce VMT and GHG", ATTACHMENT A, p 26, https://www.cetfund.org/wp-content/uploads/2022/06/Caltrans-Grant-to-SCAG-Final-Report-PRINT_web.pdf, (Mar 25, 2022).
12. *Id* (Magellan Advisors' estimates are derived from evidence collected during the COVID-19

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