



Fiber Optics

"Fiber is safer, faster, more reliable, and far more cyber secure and energy efficient than wireless."
Ronald M. Powell, Ph.D.

Internet and Telecommunications data can be transmitted either through wires or through the air “wirelessly”. Wired transmissions are faster, safer, more reliable, and far more cyber secure and **energy efficient** than wireless transmissions. In the best of all worlds, we would rely on wired transmissions for the vast majority of our Internet and Telecommunications needs, and reserve wireless for short communications when out-and-about. Unfortunately, that is not the infrastructure Telecom is designing for us, as wireless is cheaper and more profitable for industry than is fiber.

Whereas wireless radiation harms both **humans** and **wildlife**, fiber is safer for all beings.

Energy Consumption Fiber Vs. Wireless

Fiber is a far more energy efficient way to move data from point A to point B. Imagine you want to watch a video on your device. That video data can be sent in a straight line of shot to your device, and you will receive it all at once – one transmission, received. That’s fiber optic cable.

What’s wireless? First off, you need a ton of electricity because in going up the pole (think cell tower or “small cells”) you will lose about 80% of the electricity for the conversion to radio frequency/microwave radiation. From the top of the pole, the data is sent out, not just to you, but to your whole community, because that’s what cell towers can do – throw a 60 degree (or more) spray through the air. (Please note that with 5G the angle will likely be smaller but the “spray” more focused and intense.)

But you only got a tiny sliver of the transmission, so it needs to be sent again. And again. And again. Until after many transmissions, you have finally received the

complete video. Where did the rest of the RF microwave radiation go? Well, it was wasted on about a sixth of your community. All these people are needlessly polluted so their neighbor down the street, perhaps a mile away, can watch a video. A highly inefficient and hazardous way to transmit data.

"When one puts fiber so deep into a network, why stop at the small cell rather than at the premises a few hundred feet away? Fiber to the premises allows much higher speeds and availability without the same kinds of capacity limitations." Larry Thompson and Warren Vande Stadt

We would all benefit from a coordinated public/private infrastructure that connects every business,



school, home, and farm with fiber optic cables. This would create an invaluable and defensible national asset as well as many thousands of jobs. Private companies could then share access to this national asset to offer competing services, in much the same way that long distance telecom providers once shared access to one integrated system of copper telephone wires. Please note we are in no way advocating for the private sector to use this public fiber asset to build more wireless infrastructure, but rather to deliver safe, *wired* services in lieu of the unbridled wireless expansion that is being foisted on us all.

Resources on Fiber

Consider sharing some of these with your community and elected representatives:

Re-Inventing Wires: The Future of Landlines and Networks Timothy Schoechle, PhD

Senior Research Fellow National Institute for Science, Law and Public Policy

"The Internet has become one of the defining technologies of the modern world.

Why has America, the Internet's creator, become one of its most impoverished users among all the developed nations in terms of the proportion of its people with Internet access and the speed and quality of that access? Why has the Internet been growing in an inefficient, insufficient, and unsustainable direction? Is wireless access being oversold? Why

are existing copper phone lines being abandoned when current protocols allow them to deliver data at gigabit speed? This report seeks to address these questions and propose answers and solutions. It explores the historical forces at play, the emerging technologies that will define the future of landlines and networks, and the public policy choices and opportunities that confront us today."

<http://electromagnetichealth.org/wp-content/uploads/2018/02/ReInventing-Wires-1-25-18.pdf>

Connected Communities – Wired Networks for Crossing the Digital Divide Why Community Owned Fiber is the Smart Choice

Superb website on municipal fiber. Well worth sharing with city councils and other potentially interested parties.

<http://connected-communities.ca>

Enough of the 5G Hype Feb.11th, 2019 | Ernesto Falcon | Electronic Frontier Foundation

Electronic Frontier Foundation usually covers the privacy concerns of our increasingly all things wireless world. In this piece they debunk 5G and explain why fiber-to-the-home is far superior to wireless broadband. "Wireless carriers are working hard to talk up 5G (Fifth Generation) wireless as the future of broadband.

But don't be fooled—they are only trying to focus our attention on 5G to try to distract us from their willful failure to invest in a proven ultrafast option for many Americans: fiber to the home, or FTTH.”

<https://www.eff.org/deeplinks/2019/02/enough-5g-hype>

Dividing Lines | A Docu-Series put out by National Digital Inclusion Alliance (NDIA)

| Why is Internet Access Still a luxury in America?

Website and home of the documentary, *Dividing Lines*, published by the National Digital Inclusion Alliance (NDIA). This website documents clearly how Telecom and our government have not only neglected to bring broadband to rural America, but have created the “digital divide” by enacting laws and regulations that have the effect of preventing the delivery of fast, reliable, and safe fiber to all homes, businesses, and farms.

<https://www.dividinglines.org>

Wireless Networks Are Not as Fast, Secure, Reliable or Energy-Efficient as Wired Systems, Says New Report Jan. 26th, 2018 | Business Wire

Announcement and link to report by Dr. Timothy Schoechle. “A public policy report on the Internet and the future of landlines and wireless networks, *“Re-Inventing*

Wires: The Future of Landlines and Networks,” was published online today by the National Institute for Science, Law & Public Policy (NISLAPP) in Washington, D.C.

Because broadband networks and the Internet have become vital components of our nation's physical, cultural and social structure, the future of these networks, the report says, must be steered towards the fastest, most reliable and future-proof, and secure infrastructure available. Such infrastructure would be wired, not wireless.”

<https://www.businesswire.com/news/home/20180126005137/en>

5G, fiber and the law Mar. 4th, 2019 | Katie Singer | Electronic Silent Spring

Clear presentation that sheds light on some of the technical and political intrigue of fiber vs. 5G.

“Until 2016, businesses and households considered “fiber optics-to-the premises” the safest, fastest, most energy efficient and secure way to access the Internet. Encased in thick conduit, pulsing light on thin strands of glass fibers, fiber optic cables carry multiple frequencies for telecommunications. Effectively, fiber cables offer unlimited bandwidth. They do not emit radiofrequency radiation (RFR). They tend to withstand weather catastrophes better than wireless systems.

For years, *wireless* telecom providers have run fiber optic cables from their core network to the large towers that support cellular antennas. Then, the system’s ‘last hop’ (from the cell tower to individual, mobile devices) is delivered wirelessly. In other words, wireless telecom infrastructure is not entirely wireless.”

<http://www.electronicssilent.spring.com/march-2019-blog/>

Reinventing Wires: The Future of Landlines and Networks Feb. 5th, 2018 | Podcast

Panel discussion on the enormous benefits of fiber-to-the-premises and the serious drawbacks of 4G/5G small cells being pushed on us by Telecom. Speakers: Timothy Schoechle, Ph.D. Senior Research Fellow, National Institute for Science, Law and Public Policy Martin Pall, Ph.D. Professor Emeritus of Biochemistry and Basic Medical Sciences, Washington State University Jim Turner, Esq. Partner, Swankin & Turner Duncan Campbell, Esq. Radio Host, “Living Dialogues.”

<https://www.commonwealthclub.org/events/archive/podcast/reinventing-wires-future-landlines-and-networks>

Municipal fiber optic networks are the future, home automation expert says

May 25th, 2017 | André Fauteux, Editor | La Maison du 21e siècle magazine

Interview of Dr. Timothy Schoechle.

"I recommend deploying local fiber-optic networks everywhere. All municipalities in North America should put their own fiber networks in. They would save a lot of money on Internet access. The smart grid has always been confused with smart meters but they are not related. The original idea of the smart grid was to use information to better control the generation, transmission and distribution of power. This is still a good idea and fiber is best to transmit data."

<https://maisonsaine.ca/english/municipal-fiber-optic-networks-are-the-future-home-automation-expert-says.html>

Bruce Kushnick Primer Dec. 2017 | Scientists for Wired Technology

Why do we still not have a fiber optics system if we paid for it in our rates?

Bruce Kushnick has spent decades following Telecom/FCC actions with regard to fiber. He has an in depth understanding of how consumers have paid out billions in rate increases for fiber optic networks that Telecom never delivered on. Furthermore, the FCC has been completely complicit and has turned a blind eye to Telecom's shoddy accounting and broken promises.

Link to video lecture and book by Bruce Kushnick:

<http://scientists4wiredtech.com/regulation/kushnick-primer/>

Opinion: FCC Set to Waste Billions on the Wrong Rural Broadband Providers Mar.

20th, 2018 | Mathew Marcus | Institute for Local Self Reliance

Author Mathew Marcus explains why our captured government needs to stop throwing money at the "Big 4" – Verizon, AT&T, T-Mobile, and Sprint – to "bridge the digital divide". The private sector will just not deliver on ***fast, safe, reliable, cyber secure and energy efficient fiber to all homes.***

<http://www.dailyyonder.com/opinion-fcc-set-waste-billions-wrong-rural-broadband-providers/2018/03/20/24578/>

Why 5G Makes Me Reconsider the Health Effects of Cellphones April 1st, 2019 |

Susan Crawford | Wired

Susan Crawford is a John A. Reilly Clinical Professor of Law at Harvard Law School. Crawford has been an outspoken proponent of fiber optics for high speed broadband due to its superiority to wireless. But until now, Crawford has not talked about health. Here for the first time, she addresses health.

https://www.wired.com/story/why-5g-makes-reconsider-health-effects-cellphones/?mbid=social_fb_onsiteshare&fbclid=IwAR2rfyHxZ_z1bcnLjZ62s_Sxvk8efAa6DRQ0Jdjm0twl-PkdXaroEz_pAVs

Cabled Municipal Broadband—a solution to 5G and everything else April 4th, 2019 |

Devra Lee Davis | Thrive

Dr. Davis invites communities to consider municipally owned fiber in lieu of the densification of our neighborhoods with unnecessary wireless infrastructure. Tired of your lack of connectivity? Embarrassed that South Korea has internet speeds 200 times faster than we do? There are 800 cities across the nation that are building their own municipal wired fiber-optic networks to bring lightning-fast connections straight to their homes.

https://thriveglobal.com/stories/cabled-municipal-broadband-a-solution-to-5g-and-everything-else/?fbclid=IwAR2WS-XtqwYVoW4AeAysK00crmCilnJuv0tA4lO811qv5l1kHXo-LNc_VjM

Fund Fiber Optic Broadband, NOT WIRELESS Broadband Nov. 2017 | Blog post by ElectricalPollution.com

“The United States is planning its future broadband infrastructure. Public input asking for safe, secure, reliable, extremely high speed, and energy efficient is needed. Fiber optic broadband delivers all these. Support Fiber Optic Broadband.”

<http://www.electricalpollution.com/FundFiberNOTWireless.html>

Hundreds of Cities Are Wired With Fiber—But Telecom Lobbying Keeps It Unused

June 4th, 2014 | Jason Koebler | Motherboard

Although from 2014, this article has a lot of useful (and somewhat complicated) information about why many people still don't have fiber when the fiber has already been laid! Bottom line seems to be, the big telecom companies, like Comcast, Verizon and AT&T are controlling the playing field to their advantage and our loss. "Government buildings all around the country are wired with fiber, but agreements with huge telecoms keep it out of people's homes....*Unfortunately, those people—and millions of others around the country—will have to settle for Internet speeds that are relatively run-of-the-mill, while tons of unused fiber sits beneath them.*"

https://motherboard.vice.com/en_us/article/gvyyym/hundreds-of-cities-are-wired-with-fiberbut-telecom-lobbying-keeps-it-unused

Defining and Mapping Broadband Coverage in America June 21st, 2017 | Dr. Robert Wack from Westminster, Maryland | Comments before the Committee on Energy and Commerce

Westminster City Council president, Dr. Wack describes a public private partnership his city launched which provides fiber network to all homes and businesses.

https://www.youtube.com/watch?time_continue=2578&v=z1b8-AaBzok

San Francisco seeks universal fiber broadband with net neutrality and privacy Feb. 1st, 2018 | Jon Brodtkin | Ars Technica

"San Francisco is trying to find network providers to build a city-wide, gigabit fiber Internet service with mandated net neutrality and consumer privacy protections. It would be an open-access network, allowing multiple ISPs to offer service over the same lines and compete for customers".

<https://arstechnica.com/information-technology/2018/02/san-fran-seeks-universal-fiber-broadband-with-net-neutrality-and-privacy/?comments=1>

Net Neutrality Chant: "Sue the FCC; Break Up Verizon & AT&T" Dec. 13th, 2017 |

Bruce Kushnick | Huffington Post

Bruce Kushnick explains some of the other ways beyond net neutrality in which the FCC is colluding with Telecom at the expense of the American people.

"Net Neutrality is only one of 15-20 different current FCC proceedings that are designed to all work together, which we dubbed the 'Wheel of Mis-Fortune'. While Net Neutrality is a catchy phrase, it is more of a distraction; the real problems are much deeper and they have gotten far too little attention."

https://www.huffingtonpost.com/entry/net-neutrality-chant-sue-the-fcc-break-up-verizon_us_5a30f7e6e4b04bd8793e95a6

BRUCE KUSHNICK 3 PART SERIES IN UNRAVELING THE WIRELESS VS. WIRED SCANDAL

Not happy with your wireless service? Blame the FCC Oct. 9th, 2017 | Bruce

Kushnick | Huffington Post

Part 1

"The FCC released the 'Twentieth Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless'; a piece of propaganda on wireless competition in America to help AT&T and Verizon. As we will discuss, the statistics and presentation are based on a questionable manipulation of the facts, or more importantly, it is the omission of basic information that is the real problem."

<https://www.huffingtonpost.com/entry/59db1ebce4b0705dc79aa964>

America's Wireless: 59th in the World in LTE; 2nd in 'Most Expensive' Data Prices; 40% Is Overcharged due to "Whamming". Oct. 15th, 2017 | Bruce Kushnick |

Huffington Post

Part 2

"America is 59th in LTE wireless speeds according to Open Signal's June 2017 report.

America is 2nd in 'most expensive' data out of 41 countries, based on Rewheel Research.

The FCC manipulated the average wireless speed; it is 46%-72% above what the other research firms have found."

"...when you go online today it is as if an uninvited mob has joined you on a conference call – with hundreds of uninvited companies, most of whom you never heard of, and you have no idea of their intentions."

<https://www.huffingtonpost.com/entry/59e06c5be4b003f928d5e5c9>

Wireless Smartphones with Only 10Mbps Down, 1Mbps Up, are Not a Substitute for a Wired Broadband Connection. Oct. 19th, 2017 | Bruce Kushnick |

Huffington Post

Part 3

"Conclusion: Wireless Is Not a Substitute for Wireline Cable TV, Internet or Even DSL, Much Less a Fiber Optic-Based Service."

<https://www.huffingtonpost.com/entry/59e8ecbce4b0542ce4290c1c>

Google Pivots from Fiber to 5G Aug. 17th, 2016 | Posted by Kaz Weida | HSI (High Speed Internet)

"Cities across America have been waiting patiently for Alphabet, Google Fiber's parent company, to begin building the infrastructure that'll bring high-speed internet home. But thus far, it's been an exercise in frustration for both sides....Development of fiber networks by Google in over 16 cities has stumbled and stalled based on two major roadblocks:" – Expensive Infrastructure and Legislative Limbo.

<https://www.hightspeedinternet.com/resources/google-pivots-fiber-5g/>

Koch Brothers Are Cities' New Obstacle to Building Broadband Dec. 16th, 2017 |

Susan Crawford | Get Wired Magazine

"...fed up with federal apathy and sick of being held back by lousy internet access controlled by local cable monopolies, scrappy cities around the US are working hard to find ways to get cheap, world-class fiber-optic connectivity. It's always been an uphill climb, as the 'incumbents'—giant carriers like Comcast, Verizon, and AT&T—are constantly working behind the scenes to block competition. (Recently, Comcast spent nearly \$1 million opposing a municipal-fiber vote in Fort Collins, Colorado.)"

<https://www.wired.com/story/koch-brothers-are-cities-new-obstacle-to-building-broadband/>

"5G" Wireless Is the New Fiber Optic, Bait-and-Switch Scandal You can fool most of the people most of the time. With "5G", you can fool almost everyone except those in on the joke. Mar. 8th, 2018 | Bruce Kushnick | The Medium

Telecom Analyst and expert, Bruce Kushnick pierces through industry hype and gives context to this newest 5g "bait" which is but a repeat of many other similar "bait and switches" that came before. "This is just the latest in a long list of scandals by AT&T and Verizon to use the promise of a new technology to get rid of regulations, kill off competition and to raise rates. And this scheme relies on the FCC, not to mention their friendly state and federal politicians, to push it through."

<https://medium.com/@kushnickbruce/5g-wireless-is-the-new-fiber-optic-bait-and-switch-scandal-646246b8f34d>

Verizon's Proposed Settlement in New York Covers Up One of the Largest,

Nationwide, Accounting Scandals in American History Mar. 19th, 2018 | Bruce

Kushnick | The Medium Veteran Telecom Analyst, Bruce Kushnick exposes how in New York, Verizon has cross subsidized the wireless buildout with funds paid by ratepayers for wireline services. "Verizon's Proposed Settlement in New York Covers

Up One of the Largest, Nationwide, Accounting Scandals in American History. ^[L]_[SEP]

<https://medium.com/@kushnickbruce/verizons-proposed-settlement-in-new-york-covers-up-one-of-the-largest-nationwide-accounting-5b0c1e8e1aa6> ^[L]_[SEP]

Editor's Corner—Fixed 5G was tested by the cable industry, and it came up a bit short Nov. 8th, 2017 | Mike Dano | Fierce Wireless ^[L]_[SEP]

(Fixed wireless is Internet access at a set location, such as your home or business (as opposed to MOBILE wireless where you can connect to the Internet while on the go. Fixed wired is fiber or cable in a set location.)) ^[L]_[SEP]

Article discusses a new report titled, "Can a Fixed Wireless Last 100m Connection Really Compete with a Wired Connection and Will 5G Really Enable this Opportunity?" The report seems to conclude that for the time being, fixed wireless doesn't cut it when compared to fixed wired. ^[L]_[SEP]

<https://www.fiercewireless.com/5g/editor-s-corner-cable-industry-tested-fixed-5g-and-it-came-up-a-bit-short> ^[L]_[SEP]

Community-Owned Fiber Networks: Value Leaders in America Pricing Review Shows They Provide Least-Expensive Local "Broadband" Jan. 2018 | David Talbot, and Kira Hessekiel, Danielle Kehl | Harvard University ^[L]_[SEP]

Authors compared municipal fiber pricing to ISPs, and found that "most community-owned FTTH networks charged less and offered prices that were clear and unchanging...." ^[L]_[SEP]

https://cyber.harvard.edu/sites/cyber.harvard.edu/files/2018-01-10-Pricing.Study_.pdf ^[L]_[SEP]

Cooperatives Connect Rural America Mar. 20th, 2018 | Matthew Marcus | Institute for Local Self-Reliance ^[L]_[SEP]

Excellent article about why fiber in rural areas should be built by rural communities

rather than throwing billions at the “Big 4” who will never deliver. [L] [SEP] Author Mathew Marcus explains why our captured government needs to stop throwing money at the “Big 4” – Verizon, AT&T, T-Mobile, and Sprint – to “bridge the digital divide”. The private sector will just not deliver. “Rural communities have already proven that cooperatives are the way to get good, fast Internet access to underserved areas. So why are AT&T and other big corporations in line to get \$2.5 billion in government funding to reach customers – again.” [L] [SEP]

<http://www.dailyyonder.com/opinion-fcc-set-waste-billions-wrong-rural-broadband-providers/2018/03/20/24578/> [L] [SEP]

5G Is Not the Answer For Rural Broadband – 5G wireless, due to begin rolling out in 2020, will improve mobile broadband and support the internet of things. It may even be suitable for fixed broadband in dense urban areas. But it has neither the capacity nor the cost-effectiveness to address the rural fixed broadband gap. Mar.

April, 2018 | Larry Thompson and Warren Vande Stadt | Vantage Point Solutions [L] [SEP]

As the 5G wireless network is more expensive for the initial capex (capital expenditure) as well as opex (operating expenses) and provides 1 percent of the broadband speed and capacity available on an FTTP network, it is unlikely to be a good investment if used only for fixed broadband services. There may be some select scenarios for which it makes economic sense, but one would expect those scenarios to be limited.” [L] [SEP]

http://www.bbcmag.com/2017mags/Mar_Apr/BBC_Mar17_5GNotAnswer.pdf [L] [SEP]

LETTER: Bringing fast and healthy internet to coastal communities. How will local officials, including First Nations leaders, connect their communities Mar. 15th, 2018 | Oona McQuat | The Northern View [L] [SEP] Community-owned, wired fiber optic networks make it possible to have a fast connection to the web without harming the web of life that sustains us. [L] [SEP]

<https://www.thenorthernview.com/opinion/letter-bringing-fast-and-healthy-internet-to-coastal-communities/>

Hundreds of Cities Are Wired With Fiber—But Telecom Lobbying Keeps It Unused.

Government buildings all around the country are wired with fiber, but agreements

with huge telecoms keep it out of people's homes. June 14th, 2014 | Jason Koebler

| Motherboard

"Throughout the country, companies like Comcast, Time Warner Cable, CenturyLink, and Verizon have signed agreements with cities that prohibit local governments from becoming internet service providers and prohibit municipalities from selling or leasing their fiber to local startups who would compete with these huge corporations...What happens then are so-called 'middle-mile' projects, where government buildings, schools, and nonprofit groups can be wired up, but expanded access to consumers is met with stiff lobbying opposition and threats from larger ISPs."

https://motherboard.vice.com/en_us/article/gvyyym/hundreds-of-cities-are-wired-with-fiberbut-telecom-lobbying-keeps-it-unused

QUOTES ABOUT FIBER

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<https://www.businesswire.com/news/home/20180126005137/en>

"I recommend deploying local fiber-optic networks everywhere. All municipalities in North America should put their own fiber networks in." Timothy Schoechle

<https://maisonsaine.ca/english/municipal-fiber-optic-networks-are-the-future-home-automation-expert-says.html>

"The United States is planning its future broadband infrastructure. Public input asking for safe, secure, reliable, extremely high speed, and energy efficient is needed. Fiber optic broadband delivers all these. Support Fiber Optic Broadband."

<http://www.electricalpollution.com/FundFiberNOTWireless.htm>

"Conclusion: Wireless Is Not a Substitute for Wireline Cable TV, Internet or Even DSL, Much Less a Fiber Optic-Based Service." Bruce Kushnick

<https://www.huffingtonpost.com/entry/59e8ecbce4b0542ce4290c1c>

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"...fed up with federal apathy and sick of being held back by lousy internet access controlled by local cable monopolies, scrappy cities around the US are working hard to find ways to get cheap, world-class fiber-optic connectivity. It's always been an uphill climb, as the 'incumbents'—giant carriers like Comcast, Verizon, and AT&T—are constantly working behind the scenes to block competition. (Recently, Comcast spent nearly \$1 million opposing a municipal-fiber vote in Fort Collins, Colorado." Susan Crawford, Clinical Professor of Law at Harvard

<https://www.wired.com/story/koch-brothers-are-cities-new-obstacle-to-building-broadband/>

"What most people don't realise is that we don't really use cellular for delivering data to mobile devices. More and more of the time, laptops and phones will preferentially connect to a Wi-Fi network," Nick Hunn

<https://www.nickhunn.com/qualkia-constructing-the-5g-myth/#respond>

"As Wi-Fi coverage is becoming more and more widespread, rather than attempting to move devices from Wi-Fi to 5G, it would make more sense for the industry to concentrate on integrating more services over Wi-Fi, allowing them to better focus cellular spectrum on when and where it's most needed."

<https://www.nickhunn.com/qualkia-constructing-the-5g-myth/#respond>

"William argues that network operators and regulators need to understand that circumstances and technology limitations have conspired to produce a 'Wi-Fi First' world, where Wi-Fi is set to be the primary method by which mobile devices and smartphones will access data, wherever it is available. They will only revert to cellular data when they have no Wi-Fi coverage." Nick Hunn

<https://www.nickhunn.com/qualkia-constructing-the-5g-myth/#respond>

Bruce Kushnick - The Book of Broken Promises @ Civic Hall Boo...



Bruce Kushnick – The Book of Broken Promises @ Civic Hall Book Day – Apr 28 2015

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