

Fiber optic Infrastructure Presentation

Senate Finance 02/07/2019

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“My answer has been, as it is tonight, to point out these plain principles, That where a community -- a city or county or a district -- is not satisfied with the service rendered or the rates charged by the private utility, it has the undeniable basic right, as one of its functions of government, one of its functions of home rule, to set up ... its own governmentally owned and operated service” - *Franklin Delano Roosevelt*

What I am going to Present

The electric grid of the future (next year) and why fiber optic is necessary to meet our energy goals

Why I am so bullish about fiber optic infrastructure

Technology comparisons (why I am so bullish about fiber optic infrastructure)

Fiber optic and Telecommunications (why I am so bullish about fiber optic infrastructure)

Advantages of using the regulated electric utility for open access fiber

Legislative considerations

Final thoughts

Why fiber optic cable?

- Fiber optic broadband is the bridge to the future for Vermont to have a vibrant economy
- Economic development and growth depends on it
- Urban data rates currently average 70 MBS; 200 MBS by 2020; 1000 MBS by 2028
- Netflix HD requires 25 MBS alone.
- The world is moving towards ever faster data rates and rural America is being left behind
- Fiber to the Premise is the ultimate solution; beyond 30 year life and “future proof”
- Next generation smart meters are IP based {require reliable broadband}
- Getting to the goal of 100% renewable energy 100% of the time will require fiber

Fiber optic cable – the answer for telecommunications

Because fiber-optics uses light instead of electricity to transmit data, the frequencies that are used are much higher and the data capacity is much greater. The fiber-optic cable itself is made from glass or plastic which is not susceptible to electromagnetic interference like metal cables. This allows data to flow over great distances without degrading. Interference and energy loss is the limiting factor for all types of communication transmissions and fiber optics handles these factors much better than other modes of transmission. In the future, more and more of our world will be connected via fiber optics as we outgrow the old copper based infrastructures.

Light moves very fast (186,000 miles per second, to be specific), enabling conventional speeds of 10,000 Megabits (Ten Gigabits) per second on single fiber-optic networks — almost 140 times faster than the US urban broadband average of 70 Megabits per second. A single strand of fiber can be split into 100 wavelengths, allowing recorded speeds up to 13 terabytes/second. Nokia has a new technology to bring that to 32 terabytes/second.

Consumers think of fiber as a new technology, but the Internet “backbone” network connecting cities and countries has been built with fiber-optic cables since the dawn of the Internet. The first submarine fiber-optic cable connected the US to France and Britain back in 1988, and hundreds currently criss-cross the ocean floor all around the world

Regulated electric utility ownership – the advantages

- An electric utility borrows at much lower rates than telecommunication companies
- Electric utility life is 30 years, twice that of telecommunication companies, which cuts the infrastructure costs in $\frac{1}{2}$ in terms of a tariff rate
- Placing the fiber in the electric space eliminates expensive make ready costs
- Keeping the fiber as part of the regulated utility eliminates the expensive pole attachment rates – these rates run about \$400/year/mile which equates to a \$14K savings over the life of the infrastructure
- Today we are paying for two separate companies to maintain the same infrastructure. When a storm hits and takes down lines, the electric utility comes out repairs its lines, and then the telecommunication company comes out. Two bucket rolls that could be one. Two sets of labor, two sets of company overhead



Legislative considerations

- Establish language encouraging electric utility investments in fiber backbone.
- Establish the position of Vermont state broadband manager under the Vermont Agency of Commerce and Community Development.
- Give authority to set bulk data tariffs to Public Service Commission. Base it on estimated adoption rates to be paid for by telecommunications providers (for example cents/minute/mile). Establish a loop support (redundancy) tariff as well.
- Define network access point as the electric meter. Require open-access.
- Exempt fiber infrastructure from local property taxes.
- Require all existing electric utilities to provide public fiber maps. This fiber was paid for by electric utility ratepayers. This includes VELCO.
- Don't overbuild existing telecommunications company fiber (allow 10% overlap for practical reasons).
- Establish firm requirements for broadband minimums of 100 Mbs synchronous,
- Allow micro-trenching for buried fiber.
- Allow open access to existing state-owned fiber.
- Require all pole assets to be turned over to electric utilities at net book value.
- Exempt electric utility fiber from make-ready requirements and pole attachment fees.
- Encourage pilot projects

Final Thoughts

- Great case study – Midwest Energy and Communications - <https://www.cooperative.com/programs-services/bts/Documents/Advisories/Advisory-Broadband-Case-Study-Midwest-Energy-Dec-2018.pdf>
- Example consumer broadband costs (from Midwest Energy) -
 - \$49.95 per month for 25 Megabits per second (Mbps) upload and download
 - \$59.95 per month for 50/50 Mbps
 - \$79.95 per month for 100/100 Mbps
 - \$119.95 per month for 1 gigabit upload and download (1,000 Mbps)
- While I do respect and support the activities of Community Utility Districts, continued work under the existing expensive infrastructure model will not result in the infrastructure that Vermont needs. CUD's do need centralized resources. The districts are not able to obtain the necessary technical resources they need on their own. Without any changes, CUD's are the best we have and we need to support them.
- There is \$350 million in funding for up to 90% of the infrastructure costs for fiber build out in the 2019 US Farm Bill.
- There is money in the Connect America Fund.
- Utility banks are willing to lend up to 80% of the infrastructure cost for a well-written plan at very low borrowing costs.
- Put out an RFP for an engineered telecommunications plan to make this happen