Proposed testimony to House Energy and Technology Committee
Tuesday, September 3, 2020
Christine Hallquist speaking on behalf of NEK Broadband

NEK Community Broadband (www.nekbroadband.org) is a Communications Union District (CUD) consisting of 31 towns in Northern Vermont working to provide every E911 business and residential address in the with access to a minimum speed of 100 Mbps, symmetrical at an affordable price. Our goal is to ultimately get every home and business connected to fiber. NEK Broadband will use wireless as an interim solution to get as many addresses connected as soon as possible. Investment in wireless provides short term gains with less than reliable and limited connectivity. The use of wireless does negatively impact the business case and the long term viability of the CUD's. The CUD implements wireless solutions by working with existing incumbent telecommunications providers, giving those providers the better business cases. Additionally, there has yet to be a project deployed in Vermont that has proven to deliver the level of service that warrants continued investment.

Advantages of Fiber

Let's talk about the advantages of fiber and the limitations of wireless. Using wireless, the amount of data that can be transferred is directly related to the frequency of the transmitter/receiver. The higher the frequency, the higher the data rate. However, as the frequency goes up, the signal becomes more directional and cannot get around hills and penetrate trees as well. Therefore you need to have more wireless transmitter/receivers which significantly increases the cost. Each one of these installations will be connected to fiber. Ultimately, wireless is not a good final solution for Vermont due to the limitations of bandwidth and the fact that we are a mountainous region with significant forest cover.

I am going to intentionally oversimplify the following examples. However, these will give you an idea of the beauty of fiber.

Let's look at a typical LTE wireless tower and its data capacity versus fiber. A LTE tower uses a frequency of 700 megahertz and you theoretically get 1.4 Gigabits/second maximum data capacity per installation.. To run a 4K HD video, it requires 25 megabits per second. One tower may have up to 56 users running 4K HD video. In 2011, a team at Japan's National Institute of Information and Communications Technology has demonstrated that fiber can transmit 100 terabits per second, and that number continues to grow. Wireless transmission is limited by physics, which cannot be changed. Fiber transmission is limited by technology, which will continue to improve. That one fiber can support 4,000,000 users. Consider the fact that utilities are running 144 strands of fiber, we are now looking at more than 570 million users. Meanwhile, due to improvements in technology, fiber capacities are increasing, while LTE remains fixed.
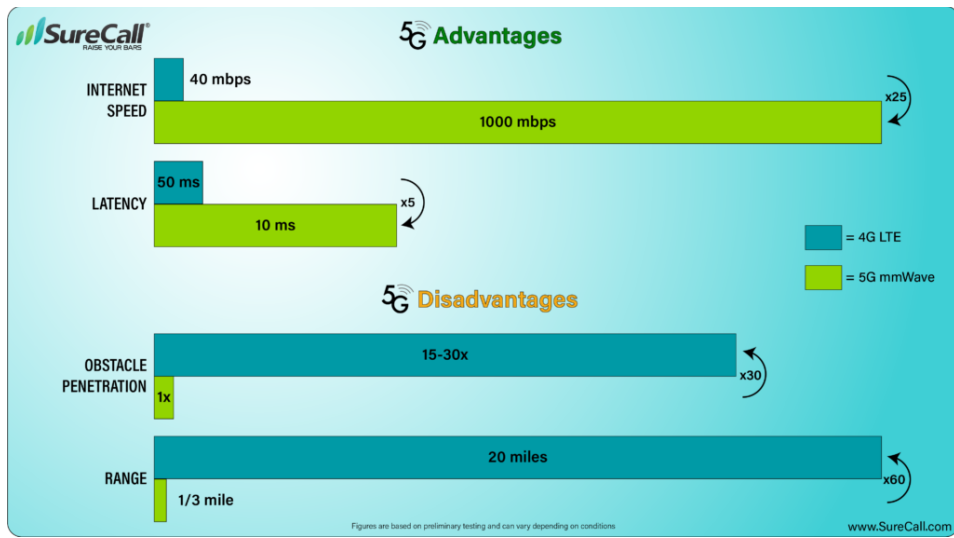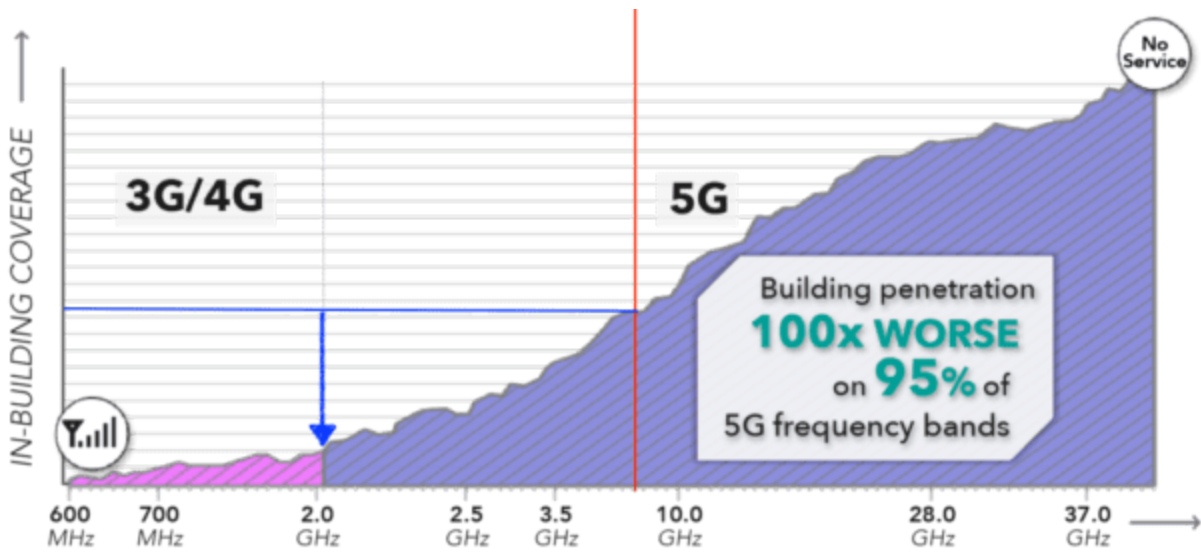
Here are some example graphics.

Illustration 1: This shows how 5G, operating at higher frequencies, has a hard time getting around obstacles, like trees, mountains and buildings
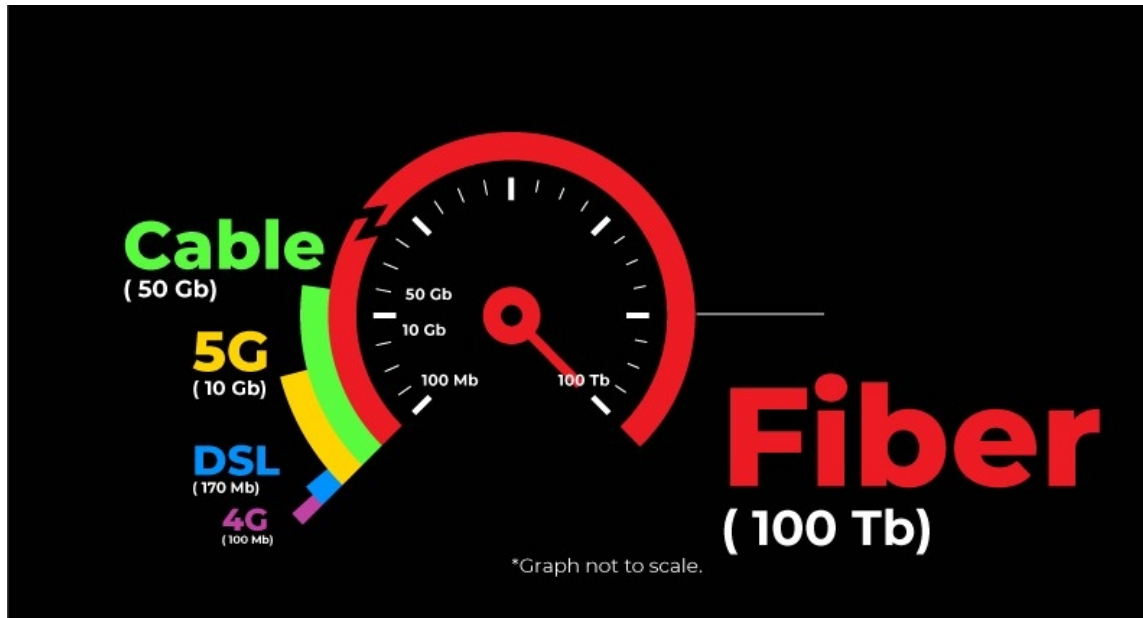
Illustration 2: This shows the relative comparison betweent technologies. The specifics vary by site. Vermont typically gets lower performance on DSL and wireless than urban areas.

Now lets compare fiber to Starlink (the satellite system being deployed by SpaceX). Starlink maximum data transfer capacity is 20 Gigabits/sec. Each satellite cost $1 million. One strand of fiber can carry 100 terabits per second. that is the equivalent of 5000 Starlink satellites (or a $5 billion expenditure). The utilities are hanging 144 fiber counts. That is the equivalent of 720,000 Starlink Satellites. If you were to cover the entire state with fiber it would be less than 1/1000 the asset cost of Starlink and we will have a technology that will be infinitely more flexible. That would assume that Starlink satellites were only dedicated to Vermont. Starlink eventually plans to deploy 12000 for the entire planet

Immediate considerations

NEK Broadband would like to see the $2 million allocation in the Governor's budget be directed to the CUD's. The CUD is an excellent model for how to provide telecommunication services to rural Vermonters and needs to be strengthened. All future grant monies should be directed through the CUD's. NEK Broadband serves some of the least dense and most economically challenged areas of Vermont. The incumbent for-profit providers will only serve locations that can make money for them. As those carriers pick off those locations, the business case becomes more challenging for the CUD's. The CUD's will partner with those incumbent providers where it makes sense. It is also important that the CUD's are able to build their asset base in order to leverage more private investment.

As part of building the asset base, NEK Broadband is looking to develop agreements with the state and electric utilities to collaborate in the use of existing, as well as future fiber assets. By building a more reliable data network, the network will enable more reliable communications to achieve the goals of the Comprehensive Energy Plan, as well as improved communications during crisis. NEK Broadband will be looking to use Indefeasible Rights of Use as the method to create these partnerships. There are

1000's of miles of underutilized fiber strung throughout the state that, if accessible for the CUD's, would drastically reduce the cost of deployment and amount of time it takes to solve this urgent problem.

Important issue to be addressed separately

With the current grant programs, we have discovered that the information on existing telecommunications assets in mapping data given to the state is not accurate. While this is understandable, it has hampered our efforts.

NEK Broadband is going to be looking for the state of Vermont to create a public database of the poles and wires assets throughout the state and to put the necessary mechanisms in place for that database to be updated as the electric and telecommunications utilizes update their databases.

NEK Broadband is currently working on cataloging the existing telecommunication assets in the area in order to identify places where wireless infrastructure can be quickly deployed to serve as many priority addresses as possible.