

# THE 5G WORKFORCE AND OBSTACLES TO BROADBAND DEPLOYMENT

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## HEARING

BEFORE THE

COMMITTEE ON COMMERCE,  
SCIENCE, AND TRANSPORTATION  
UNITED STATES SENATE

ONE HUNDRED SIXTEENTH CONGRESS

SECOND SESSION

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JANUARY 22, 2020

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED SIXTEENTH CONGRESS

SECOND SESSION

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## **THE 5G WORKFORCE AND OBSTACLES TO BROADBAND DEPLOYMENT**

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**WEDNESDAY, JANUARY 22, 2020**

U.S. SENATE,  
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,  
*Washington, DC.*

The Committee met, pursuant to notice, at 10 a.m. in room SH-216, Hart Senate Office Building, Hon. Roger Wicker, Chairman of the Committee, presiding.

Present: Senators Wicker, Blunt, Fischer, Sullivan, Johnson, Cantwell, Peters, Tester, Sinema, and Rosen.

### **OPENING STATEMENT OF HON. ROGER WICKER, U.S. SENATOR FROM MISSISSIPPI**

The CHAIRMAN. Good morning. The Committee will come to order.

And I must say the accolades keep pouring in for my decision to continue on with this hearing in spite of the late hour last night.

We are here to discuss important issues affecting our economy and our workforce readiness. So we will convene today to discuss 5G workforce readiness and obstacles to broadband deployment in our country.

I welcome our distinguished panel of witnesses and thank them for appearing today. We will hear from Mr. Brendan Carr, Commissioner at the FCC; Mr. Jimmy Miller, Chairman of the National Association of Tower Erectors and President and CEO Miller Company, Incorporated; Ms. Lisa Youngers, Executive Director of the Fiber Broadband Association; Mr. Harold Feld, Senior Vice President of Public Knowledge; and Ms. Shirley Bloomfield, Chief Executive Officer of NTCA, the Rural Broadband Association.

5G is the fifth generation of wireless communications technology, as every member of the Committee knows and as many more Americans are learning. Developing and deploying national 5G networks is critical for the future of the United States. 5G promises to create 3 million new jobs, generate \$275 billion in new investment, and will spur up to \$500 billion in economic growth. With exponentially faster connections, higher speeds, and significantly larger data capacities, 5G networks are expected to transform almost every industry and economic sector.

Last week, this Committee heard from administration officials who discussed ongoing advancements in artificial intelligence, quantum computing, advanced manufacturing, and other cutting-edge innovations. Realizing the full economic and social potential

of these technologies will depend in large part on the capabilities of the nation's communications infrastructure.

As our country moves quickly toward a full-scale deployment of 5G, increasing commercial access to mid-band spectrum and removing barriers to infrastructure investment will be essential to winning the global race in this technology.

To date, the FCC has taken meaningful steps to remove regulatory barriers to broadband infrastructure investment. For example, the Commission's efforts to streamline the permitting process for small cell deployment and speed up pole attachment processes will help accelerate 5G build-out and close the digital divide.

Workforce readiness is a critical component to U.S. 5G leadership. The equipment installation for 5G will constitute a fundamental shift in network deployment from existing 4G networks. With the deployment of 4G, the wireless industry has been engaged in building and maintaining large cell towers to provide several miles of broadband coverage to certain geographic areas. On the other hand, 5G networks will require the installation of small radio equipment and antennas in such density and scale as to require a substantial increase in labor. Maintenance of this equipment and new technical standards for the implementation of 5G will add even more to the workforce demand.

According to reports, the United States faces a 5G labor shortage. Estimates suggest there are approximately 27,000 tower climbers prepared to install 5G equipment. However, it is projected that 20,000 more tower climbers are needed to accelerate the deployment of 5G in order to win the race and secure the first-mover advantage in the United States. Additional labor will also be needed to lay fiber to support wireless connections, install radios, and deploy other essential equipment.

To address 5G workforce needs, the Department of Labor is engaged in a joint effort with the telecommunications industry and other government agencies to provide training and improve technical skills among the telecommunications workforce. The Department of Labor's Telecommunications Industry Registered Apprenticeship Program, in conjunction with the Wireless Infrastructure Association, is a good example of efforts targeted at addressing this skills gap.

This Committee is keenly interested in learning about additional measures Federal, State, and local governments can take to train workers and ensure that they have specialized skills to meet 5G deployment demand.

I hope witnesses will discuss initiatives within the private sector to improve 5G workforce readiness, including efforts to provide on-the-job training to the current workforce, the development of partnerships with local educational institutions to create a pipeline for skilled labor, and discuss how meaningful career opportunities can be created for Americans in this important field.

Let me again thank our witnesses for joining us today.

I now recognize my good friend and the Ranking Member, Senator Cantwell.

**STATEMENT OF HON. MARIA CANTWELL,  
U.S. SENATOR FROM WASHINGTON**

Senator CANTWELL. Mr. Chairman, can I just say thank you, thank you, thank you for this hearing this morning?

The CHAIRMAN. That is pretty much a universal sentiment.

[Laughter.]

Senator THUNE. I will echo that on the Republican side. Thank you. Just thank you so much.

Senator CANTWELL. Mr. Chairman, in seriousness, every country recognizes 5G and the form and foundation of the next generation of innovation. These networks will carry great benefits and economic returns to communities. That is why major nations, including the U.S., are making investments in network infrastructure and developing a 5G workforce.

Having that workforce is of particular importance not because we need to just construct networks, because we also need to understand the design and manage especially—especially—the security of these networks.

I am very proud of my own state of Washington. The University of Washington establishes cohorts on cybersecurity to encourage students who are already studying like fields to move over and study cybersecurity in collaboration with industry who are helping to fund those educational opportunities. We need to do more of that.

Efforts are ongoing throughout the country to help also craft apprenticeships and training programs to fill these needs. The idea that there will be a single nation that wins the 5G race is false, but we need to keep moving forward and be very clear as it relates to 5G and the fact that no government back door should exist on any solutions deployed in a broadband network. We need to respect the rule of law and the fact that these are separate entities.

The debate over who is winning this supposed race also is something to be discussed, but we also have to make sure that we are continuing to move forward on a reasonable approach to 5G. We should not hand the wireless industry all of the policies it wants just to speed it up. I do have concerns that the Trump FCC has brought into the race a narrative and is trying to use that to not address important public policy questions.

In 2018, the FCC took one vote after another to undercut local community authority to govern their own communities. The Commission voted to allow wireless carriers to bypass crucial reviews that ensure infrastructure projects respect the value of our community's place, historic preservation, and the environment.

The FCC also chose to undercut tribal nations' and localities' responsibilities to reasonably review hundreds of siting applications associated with 5G. I do not think that is the right way to move forward.

As Commissioner Rosenworcel testified last week, we have time to work on these issues in a thoughtful manner. We need to take that time and make sure that we are getting these issues right so we can get deployment. Things that are held up in a legal battle is not deployment. And that is why we have to get the right answers.

Our efforts on 5G should create a cooperative opportunity. Local communities want the benefits of these networks for their residents, but they also want to make sure that they are reasonably deployed. This can be a cooperative process.

In my state, Spokane worked with Verizon to develop collaborative policies for a 5G testbed for the city, and the City of Bellevue developed a 5G innovation partnership zone that brings together technology, business, academia, and the public sector on 5G network deployment in their community. And to continue to work together in a collaborative process is the smart policy and I think a reflection of where we need to be.

There are a lot of things about 5G that we need to work through in a comprehensive, reasonable fashion, the long-term proposals that will help us speed up the deployment of 5G spectrum. And so I look forward to continuing to work with our colleagues on that. I know we can come to solutions that answer all the questions that we have proposed throughout these committee hearings, and I look forward to working with my colleagues to achieve that.

And thank you, Mr. Chairman. Really, actually, thank you for having the hearing.

The CHAIRMAN. Thank you. Senator Cantwell is not only my teammate and Ranking Member, but my dear friend.

And we are delighted now to hear from our panel. We will just start at this end with Commissioner Carr and proceed down the table. We ask our witnesses to summarize their testimony in 5 minutes. The entire statements will be included in the record at this point.

Mr. Carr.

**STATEMENT OF HON. BRENDAN CARR, COMMISSIONER,  
FEDERAL COMMUNICATIONS COMMISSION**

Mr. CARR. Thank you. Chairman Wicker, Ranking Member Cantwell, distinguished members of the Committee, thank you for the invitation to testify.

I want to begin by commending the Committee for its focus on expanding America's 5G workforce. This effort is just as important to securing U.S. leadership in 5G as our work to free up more spectrum and modernize our infrastructure rules. That is why I announced a 5G jobs initiative last year that looks to address a shortage of tower climbers and telecom techs, the men and women who put on hard hats and harnesses and build out America's Internet infrastructure.

Getting the right policies in place here in Washington makes all the difference to America's broadband builders. The good news? Our recent regulatory reforms have enabled the private sector to deliver remarkable results.

Internet speeds are up 70 percent compared to just two years ago, the digital divide narrowed by nearly 20 percent over the prior year alone, and telecom crews built out more miles of high-speed fiber than ever before.

America now has the world's leading 5G platform, the very first commercial 5G service launched here in the U.S. more than a year ago. The private sector brought 5G to 14 communities in 2018, quickly expanded that to more than 30 in the first part of 2019,



and one provider alone has now committed to building 5G to 99 percent of the U.S. population.

We need to keep this winning streak going, and the work this Committee is doing on spectrum and on infrastructure will provide an additional boost to U.S. leadership.

The success we are seeing with accelerated infrastructure builds also creates a new opportunity. Industry estimates that it could fill another 20,000 job openings for tower climbers alone. That would nearly double the size of this group of skilled workers. These are good paying jobs, ones you can raise a family on. And they are not one-off or short-term jobs either. They are careers with a clear pathway for upward mobility.

Take Shama Ray. She started her career as a fire fighter and paramedic. Eight years ago, she started climbing telecom towers. She then decided to launch her own business, and she is now the CEO of that company. She is also working to expand opportunities for women in the tower industry.

After seeing firsthand the incredible work that America's tower crews accomplish, I started a process to recognize their achievements. I am doing this through a series of 5G Ready Hard Hat presentations. My first one went to Shama.

We need to expand this group of skilled workers, and that is why I announced my jobs plan. It looks to community colleges as a pipeline for 5G jobs. It is modeled on a program developed by Aiken Technical College in South Carolina. In 12 weeks, the program can take someone with no training and teach them the skills to land a good paying job in the tower industry. I have been working with stakeholders to stand up more programs like this one, and we are already seeing results. This year, Southeast Tech in South Dakota will launch its own tower program.

Some businesses are tackling the worker shortage through in-house programs like the one I saw at a new Ericsson facility in Texas last year.

The Department of Labor is also an important partner in this effort. DOL has a registered apprenticeship program for tower techs called TIRAP, and it already supports over 2,000 apprenticeships. So DOL's continued focus on these 5G jobs can help address the workforce challenge.

In light of the efforts underway, community college programs, in-house initiatives, apprenticeships, the FCC convened a working group that can bring all these stakeholders together, and that group is now developing recommendations to expand our 5G workforce.

Going forward, the Federal Government should provide the same support for technical workforce training as it does for non-technical education. One idea that Congress is considering is to expand Pell Grant eligibility to cover shorter-term certificate programs. While I defer to others on the specifics of any such reform, there may be ways to streamline the approval process and ensure parity and opportunity between qualifying tower tech certification programs and more established or classroom-based learning.

In closing, I want to thank you again, Chairman Wicker, Ranking Member Cantwell, and members of the Committee, for the chance to testify. I look forward to your questions.

[The prepared statement of Mr. Carr follows:]

PREPARED STATEMENT OF HON. BRENDAN CARR, COMMISSIONER,  
FEDERAL COMMUNICATIONS COMMISSION

Chairman Wicker, Ranking Member Cantwell, and distinguished Members of the Committee, thank you for the invitation to testify. It is a privilege to appear before you again.

I want to begin by commending the Committee for its focus on expanding America's 5G workforce. This effort is just as important to securing U.S. leadership in 5G as our work to free up more spectrum and modernize our infrastructure rules. And that is why I announced a 5G jobs initiative last year to help address a shortage of tower climbers and telecom crews—the men and women who put on hard hats and harnesses and build out America's Internet infrastructure.

Since I joined the Commission in 2017, 5G jobs have been a leading priority for me. In fact, my first trip as a Commissioner was to a manufacturing plant in Claremont, North Carolina, where I met with workers producing fiber—the physical backbone of our wired and wireless networks. Officials across government are rightly focused on revitalizing our manufacturing base, providing middle-class jobs, and career pathways for those with technical training. And so it was inspiring to see vibrant manufacturing in western North Carolina that fit well with—and, in fact, is vital to—the new information economy. The humming of the plant and the miles of fiber optic cable it produces could be put to all sorts of end uses. But that plant has a special role in advancing our country's leadership position as an innovator. That North Carolina plant quite literally creates the high-speed platform that will power our economy for the next decade and provide so many other benefits to everyday Americans.

Getting the right policies in place here in Washington can make all the difference for America's broadband builders. And the good news is that our work to free up more spectrum and modernize our country's infrastructure rules is enabling the private sector to deliver remarkable results.

Internet speeds in the U.S. are now up 70 percent compared to just two years ago. The FCC's most recent Broadband Progress Report shows that the digital divide—the percentage of Americans that lack access to high-speed Internet services—narrowed by nearly 20 percent over the prior year alone. Telecom crews are building out more miles of high-speed fiber than ever before—over 450,000 route miles in 2019 alone, which is enough to wrap around the Earth over 18 times. Internet providers also set a record for the number of new homes passed with high-speed fiber at 6.5 million, which represents a 16 percent increase since 2018.

The 5G results are especially exciting. Americans should be proud that we now have the world's leading 5G platform. The very first commercial 5G service launched here in the U.S. over a year ago. By the end of 2018, the private sector extended 5G to 14 communities. Halfway through 2019, that figure expanded to more than 30, and one provider alone has now committed to building 5G to 99 percent of the U.S. population.

Many of these 5G builds are powered by small cells. These are the backpack-sized antennas that provide the fiber-like capacity and millisecond latency that are key for many 5G applications. Because of FCC reforms to small cell infrastructure rules, investment in small cells has boomed. The private sector deployed 13,000 small cells in 2017, 60,000 in 2018, and now has a total estimated base of 200,000.

These figures quantify the momentum America now has for 5G. But numbers don't tell the full story of what these infrastructure builds mean for everyday Americans. After all, if 5G builds were limited to the wealthiest neighborhoods of America's biggest cities, we could not claim that our policies are working. We can claim success only when every community has a fair shot at next-generation connectivity.

That is why I have spent a lot of my time on the Commission outside of D.C. I have visited the communities and neighborhoods that we cannot leave behind as the country transitions to 5G. And while there is much more work to do, I am proud of the progress that our common sense infrastructure policies are already delivering in many of these communities.

Take Houston's Second Ward. This is a part of the city that hasn't always shared in the prosperity or investments that its neighboring communities have seen. In September, I spent time there with Mayor Sylvester Turner and a few of the broadband builders working to connect Houstonians. I talked to workers who were trenching fiber and powering up small cells to boost capacity there. Why is there so much private sector investment in that lower-income neighborhood? It's because many households use a wireless connection as their only onramp to the Internet,

and the infrastructure rules that the FCC and local officials put in place allow wireless providers to respond to this demand. Providing more capacity to the Second Ward helps its residents enjoy the benefits of fast broadband like the rest of Houston.

Next-generation builds in Houston and other high-density locations are not enough for the U.S. to claim a leadership role in 5G. We cannot let 5G opportunity be a unique privilege of living in a big city. That is why this Commission has focused on making sure that rural America is not left out of the jobs, education, and healthcare innovations built on 5G. There, too, we are seeing results.

In Sioux Falls, South Dakota, a few months ago, I saw small cells being installed that are now live, providing 5G service. Most people would not have picked Sioux Falls to be among the first places to get 5G, and yet thanks to the common sense infrastructure rules that Mayor Paul TenHaken put in place there—policies that the FCC used as the model for our own infrastructure reforms—Sioux Falls is at the vanguard of 5G. Our rules are designed to remove barriers at all levels of government, and speed deployment to all communities in America.

In South Carolina, a company built a 100,000 square foot manufacturing plant less than a year ago to meet the increase in demand for small cells. At the facility, Jake and his crew told me that they got jobs at the plant less than six months ago. They had been employed in general steel and construction work before. They now have 5G jobs. And the company says they are expanding their workforce by nearly 10 percent every month to keep up with demand.

In Elkmont, Alabama, a small-town manufacturing plant is already seeing a big boost from 5G. The facility makes the harnesses and other gear that America's tower climbers use to install new small cells. The plant has doubled production over the last year-and-a-half with new small cell builds underway.

We need to continue to build on the success we are seeing. We need to extend America's winning streak. That means continuing our work to free up more spectrum and streamline outdated infrastructure rules. The leadership this Committee is showing on these issues is providing a significant boost to U.S. leadership in 5G. I want to commend the Committee in particular for its work on the STREAMLINE Small Cell Deployment Act, which would update our infrastructure rules to account for new 5G technologies.

In fact, the successes we are seeing in accelerating infrastructure deployment have created a new challenge and opportunity. Industry estimates that it needs to fill another 20,000 job openings for tower climbers and telecom techs to complete this country's 5G build. That would nearly double the size of this group of skilled workers.

One of the highest privileges of this job has been spending time with America's tower climbers and telecom crews. Put simply, they are the best of the best. And seeing firsthand the work it takes to build out this country's Internet infrastructure has only reinforced in my mind the need for programs that can train more 5G workers.

In Cincinnati, Ohio, I met with a company that has doubled the number of small cells they are installing from 30 to 60 per month, and they recently hired four new crews just to keep up with demand. In San Jose, California, I met with a worker who has been climbing towers for seven years. He now wants to double the size of his crew but is struggling to find enough workers. Tower companies are routinely turning down jobs because they do not have the workforce in place to complete the work. Indeed, two years ago, when I joined Senator Wicker at Jackson State University for a jobs roundtable, we heard from industry leaders about the difficulty they have filling jobs.

These are good-paying jobs, too. They do not require an expensive four-year degree. And they are 5G jobs that can help lift thousands of American families up into the middle class. One tower company reports that a qualified worker can earn upwards of \$70,000 in their first year of employment. And these are not one-off or short-term jobs, either. They are careers with a clear pathway for upward mobility. Tower companies tend to be small businesses. And I have met with women and men who started out as tower techs and have gone on to run their own companies.

Take Shama Ray. She started out her career as a firefighter and paramedic. Eight years ago, she transitioned into climbing towers and building out Internet infrastructure. In 2012, she decided to start her own tower company, and she is now the owner of Above All Tower Climbing, which is based in Missouri. In addition to her day job running the business, she is now working to expand opportunities for women in the tower industry.

Last year, I started a process to recognize America's tower climbers and tell their stories through a series of interviews and what I call "5G Ready Hard Hat Presen-

tations.” My first 5G Ready Hard Hat went to Shama Ray because her story exemplifies the best of America’s tower techs.

Or take Mike Young. After earning an associate degree in wireless communications, he joined a tower company at age 18. He started out as an entry level tower tech. He moved up to become a crew chief, then a project manager, and then the Chief Operating Officer of the company. Just last year, he was promoted to President of that company—Vikor Teleconstruction, which is based in Sioux Falls, South Dakota. Even though Mike has climbed the corporate ladder, I can testify to the fact that he keeps his tower skills sharp. I had the chance to join him on top of a 2,000-foot broadcast tower in Rowena, South Dakota. I can assure you that spending time in the air with Mike gave me a newfound appreciation for the work that America’s tower crews do every day.

We need to expand this group of skilled workers. That is why, as noted above, I announced a jobs initiative to help address this opportunity. It looks to community colleges and technical schools as a pipeline for 5G jobs. It is modeled on a program developed by Aiken Technical College in Graniteville, South Carolina. In 12 weeks, the program can take someone with virtually no training, teach them the mix of classroom and physical skills necessary to build and install new cell sites, and enable them to land a good-paying job in the tower industry. Dr. Gemma Frock, who developed the program, says that 100 percent of her students have received job offers upon graduating from the program.

My 5G jobs initiative aims to stand up more community college programs like the one at Aiken. And I have been working with stakeholders, including the National Association of Tower Erectors (NATE), on doing just that—focusing on schools in different regions of the country. The good news is that we’re already making progress. A few months back, in Sioux Falls, South Dakota, I visited Southeast Technical Institute, and talked with the trade school’s administrators about the opportunities that a tower training program could bring to the community. I am pleased to report that the school is launching a tower tech certification program this year. And I am continuing to work with stakeholders to stand up more programs like these.

Of course, community college programs are not the only pathways to expanding our 5G workforce. Some companies are tackling the worker shortage head-on by expanding their in-house training opportunities. I saw one leading example of this last year in Lewisville, Texas. That is where Ericsson opened a new 26,000 square foot facility to train its own tower climbers. In 2019 alone, Ericsson reports that 847 trainees completed the program, which underscores the significant demand for tower techs. Other companies are following that model.

But training workers in-house can be expensive, particularly for many of the smaller tower companies that are building out 5G networks. Indeed, one tower company has reported that they spend about \$12,000 per person on training within the first sixth months of employment. So I think we should continue to look for ways to support additional training opportunities while also highlighting the good work that businesses are doing through their in-house programs.

The Department of Labor is an important partner in this effort. DOL already has a registered apprenticeship program for tower techs called the Telecommunications Industry Registered Apprenticeship Program or TIRAP. The Wireless Industry Association has been working with DOL on this initiative, and TIRAP already supports 2,085 apprenticeships with 30 different employers. Apprenticeship programs like this hold great promise because they allow those with obligations or families to support a chance to earn while they learn. DOL’s continued focus on support for 5G jobs can help address the workforce challenge.

In light of the various efforts that are underway—community college programs, in-house or third-party training efforts, and registered apprenticeship programs—the FCC has convened a working group that can bring all these different stakeholders together. In particular, the FCC’s Broadband Deployment Advisory Committee now has a Broadband Infrastructure Deployment Job Skills and Training Opportunities Working Group that is focused on expanding our 5G workforce. I look forward to working with that group and reviewing their recommendations. And I should note that there is a bill in this Committee—the Telecommunications Opportunities for Workers Engaging in Real Infrastructure Deployment Act of 2019 or TOWER Act—that would go a long way to addressing the need for more 5G workers through a coordinated, stakeholder-based effort.

At bottom, expanding our 5G workforce must remain a national priority. The Federal government should provide the same support for technical workforce training as it does for non-technical education. Aiken Technical College, for example, has been able to get its students access to Pell grants as well as specialized aid for its students who are veterans by designing its program to be a credit degree pathway.

However, that designation is not without its own costs and difficulties, and other schools, such as Southeast Tech, have chosen a non-credit approach, which leaves them with fewer funding sources. There is also bipartisan work ongoing in Congress—the JOBS Act of 2019 being one example—that aims to expand Pell grant eligibility to cover shorter-term certificate programs. While I defer to others on the specifics of any such reforms, there may be ways to streamline the approval process and ensure parity in opportunity between qualifying tower tech programs and more established or classroom-based learning.

\* \* \*

In closing, I want to thank you again Chairman Wicker, Ranking Member Cantwell, and distinguished Members of the Committee for holding this hearing. I welcome the chance to answer your questions.

The CHAIRMAN. Thank you, Commissioner Carr.

Mr. Miller, when did you arrive in town?

Mr. MILLER. I arrived yesterday afternoon.

The CHAIRMAN. Glad you made it. I hope you brought your coat.

Mr. MILLER. I did not.

[Laughter.]

Mr. MILLER. But I wish I had.

The CHAIRMAN. Well, welcome from Gulfport, Mississippi, and you are recognized for your opening statement.

**STATEMENT OF JIMMY MILLER, CHAIRMAN,  
NATIONAL ASSOCIATION OF TOWER ERECTORS (NATE)  
AND PRESIDENT, MILLERCO**

Mr. MILLER. Thank you, Mr. Chairman. Mr. Chairman and members of the Committee, my name is Jimmy Miller. I am President of MillerCo, a privately held woman-owned company established in 1997 in Gulfport, Mississippi. MillerCo offers a complete range of services for the wireless industry.

I am testifying today as Chairman of the National Association of Tower Erectors. NATE is a nonprofit trade organization consisting of 900 member companies, mostly small businesses that construct, service, and maintain hundreds of thousands of communications towers, distributed antenna systems, small cell networks, and broadband throughout all 50 states and 13 other countries.

I am privileged to testify alongside Commissioner Carr who, along with Chairman Pai, have been outspoken champions advocating for greater workforce development in our industry. Incidentally, both men have visited tower sites and both have actually climbed towers. If any of you would like to visit a tower site or small cell in your state, we can make this happen. You do not even have to climb if you are afraid of heights.

The 5G rollout, coupled with initiatives to close the digital divide, is creating great industry opportunities as well as a major industry challenge. The most significant challenge is attracting, recruiting, and retaining a properly trained and qualified workforce. As President of MillerCo, I am regularly confronted with these workforce challenges which are afflicting many in our industry and increasing the pressure on small contractor companies like mine to hire individuals who we can mold into skilled tower employees.

As previously stated, our industry has approximately 29,000 workers who we call tower technicians, and according to recent projections, we could easily accommodate as many 20,000 additional techs over the next 10 years to meet current and future demands.

Impediments to growing our workforce include working at heights, sometimes up to 2,000 feet; extensive travel to worksites; dearth of industry programs at the community college/technical college level; competition from other industries; lack of awareness in career opportunities in the telecom industry; and lack of funding at the Federal, State, regional, and local levels.

We have to do a better job of publicizing our industry and telling the story of the career pathways and earning potential available. Immediate earning power for technician-level workers can range from \$45,000 to \$70,000 per year with lots of room for advancement for growth. And what other profession allows employees to be promoted on their way down, in our case down a tower?

A major component of NATE's workforce development effort deals with training. It is not a quick undertaking. We can often get a technician through basic safety and technical training in two weeks, but he or she needs at least a year on the job to become competent.

Additionally, the technical skill sets continue to become more complex. Today's technicians need to expand and diversify their skill sets to include training in areas such as small cell antenna installations, 5G equipment specs and design, fiber optics, distributed antenna systems, and 5G RF.

Other obstacles in the march to 5G and broadband expansion are the lack of accurate and timely broadband coverage maps and regulatory processes and timelines that inhibit our work.

There are ways to help address our workforce shortage. The tower and wireless installation at Aiken Technical College in Aiken, South Carolina and the wireless infrastructure technician program at Southeast Technical Institute in Sioux Falls, South Dakota are two educational programs that exemplify how higher education and private industry can partner.

Another way is to advance companion legislation to House bill 1848, the Communications Jobs Training Act. This bipartisan legislation would authorize \$20 million per year for 3 fiscal years for a competitive grant program to develop curriculum and certificate programs at community colleges, vocational institutes, and military organizations to attract and train a future pipeline of workers. This is NATE's top legislative priority this year.

Attracting veterans for tech careers is another priority. NATE members Warriors4Wireless is directly involved in training veterans for new careers in our industry.

My written testimony also has details on the National Wireless Safety Alliance, which provides portable nationwide credentialing and certification, and on the Telecommunications Industry Registered Apprenticeship Program.

My written testimony also highlights other bills NATE supports that seek to address small cells and broadband.

I would like to thank the Committee for this opportunity today.  
[The prepared statement of Mr. Miller follows:]

PREPARED STATEMENT OF JIMMY MILLER, CHAIRMAN, NATIONAL ASSOCIATION OF  
TOWER ERECTORS (NATE) AND PRESIDENT, MILLERCO

Mr. Chairman and members of the Committee, my name is Jimmy Miller. I am the President of MillerCo, a privately held woman-owned company established in

1997 in Gulfport, Mississippi. MillerCo offers a complete range of services for the wireless industry. These services include the installation and maintenance of wireless technologies and any other appurtenances associated with a cell tower site including the FAA Obstruction Lighting Systems.

I am testifying today on behalf of the National Association of Tower Erectors, also known as NATE, for which I serve as its Chairman. NATE is a non-profit trade organization whose membership encompasses all layers of the communications infrastructure ecosystem, and now includes over 900 member companies that construct and service and maintain hundreds of thousands of communications towers, distributed antenna systems (DAS), small cell networks and broadband throughout all 50 states and 13 other countries. I am honored to serve as a voice today on behalf of NATE's membership, a majority of which are the small business contractor firms like mine that enable connectivity on a daily basis.

I am also privileged to testify alongside FCC Commissioner Brendan Carr and Lisa Youngers at today's hearing. Commissioner Carr, along with FCC Chairman Ajit Pai, have been outspoken champions advocating for greater workforce development in our industry. Incidentally, both Chairman Pai and Commissioner Carr have visited a number of our NATE member tower facilities around the country, and both have actually climbed towers with the crews from some of our member companies. If any of you would like to visit a tower site or small cell pole in your respective states, we can make that happen. You don't even have to climb if you are afraid of heights!

Given the demographic reach and diverse make-up of NATE's membership, the Association is well positioned to articulate what we believe to be the primary obstacles to 5G and broadband deployment during today's hearing.

I want to start by focusing on the most significant challenge with which our industry and contractor firms like mine are dealing, which is the shortage of a properly trained and qualified workforce that is expected to possess the diverse skill set necessary to produce the expansion of universal broadband, public safety and ubiquitous 5G coverage across North America, while completing the broadcast repack. If we are to win the hyper-competitive global race to build and deploy 5G, which will enable our national, state and local economies to leverage technologies based on the Internet of Things, smart cities, artificial intelligence and virtual reality, we must ensure that we have enough trained workers. We simply cannot meet these national goals without doing so.

2020 marks the early stages of what appears to be a protracted cycle for the telecom industry as we deploy the next generation of wireless and integrate innovative technologies to enhance the economy. However, the 5G rollout, coupled with targeted initiatives to continue to expand broadband and related infrastructure to rural and underserved areas of the United States, is creating a major industry challenge across the country, its various regions and communities. This challenge involves attracting, recruiting and retaining a skilled, productive and safe telecom workforce for all industry sectors.

Based on industry estimates, our industry has approximately 29,000 workers, who we call tower technicians, as part of our existing labor pool. According to recent projections, the industry could accommodate as many as 20,000 additional technicians over the next 10 years to meet current and future demands related to next generation infrastructure and broadband deployment activities.

In my role as President of MillerCo, I have experienced first-hand the challenges associated with attracting, recruiting and retaining workers. These workforce challenges confronting the industry serve to increase the pressure on small contractor companies like mine to hire individuals who we will mold into skilled tower technicians.

Based on my personal experiences and the feedback NATE receives from our member companies on a weekly basis, some of the impediments to growing the workforce include, but are not limited to, the following factors:

- Lack of public awareness of the telecom industry's career opportunities
- Dearth of industry programs at the community college/technical college level
- Competition from other industry sectors and construction trades
- The surging demand for new workers created by 5G deployment, rural broadband initiatives and projected new builds (explosive demand far exceeds supply)
- Decline in population growth (fewer students in pipeline)
- Lack of funding at the federal, regional, state and local levels
- Unwillingness to work at heights and extensive travel are barriers to entry for prospective workers

- Graying workforce unable to handle rigors of technician jobs
- Lack of awareness by parents, youth and adult workers of a viable career and pathway in the industry

It is not enough for men and women to say they want a career as a wireless infrastructure technician. They first have to be willing and physically capable to do the job, often working at elevation. While there are many thousands of communication structures less than 200 feet high, there are an enormous number taller than that, and broadcast towers can reach 2,000 feet high. The workforce we are seeking to attract to our industry must be able to possess a diverse skill-set that can navigate many different sizes of communications structures.

These highly skilled technician positions must be filled by people sufficiently educated and trained in proper techniques and in the use of the requisite equipment. This is not a quick undertaking. Employers who train their own employees and the industry's private training company providers can often get a technician through rudimentary safety training in two weeks, but he or she needs at least a year on the job to become competent at a specialty in which the employer works.

Additionally, the technical skill-sets required of technicians continue to become more complex as next generation technologies evolve. Today's technicians need to expand and diversify their skill-sets to include training in areas such as small cell antenna installation, 5G equipment specifications, 5G construction best practices, 5G infrastructure design, distributed antenna systems, fiber work; as well as possess a fundamental understanding of spectrum bands and radio frequency (RF) characteristics related to 5G.

In addition to the workforce challenges I have articulated, I would be remiss if I did not mention several other obstacles to the 5G and broadband build cycle that I and other NATE members are experiencing.

One threat to 5G and broadband deployment is the extensive regulatory processes that are often in place at the federal, state and local levels. To maintain the United States' position as a global leader in 5G and accomplish the government and industry's collective deployment objectives, the Association favors streamlining the processes at the federal, state and local levels to modify or eliminate unnecessary, expensive and oftentimes excessively onerous regulations.

Another impediment that bears mentioning as an obstacle, which has been well documented, is the lack of accurate and timely broadband coverage maps. The Association's members on the frontlines of deployment know better than most where the coverage gaps exist, and some of the issues associated with broadband mapping inaccuracies present a threat to our country's future deployment objectives.

### **Potential Solutions**

Addressing the industry's challenge to attract, recruit and retain a skilled, safe and productive workforce will require a commitment of collaboration at the federal, regional, state and community levels between companies, educational and community-based institutions. Additionally, it will require a great deal of advocating and coordinating to ensure that information is shared and relationships are forged consistently across the Nation.

NATE's leadership has committed to investing in workforce development and training initiatives to promote the professional career path opportunities available in our thriving industry. The Association's commitment in this arena is reflected by the establishment of the NATE Workforce Development Committee. The mission of this group is to create awareness and provide information of the many career opportunities in the telecommunications industry to individuals. Through partnerships, the NATE Workforce Development Committee is working to facilitate educational opportunities to individuals who are seeking a new vocation/occupation.

I am proud that I joined some of my colleagues in representing NATE in a workforce development-themed event at the White House last year commemorating the one-year anniversary of the Pledge to America's Workers initiative, a key program of the Administration's National Council for the American Worker. At the event, we affirmed our organization's commitment to facilitating training and professional development opportunities for 10,000 current and future workers over the course of the next five years.

A major component of workforce development is the abundance of training available in the industry to develop and grow a skilled workforce. NATE facilitates high quality training by providing best practices guidelines, standards and subject-matter expertise to ensure that minimum benchmarks are established in training curriculum. Additionally, NATE has approximately 25 private training companies which provide third party training services as members of the Association.



The NATE EXCHANGE also continues to be a “go-to” website platform for wireless construction and maintenance companies and individual tower technicians to gain access to training courses in the wireless infrastructure industry. The EXCHANGE, which offers technical training courses from our member training providers in 17 different skill categories, is a valuable benefit as NATE member companies qualify for discounted rates in designated training courses offered on the website portal.

Federal grant-enabled training sessions have been a resource that NATE has tapped into to facilitate training in the industry. For the fifth consecutive year, NATE was selected by the U.S. Department of Labor—OSHA to receive a Susan Harwood Targeted Topic Training Grant. The Susan Harwood Training Grant Program awards funds to non-profit organizations on a competitive basis. Awards are issued annually based on congressional appropriation.

Through these training grants, NATE has been able to positively impact the marketplace by developing curriculum and offering free training sessions nationwide on courses including topics such as Train-the-Trainer, Fall Prevention, Rigger Awareness, Advanced Rigging Principles and Wireless Rooftop Deployment (this year’s grant program). As an added benefit, at the conclusion of every grant program year, NATE makes the training curriculum available on the Association’s website for companies and workers in the industry to utilize.

To provide further direction and focus to NATE’s workforce development efforts, the Association recently retained GKF Consulting, LLC to develop an industry-specific needs assessment and workforce strategic plan. A central hallmark of this plan is to address the educational needs of the industry by advocating for a workforce system of “Telecom Center of Excellence” certificate-based programs strategically located around the country at community colleges and technical institutes.

NATE believes that the Tower and Wireless Installation Program at Aiken Technical College in Aiken, South Carolina and the Wireless Infrastructure Technician program at Southeast Technical Institute in Sioux Falls, South Dakota are two existing educational programs that should serve as models to emulate nationally to promote the professional career path opportunities available in our industry.

These two programs are great examples of higher education and private industry partnering to help meet the skilled labor shortage that limits future growth. For many companies like mine, we are the entity that provides the training and the resources while on the job. Developing more programs like this will provide the necessary training and resources prior to starting in the field, which will only help to elevate the individual and the industry, and in turn will provide much greater outcomes for success for everyone across the board.

Members of the Commerce Committee can play a role in helping support this effort by introducing and advancing companion legislation in the Senate to H.R. 1848, the “Communications Jobs Training Act.” This bipartisan legislation, introduced in the House by Reps. Dave Loebsack (D-IA) and Markwayne Mullin (R-OK), would authorize \$20 million per year for three Fiscal Years to direct the FCC to carry out a competitive grant program to make funding available to develop classroom and field-based curriculum and certificate programs at community colleges, vocational institutes and military organizations to attract and train a future pipeline of workers to build, deploy and maintain the next generation networks and related infrastructure that are so vital for America’s future. This is NATE’s top legislative priority for the 116th Congress and we ask that members of the committee embrace this important bill in the Senate. While this and other measures that deal with workforce development only represent modest steps that are frankly insufficient to enable our industry to keep pace with the growing demand for enhanced communications services, they are collectively a significant step in the right direction.

NATE also views S. 2363, the “Tower Infrastructure Deployment Act,” as another bill that merits Senate support. This legislation would amend the Communications Act of 1934 to establish a Telecommunications Workforce Development Advisory Council within the FCC to facilitate participation in industry-specific workforce development programs and identify ways to improve workforce development in the communications industry.

NATE’s commitment to workforce development is also highlighted in the Association’s investment in providing the initial round of seed funding to support the launch of the National Wireless Safety Alliance (NWSA). NWSA is a 501(c) (6) assessment and certification organization that provides nationwide, portable worker credentials to tower technicians in progressive worker categories in order to ensure continued excellence and professionalism in the industry. After workers receive training to become tower technicians, companies have an opportunity to ensure that their workers obtain NWSA certification credentials that are applicable throughout the country. Workers, regardless of their training pathway, will ultimately be re-

quired to take a standardized NWSA knowledge and field-based assessment in order to become certified. NWSA offers worker certification credentials in the following worker categories: Telecommunications Tower Technician I (TTTI), Telecommunications Tower Technician II (TTTII), Antenna & Line Specialty and Foreman. Much like an electrician's card, the NWSA certification card is a source of pride for workers and is creating a career pathway for the industry's technician workforce to follow.

The Wireless Infrastructure Association is the national sponsor of the Telecommunications Industry Registered Apprenticeship Program (TIRAP) and this initiative represents another opportunity to grow the workforce. I have the privilege of serving on the TIRAP Advisory Board. TIRAP administers a total of nine occupations, all critical to the development and deployment of 5G networks. Apprenticeship-based training is tailor-made for companies like mine.

TIRAP's entry-level apprenticeship is the occupation of Telecommunications Tower Technician ("TTT"). A TTT is a member of a crew performing general construction activities with an emphasis on tower system installation and maintenance/inspection of existing support structures used in the provision of telecommunication systems, including personal wireless communications, public safety communications, utility networks and broadcasting.

The apprenticeship utilizes a competency-based approach that measures the individual apprentice's skill acquisition through a combination of specified minimum number of related technical instruction, on-the-job learning and the successful demonstration of competency in a variety of skills and safety protocols as described in a work process. The work process schedule developed by TIRAP draws from current regulations and industry standards and generally accepted best practices to outline the necessary competencies that must be mastered by the apprentice in order to be credentialed as a TTT. 5G will require many additional occupations beyond tower techs. RF engineers, site acquisition managers, antennae installers and host of others will be required to deploy next generation wireless networks.

While the White House has made 5G workforce deployment a priority, the Department of Labor has yet to turn its focus on addressing 5G workforce challenges. There need to be additional opportunities for companies and organizations to grow apprenticeship programs in the telecommunications sector. It is my hope that some of these issues can be appropriately addressed and the process significantly streamlined to allow more workers to be trained in accordance with TIRAP training pathways and for employers to receive funding for some of the training. It is essential that DOL place a priority on developing the 5G workforce through apprenticeships as an industry of the future that will create jobs in virtually every sector of the economy; by some estimates, up to 22 million jobs will be supported by 5G.

Speaking of apprenticeship programs, NATE encourages Commerce Committee members to assist our industry by also supporting S. 951, the "Apprentice Hubs Across America Act of 2019." This legislation promotes registered apprenticeships within in-demand industry sectors like ours, through the support of workforce intermediaries and for other purposes.

Attracting transitioning veterans with military backgrounds for technician careers is another focal point for the Association and presents a golden opportunity for the industry. NATE member organizations Airstreams Renewables, Inc. and Warriors4Wireless (W4W) are both directly involved in training veterans for new careers in our dynamic industry.

NATE holds a Board of Directors seat in the W4W organization that is bridging the gap between the demand for trained and deployable wireless technicians, and the thousands of qualified service men and women eager to transfer the skills they've learned in the military. W4W provides training, advanced certification and transitional support, giving veterans the building blocks they need for an exciting and fulfilling career in the telecommunications industry.

The efforts of the W4W organization are starting to scale. According to President and CEO Kevin Kennedy, in 2019, the organization trained and placed 141 veterans (who attended a two week training program and were then connected to hiring partners) with industry companies and directly placed (identified veterans, screened and then connected to hiring partners) an additional 309 veterans to industry companies. This equates to a total of 450 veterans the W4W organization assisted and connected to jobs in the industry in 2019 alone. Additionally, for the past 30 months, W4W has had a 100 percent success rate in getting their technician graduates at least one job offer.

In 2020, W4W projections include training and placing 280 veterans to employers and directly placing an additional 320 identified veterans to employers in the industry, for a total of 600 veterans assisted.

NATE believes that enhancing the use of emerging technology like unmanned aerial systems—drones—into commercial communications infrastructure work will also play a role in helping to address the tower industry’s workforce shortage by maximizing the use of our available manpower, without the loss of any jobs. We estimate that the use of drones for tower inspections can reduce the number of climbs by tower technicians by as much as one-third, which will reduce risk to climbers while facilitating and expediting necessary tower work.

We hope that these collective efforts will help to attract more potential workers. But a simple fact remains: it seems that the services our industry provides all too often are taken for granted, and many people—particularly younger individuals—don’t even think about, much less contemplate, a career in our industry. We have to do a better job of marketing and publicizing our industry and telling the story of the career pathways and earning potential available in our industry.

The last several years, NATE officials have made a concerted effort to conduct workforce development meetings and forged relationships with representatives from third party, national advocacy organizations including the Association of American Community Colleges, the Association for Career and Technical Education, Capitol Tech University, the League of United Latin American Citizens, the Multicultural Media, Telecom and Internet Council, the National Association for the Advancement of Colored People, the National Black Church Initiative and the National Urban League. During the meetings, NATE focused on educating these organizations on the career opportunities available in the wireless and broadcast industries to help promote the profession and recruit a pipeline of workers into the industry.

Immediate earning power for technician level workers can range from \$45,000 to \$70,000 per year with lots of room for advancement and growth. It is not uncommon for technicians to follow a progressive pathway of being promoted to a crew foreman, a construction manager, project manager and even a company executive-level role. What other profession allows employees to be promoted on the way down—in our case—down a tower!

I also would like to return briefly to the subject of streamlining the existing burdensome regulatory environment that I referenced earlier in my remarks. NATE is currently represented by Miranda Allen, CEO of member company RSI Corp, on the FCC’s Broadband Deployment Advisory Committee’s (BDAC) Job Skills and Training Opportunities Working Group. Additionally, Leticia Latino-van Splunteren from member company Neptuno, USA Corp is serving as the Chairwoman of the BDAC’s Job Skills and Training Opportunities Working Group. NATE is encouraged by the work that the BDAC and its working groups are doing to identify opportunities to remove current regulatory barriers. It is imperative that the FCC prioritize implementing recommended processes as soon as possible so as to expedite 5G deployment.

NATE applauds the bipartisan leadership of Senators John Thune and Brian Schatz in introducing the “STREAMLINE Small Cell Deployment Act.” As you know, this legislation would implement fee limits, streamline deployment timelines and include other key measures that would position the United States to win the global race to 5G. You and your colleagues can play a major role reducing the regulatory obstacles to deployment by supporting legislation like this and others that may be introduced.

NATE supports efforts by Congress and various Federal agencies that seek to update broadband coverage maps, especially in rural America where there are many white spaces to fill. Accurate coverage maps will provide Members of Congress and the Federal government the clarity and information to make more efficient, targeted use of funds so that industry can deploy broadband to the areas that truly need it.

Legislation introduced by Chairman Wicker, with the support of many Senate cosponsors, the “Broadband DATA Act,” is an important step in this process as this measure would require the FCC to change the way broadband data is collected, verified and reported.

NATE is also supportive of the “Broadband Interagency Coordination Act,” bipartisan legislation introduced by Chairman Wicker and Senator Amy Klobuchar. This legislation would require the Federal Communications Commission, the U.S. Department of Agriculture and the National Telecommunications Information Administration to enter into an interagency agreement that mandates coordination among the agencies for the distribution of broadband deployment funds.

NATE also commends Chairman Wicker and Senators Gardner, Baldwin, and Peters for recently introducing the “Industries of the Future Act of 2020.” NATE supports this forward-looking legislation as a mechanism to ensure that the next generation wireless networks and the infrastructure jobs they create receive the appropriate level of research, development and funding to ensure the United States remains the global leader in wireless innovation.

In conclusion, I would like to thank the Committee for this opportunity. Please be assured that NATE's commitment to safety, education and training in constructing, maintaining and deploying communications infrastructure will never be compromised. NATE members will do everything we can to help meet the wide range of national communications goals, including the completion of the repack and the expansion of broadband and other endeavors addressing 5G as well as programs to close the digital divide. Our bottom line is that we want work to be done properly and efficiently, and that at the end of the day, we want our workers to come home safely. This is good for us, for you, for our Nation's economy, competitiveness and homeland security, and for our vital communications capabilities.

The CHAIRMAN. And thank you very much for your testimony.  
Ms. Youngers, you are now recognized. Welcome.

**STATEMENT OF LISA R. YOUNGERS, PRESIDENT AND CHIEF  
EXECUTIVE OFFICER, FIBER BROADBAND ASSOCIATION**

Ms. YOUNGERS. Thank you. Chairman Wicker, Ranking Member Cantwell, and members of the Committee, I am Lisa Youngers, President and CEO of the Fiber Broadband Association. Thank you for inviting me to testify today.

The Fiber Broadband Association has more than 250 members dedicated to accelerating the deployment of all fiber networks throughout the country. While this hearing's focus may start with 5G, it is important to understand that fiber is the fundamental network technology for the 21st century providing the underlying infrastructure not just for 5G but for wireless networks, smart communities, and smart grids, as well as Internet of Things applications, while also providing direct connections to homes, businesses, and anchor institutions.

To date, we are making great progress in the deployment of all fiber networks throughout the U.S. In 2019, over 450,000 fiber route miles were deployed, and as of September 2019, 46.5 million homes have access to all-fiber networks, 6.5 million more than the year before.

We expect that good news about all fiber deployments will continue especially as fiber is deployed to support small cell and 5G deployments. This is critical given that other countries, including China, have adopted programs to rapidly deploy fiber.

Additionally, in the case of China, it has intentionally built so much excess fiber manufacturing capacity, enough to take over both the entire U.S. and European fiber markets, that Chinese manufacturers are almost certain to offer dumped prices to U.S. 5G providers.

Even with the good news about fiber deployments, there are ways for us to accelerate our efforts.

First, we need to address workforce issues. FBA members find that getting and retaining skilled personnel are among the biggest chokepoint in deployments. Yet, these are good jobs with a good career path. The personnel shortfall has become so bad that I have construction members starting to turn away work and some contractors have stopped buying new equipment because there are not enough skilled personnel to run the machines.

Our members have already started addressing these issues, and you have heard about some of those efforts here today. They are partnering with community colleges and trade schools to develop programs and curricula that will give students training on deploy-

ing fiber broadband networks. One member teamed with the State Technical College of Missouri to create a utility system technician associates degree, and a North Carolina local provider partnered with Wilson Community College to provide fiber deployment training. Members are also working with high school students to discuss fiber job opportunities and training. These efforts are significant, but they will not alone meet increasing workforce demands. Federally supported workforce development programs and apprenticeships are needed. We commend the Department of Labor's Employment and Training Administration for its programs and urge it to prioritize granting funds for fiber broadband deployment and 5G training and apprenticeships. Congress should also explore other opportunities to find new funds to support this type of training.

We also urge Congress to enact the TOWER Infrastructure Deployment Act, introduced by Senators Gardner and Sinema, which would create the Telecom Workforce Development Advisory Council to advise the FCC. We ask that the Committee include in this legislation, a directive that individuals with expertise in fiber workforce issues be appointed as members of the Council.

In my written testimony, I discuss other barriers to fiber deployments and how to address them. Let me highlight two.

First, the FCC should adopt later this month Chairman Pai's Rural Digital Opportunity Fund draft order which, with the budget clearing round proposal, will bring higher performance broadband to unserved areas with less Federal funding, thereby helping to close the digital divide.

Second, across the board, my members tell me that access to poles is a continuing problem even after the 2018 FCC order. We urge the FCC to be vigilant and address these concerns.

Further, we need a more expeditious, less costly way to resolve disputes between utilities and attachers. We therefore urge Congress to enact legislation providing for an alternative dispute resolution process akin to what is included in standard commercial contracts.

I will close by reiterating three points.

Fiber is the fundamental infrastructure for 5G, wireless networks, smart communities, and Internet of Things.

Two, workforce issues are a chokepoint to fiber and 5G deployments.

And three, barriers to deployment remain. We are working industry to industry on solutions, and those are preferable. But government must step in where market forces may not be working.

Thank you very much for your time today.

[The prepared statement of Ms. Youngers follows:]

PREPARED STATEMENT OF LISA R. YOUNGERS, PRESIDENT AND CHIEF EXECUTIVE OFFICER, FIBER BROADBAND ASSOCIATION

Chairman Wicker, Ranking Member Cantwell, and Members of the Committee, I am Lisa Youngers, President & CEO of the Fiber Broadband Association (FBA). Thank you for inviting me to testify today.

The Fiber Broadband Association is the only association across the Americas dedicated to accelerating the deployment of all-fiber networks to all locations and for all purposes. We have more than 250 members including broadband service providers, network deployment contractors, equipment vendors, and others, all of whom are dedicated to accelerating the deployment of all-fiber networks throughout the country. As I expect you know, fiber is the fundamental network technology for the 21st

Century providing the needed underlying infrastructure not just for 5G, but for wireless networks, smart communities, smart grids, as well as Internet of Things applications, while also providing direct connections to homes, businesses, and anchor institutions.

To date, we are making great progress in achieving our goal of rapid all-fiber network deployments. As of September, 2019, 46.5M homes have access to all-fiber networks (about 40 percent of total homes), and 20.5M homes are connected with fiber—a 44 percent penetration rate. Over the past year, all-fiber networks became available to 6.5M additional homes—a record level of additions. While large providers account for most fiber connections, over the past year, smaller providers accounted for 25 percent of the new home connections and 41 percent of all-fiber capital expenditures. All-fiber deployments to various customer end-points are at record levels. In 2019, over 450,000 fiber routes were deployed—driven by new deployments to homes, upgrades by cable operators, and the beginning of deployments to 5G sites and small cells.

We expect the good news about all-fiber deployments will continue, especially should the Federal Communications Commission (FCC) adopt and implement the Rural Digital Opportunity Fund with the so-called “budget clearing round” proposal, which many of you support. This proposal will drive support for future-proof networks to many more locations in unserved areas. We also expect further progress as the Rural Utilities Service continues to implement the ReConnect program by awarding funds for all-fiber network builds.

As for removing barriers to all-fiber deployments, FBA members have developed new construction techniques that lower the cost and shorten the timeline for fiber-builds, and they have worked to develop and provide training for the many new employees that are needed on their projects—a subject I will touch on further in a moment. The FCC and state and local governments have made significant strides over the past several years. For example, the FCC’s 2018 pole attachment order, which instituted One-Touch Make-Ready (OTMR) and other measures, was a positive step. Additionally, many of our members support efforts that require government entities to act promptly to approve access to their rights-of-way at cost-based rates.

That said, there are still too many barriers that delay and even halt all-fiber deployments. This not only harms consumers, but jeopardizes our international competitiveness. A recent report from the Center for a New American Security highlighted that “China has invested more heavily [than the U.S.] in the fiber and physical infrastructure for standalone 5G,” and that “the Chinese government has undertaken significant investments in building up a more robust digital infrastructure of fiber optic networks that are important to facilitate the large-scale deployment of 5G.”

Based on recent discussions with our members, let me highlight some barriers to deployment that are of greatest concern to them.

### **Labor and Job Training**

The annual investment from the private and public sectors in communications infrastructure is enormous—by our count more than \$80 billion—and we see that trend continuing. Not only are we rapidly building all-fiber networks across the country, but providers are investing enormous amounts in other communications technologies, including 5G. As a result, our members are telling us that getting and retaining skilled personnel is among the biggest chokepoints in deployments. Yet, these are good jobs with a good career path. The personnel shortfall has become so bad that one of my construction members said it has started to turn away work. Another member said the company is short 100 crews needed to support the amount of work they could bring in—not people, crews. And one of my equipment providers said that after two years of record sales, contractors have stopped buying new equipment because they do not have enough people to run the machines.

As I mentioned at the outset, our members have been engaged in efforts to increase the workforce for the fiber industry. Because existing educational programs do not provide the skills they need, companies are partnering with community colleges and trade schools to develop programs and curricula that will give students training on deploying broadband networks: from creating network architecture and reading blueprints, to fusing, splicing and closing fiber connections, and from operating heavy machinery to climbing poles and towers to install fiber and other equipment, as well as training on how to conduct “locates”—the ability to locate and mark other facilities that are already in the ground.

One example of such a program is the Utility System Technician associates degree at the State Technical College of Missouri. This degree offers students a hands-on education, learning how to install and maintain utility systems, including fiber, and even offers a “Fiber Optic Technician” certification. The program is up and running

thanks to \$2 million in state funding, donations from private companies in the form of heavy operating equipment, and industry support in creating the curriculum. Another example is Wilson Community College in North Carolina, which partnered with a local fiber broadband provider to bring a 10-week course and a 5-day boot camp on fiber deployment training to the school in 2019. There are already efforts to expand these courses into a degree or certificate program. Each of these programs and their curricula can be models for other institutions across the country.

In addition to these developments, other members are working to drive interest in broadband deployment careers among high school students. One member has created a scholarship for high school students planning to enroll in community colleges or trade schools and who have an interest in apprenticeship or pre-apprenticeship in construction trades. Another member has been working with a local high school, talking to students interested in engineering and other careers in the broadband construction industry and providing them with internship opportunities. Our members have also been ramping up their on-the-job training, which they feel is needed to support employees new to the industry and as an addition to tech school or community college training. These efforts are significant, but they will not alone meet increasing workforce demands.

Federally-supported workforce development programs provide productive opportunities to support and expand educational opportunities. The Department of Labor (DOL) Employment and Training Administration oversees two grant programs that can make a difference. The Workforce Opportunities for Rural Communities (WORC) and the Apprenticeship Readiness grant programs are each geared toward supporting educational institutions and other programs that will provide skills training that help put people to work. In fact, working with some of our members, some community colleges are waiting to hear back now on applications for Apprenticeship Readiness grants to support their efforts to establish new utility programs or update existing programs that provide fiber and other communications deployment training. In 2019, these DOL grant programs offered \$130 million combined in grants, any portion of which could make a significant impact in developing the broadband deployment workforce. The Department of Labor should prioritize granting funds for broadband deployment, fiber deployment, and 5G training—calling out those areas in their grant programs and announcements specifically. Congress should also explore other opportunities to find new funds to support this type of training.

I also want to mention the TOWER Infrastructure Deployment Act, introduced by Senators Gardner and Sinema. This legislation would create the Telecom Workforce Development Advisory Council to advise the Federal Communications Commission on workforce needs in the communications industry, ways to encourage participation in industry-led workforce development programs, and ways to improve workforce development in the industry. We encourage the Committee to ensure this legislation includes a directive that individuals with expertise in fiber workforce issues be appointed as members to the Advisory Council.

### **Pole Attachments**

In adopting the Federal pole attachment statute (Section 224 of the Communications Act), Congress understood that poles were both an essential and limited input for cable and telecommunications providers. The alternative is burying facilities, which takes far longer and can cost twice as much. Yet, while the statute seeks to facilitate access to poles (while accounting for important safety and reliability concerns), there remain issues in getting the utilities to abide by regulations they believe are contrary to their interests. As a result, while the FCC has spent the past 40 years diligently working to implement the statute, FBA members continue to have substantial problems in getting timely access to poles at reasonable rates. For instance, a utility just informed one of our members that it would need to pay \$400 per pole just to conduct a survey of potential attachment issues. Another utility increased make-ready charges to a long-time service provider by 500 percent—and to make the problem even worse, this utility is entering the broadband business as a competitor to our member. One of our service provider members needed access to only 10 poles, but the project was held up for months because it refused to buckle under and pay the utility's unreasonable make-ready fee for one pole. And, other service providers have told us they consistently face issues getting utilities to deliver power to their facilities once they are finally on the poles. Without power, services cannot be provided. We hear examples like these virtually every day. So, what can be done to improve the situation?

- First, in its 2018 order, the FCC sought to address utility concerns that attachers comply with safety and reliability requirements by establishing a process whereby electric utilities would certify contractors that attachers could

then hire to undertake survey and make ready work on poles and to make attachments. The FCC now needs to make sure this process is fully implemented as soon as possible and that the utilities are not allowed to cause further delay by not having available enough certified contractor personnel.

- Second, even though the FCC recently adopted rules to facilitate the filing and pursuit of pole attachment complaints, the process continues to be so costly and take too long that it is unusable to address most issues attachers face. In effect, attachers may have a right, but they do not have a remedy, which leads to utilities dragging out the process and making unreasonable requests. We propose Congress enact legislation establishing a commercially reasonable remedy—that is, the same type of alternative dispute resolution process that is found in commercial agreements between parties with equal bargaining power, and it must be one where an appeal can be taken to court—and not to the full FCC.
- Third, the FCC needs to regularly review its rules—either by seeking comments or holding a workshop to ensure the rules are truly addressing problems—such as the power issues discussed above—and the FCC should regularly ask stakeholders whether they have additional concerns that need to be addressed.

#### **Access to Railroad Easements**

One of the most vexing problems for FBA members is getting the right to cross railroad tracks. On its face, you would not think it would be that difficult to string a wire over or bury one under railroad tracks. The actual work typically can be completed within a day, if not much less time. However, virtually anyone building an all-fiber network can tell a story about having difficulties getting to cross the tracks—and there are lots of railroad tracks in the U.S. Just like with pole access, it too often takes too long and costs too much. But, unlike with poles, there is no Federal statute to help. As a result, providers can be held up for six months or more, and the fees, while sometimes reasonable, can skyrocket. One FBA member had to cross two tracks next to each other, each of which was owned by a different railroad. One charged \$5,000 to cross its tracks; the other \$25,000, thus showing the arbitrariness of these charges. And, quite frankly, even a \$5,000 fee is unreasonable. To address this concern, South Dakota has enacted a law with a \$750 crossing fee, and it updated this law two years later to prevent railroads from adding surcharges to this amount. Other states also responded with Iowa setting a \$750 fee, Wisconsin a \$500 fee, and Nebraska a \$1,250 fee.

FBA encourages the Committee to examine this issue further, and we encourage additional states to enact crossing laws. In the meantime, we have reached out to railroad representatives to begin a dialogue on ways to address our members' concerns.

#### **State and Local Rights-of-Way**

Virtually all fiber providers need access to state and local rights-of-way, and most have good relations with state and local governments. However, there are outliers that take too long to approve an application or seek to charge market, rather than cost-based, rates. Let me raise just one pending example.

For years, the New York State Department of Transportation (DOT) did not charge telecommunications providers for use and occupancy of the state-owned rights-of-way. However, that ended a year ago, when the state, as part of revenue legislation, adopted a new law authorizing the DOT to charge “fiber optic utilities” a fee that could be up to market value. No fee was imposed on other network technologies. Moreover, “fiber optic utilities” are prohibited from passing the fee along to consumers. So, the fee, contrary to Federal law (Section 253 of the Communications Act) is discriminatory and not cost-based—and it is hidden from the public. As we all know, if you want less of something, you tax it. At a time when we are seeking to bring all-fiber networks to new homes and businesses and to support 5G and wireless networks and smart communities, New York State's action is clearly counter-productive. Hopefully, the State will rethink this law. The alternative is for fiber providers in New York State to seek relief in court.

#### **Federal Rights-of-Way**

Congress is to be commended for adopting, as part of the MOBILE NOW legislation, provisions that seek to improve the process for access to Federal rights-of-way. It was warranted. Just several years ago, the Forest Service took 16 months to grant a permit to one of our service provider members to deploy fiber in a mere 8 miles of Federal government rights-of-way. Our member was able to engineer, permit, and construct the other 142 miles of this build in much less time.

While we are hopeful that the new law helps expedite the processing of permits by Federal agencies, we urge the Committee to be vigilant. Just recently, one mem-



ber was held up for 6 months waiting for a Federal agency to sign-off on a permit. We understand that a large part of the problem is that issuing right-of-way permits is not a primary task of Federal agencies, and so they can be easily tasked in other areas. For that reason, we believe Congress should establish a shot clock in the range of 90–120 days, which is similar in duration to what is required by the FCC for wireless siting applications. Moreover, if the agency does not meet the deadline, the application should be deemed granted.

#### **Entry Barriers**

While I have focused my testimony so far on barriers to deployments, let me add that there are still barriers to become an all-fiber provider. Many states have acted recently to tear down those entry barriers for electric cooperatives by enacting legislation that permit their entry while guarding against harm to electric ratepayers and to broadband competition. Further, many electric cooperatives in these states have built all-fiber broadband networks and are providing high-performance service to locations that once received inadequate service. We urge states that have not acted to follow.

Although FBA strongly supports private sector providers driving all-fiber builds, we are troubled by the continuing barriers many states have erected to municipal provision of broadband service. While some claim that municipal entry will undermine the free market, no one can assert that the free market is working well in many higher-cost areas to bridge the digital divide. That is why we support government subsidy programs, and that is why municipal entry, when driven by the local community, should be permitted. Just look at Colorado, where residents in Fort Collins and many other communities determined that private providers were not going to build higher-performance broadband networks they need and voted to enable their municipalities to provide all-fiber broadband service. FBA thus urges Congress and States to permit communities in rural areas to determine their “broadband destiny.”

Let me conclude by saying that we should not lose sight of the tremendous progress we have made over the past 20 years in wiring America with fiber. At the same time, we know that we can accelerate that pace and ensure deployment of this fundamental infrastructure—the very infrastructure needed for 5G, wireless networks, and smart community and IOT applications—throughout the country. The Committee is to be applauded for keeping up the pressure to address barriers we still face, and the FBA stands ready to work with you to address these concerns.

The CHAIRMAN. Thank you very much, Ms. Youngers.  
And now Mr. Feld of Public Knowledge. Welcome.

#### **STATEMENT OF HAROLD FELD, SENIOR VICE PRESIDENT, PUBLIC KNOWLEDGE**

Mr. FELD. Thank you, Chairman Wicker, Ranking Member Cantwell. Thank you all for inviting me to testify on this important issue.

This is our fourth transition from one mobile wireless architecture to another, fifth if you include the analog sunset in 2008. Each transition has presented its own challenges. Each transition has also been accompanied by stakeholders clamoring for changes to give themselves and their specific business models advantages. This frequently takes the form of dire warnings that unless the FCC or Congress acts immediately to satisfy these industry demands, we will fall behind rival countries and therefore suffer some unspecified but certainly dreadful consequence.

Despite these warnings, our nearly 30-year streak as a global leader in wireless technology remains intact. American companies such as Qualcomm, Apple, and Google continue to lead in wireless equipment and wireless operating systems. Why? In no small part because Congress has consistently resisted the hype from the wireless industry and maintained a steady, balanced course on policy. When the FCC has gotten caught up in the wireless industry-generated buzz about digital transition or spectrum crunch or what-

ever catchy name is being used to create an artificial crisis, Congress has acted to rein in the headlong rush urged by special interests.

To be clear, balance does not mean inaction or complacency, but it does mean that Congress must look past the hype to address the real underlying issues. For example, in 2005, Congress acted to strike a balance between broadcasters, the wireless industry, and public safety to move the digital transition forward. In 2012, Congress acted to resolve outstanding issues and create the first-ever incentive auction. In each case, Congress moved with deliberation to address genuine obstacles to progress while ignoring the self-serving hype of industry stakeholders.

If we had no mid-band spectrum slated for auction and no spectrum ready to open for WiFi 6, we would be in danger of falling behind in 5G deployment and adoption. But this is not the case. The FCC has two mid-band auctions scheduled for the near future, the 3.5 gigahertz CBRS auction and the 2.5 gigahertz BRS auction. These, combined with existing mid-band spectrum already held by the major wireless carriers, provide sufficient spectrum to begin a successful transition.

Even if the FCC wanted to schedule substantial auctions immediately after the current scheduled auctions, it would take time for wireless carriers to overcome capital depletion from two successive auctions and existing deployment plans. Taking the time to get it right on issues such as C-band is much more important than whether the auction takes place in 6 months, 12 months, or 18 months.

By contrast, no new spectrum suitable for WiFi 6 is available or even on the table other than the proposed 5.9 gigahertz and 6 gigahertz bands. Without swift action by the FCC to open these bands to sharing on a non-interfering basis, WiFi 6 deployment, a critical component of a successful 5G strategy, will be severely stunted.

Nowhere is balance more necessary and appropriate than in the ability of local governments to protect local safety and quality of life. Unlike carriers, local officials are responsible to their voters and must address their concerns about safety, aesthetics, disruption of local traffic, and equitable deployment. No one doubts that these communities want to see new networks with new capabilities deployed. But localities have other concerns as well, and Federal policy should respect those concerns. The Communications Act explicitly preserves zoning authority to local authorities for this very reason. Congress should reverse the FCC's preemption of local authority to protect local concerns and restore the appropriate balance between carriers and communities.

To be clear, there is a huge difference between local governments negotiating policy concerns and private companies demanding outrageous fees such as the railroad crossing fees mentioned in Ms. Youngers' testimony. Where private sector companies use their market power to extort monopoly rents, Congress should do as it did with pole attachments and step into level the playing field.

Finally, workforce shortages are a serious concern, but Congress must make sure that workers are not exploited in the name of winning the race to 5G. Congress and regulators must remain vigilant

to prevent any shortcuts with regard to safety. Additionally, Congress should do its best to ensure that the good jobs created during the building boom do not simply disappear when the demand returns to normal. Thoughtfully designed training programs, especially those that promote on-the-job learning, can simultaneously meet demand and bring good paying jobs to rural and urban communities struggling with poverty and high unemployment.

To conclude, I observe that many of the members of this Committee have seen wireless transitions before. You know better than most how challenging it can be to separate hype from real needs requiring congressional action. In considering what steps to take, Congress should continue to follow the path of success of a healthy skepticism about urgency and doomsday predictions, combined with a balanced policy toward all stakeholders.

Thank you.

[The prepared statement of Mr. Feld follows:]

PREPARED STATEMENT OF HAROLD FELD, SENIOR VICE PRESIDENT,  
PUBLIC KNOWLEDGE

Chairman Wicker, Ranking Member Cantwell, thank you for inviting me to testify today on this timely and important topic.

America has led the world in wireless technology and innovation for over 3 decades. The secret to our success has been our ability to strike the right balance among the elements that create our dynamic and innovative wireless ecosystem. Congress has struck a balance between the role of the Federal Communications Commission (FCC) in setting national policy and the role of the states in protecting the interests of their residents. Congress has struck a balance between the need for both exclusively licensed spectrum auctioned to carriers and unlicensed spectrum open to everyone. Within auctions, Congress has struck a balance among competing public policy goals such as competition, protecting incumbent services, protecting Federal services, and ensuring a pipeline of sufficient spectrum in a variety of frequency ranges for new deployments. While the FCC makes the policy choices in the first instance, it does so subject to the balance struck by Congress.

Maintaining this balance is critical to our continued leadership in wireless. We do not pursue a “flavor of the month” or crisis management approach. Our spectrum policy depends on a combination of innovation and reliability that recognizes the importance of all stakeholders throughout the supply chain. As a result, we do not simply lead the world in deployment of millimeter wave technology and 5G generally. American companies such as Qualcomm lead in the development of microchips that provide the essential guts of wireless hardware. Apple and Google lead the world in development and deployment of wireless operating systems. While no one should take this leadership for granted, it is a testament to the importance of maintaining a steady and balanced policy.

Unsurprisingly, stakeholders routinely emphasize the importance of their contribution and push the FCC and Congress to put a thumb on the scale to favor their specific needs. For example, during the roll out of 4G technology, the wireless industry repeatedly pushed the idea of a “spectrum crunch” that would make widespread adoption of 4G impossible and cede U.S. leadership in wireless to other countries.<sup>1</sup> Then, as now, wireless networks and their industry allies warned that unless Congress and the FCC acted immediately to provide wireless networks with their wish list, the United States would fall behind in the “race” to 4G. Fortunately, Congress recognized the importance of maintaining a proper balance among stakeholders. While adopting new innovations such as incentive auctions, Congress resisted the urging of wireless networks to radically preempt states or to eliminate allocations for unlicensed spectrum. As a consequence, U.S. leadership in wireless remained intact.

As we confront the challenges to 5G deployment going forward, Congress should look at the “5G race” and predictions of doom with a jaundiced eye. Globally, the

<sup>1</sup>David Talbot, “The Spectrum Crunch That Wasn’t,” MIT Technology Review (November 26, 2012). Available at: <https://www.technologyreview.com/s/507486/the-spectrum-crunch-that-wasnt/>; See also Tim Farrar, “The myth of the wireless spectrum crisis,” GIGAOM (October 21, 2012). Available at: <https://gigaom.com/2012/10/21/the-myth-of-the-wireless-spectrum-crisis/>

demand for new mobile services is driving rapid deployment of 5G without the need for Congress or the FCC to alter the balanced policies that have served us so well over the last 3 decades.<sup>2</sup> While we can expect wireless providers to highlight every successful deployment abroad as a “danger to U.S. leadership,” we should not lose sight of the long-term steady pace of deployment here in the United States. Wireless networks are already busy deploying 5G networks without the need for additional incentives. The idea that a few months of delay of a particular auction mean that we are doomed to live in China’s wireless shadow, or that the need to negotiate with local communities to protect local quality of life and ensure that the benefits of 5G are distributed equally to all Americans will cause deployment to grind to a halt, should be dismissed as nothing more than the usual high-pressure lobbying by incumbents eager for any advantage.

While framing deployment of 5G as a “race” with other nations is a potentially useful metaphor to emphasize the importance of 5G as an area of policy, we should not confuse this with a literal race to see who can deploy the greatest coverage most quickly. As we have seen repeatedly over the last 30 years of wireless development, who is “ahead” for some transient period of time while the rest of the world “catches up” is a meaningless statistic. Standards are global, as is the market for wireless. Qualcomm and other U.S. equipment makers compete for market share across Asia, Europe and South America. To the extent China poses a threat to U.S. dominance, it comes from China’s structural advantages: a large captive market, state subsidies and a willingness to steal technology it cannot develop on its own. Whether a spectrum auction happens a few months earlier or a few months later makes no difference in the overall scheme of things.

Of course, there is a difference between policy “balance” and “complacency.” Below, I highlight several areas where the Congress should act to preserve the necessary balance and resist the efforts of wireless networks to push the panic button to gain unwarranted—and ultimately detrimental—concessions. Nevertheless, to the extent we must characterize the deployment of 5G as a “race,” we should recognize it is not a sprint but a marathon—and one we are leading quite handily. Even CTIA, which has the most to gain from pushing the panic button on policy, now agrees that the United States has pulled ahead of countries such as South Korea and is once again “leading the 5G race.”<sup>3</sup> What is important is getting the policy balance right, not adopting wrong policies as quickly as possible.

### **Workforce Issues: Opportunities for Local Training and Job Creation**

Every transition from one wireless network standard to another creates a demand for tower climbers. However, there is currently a severe skills gap—meaning there are not enough trained tower climbers to meet industry demand.<sup>4</sup> One way to meet the demand for tower climbers is to increase funding for work-based learning programs in tower climbing. These programs are well-suited towards individuals living in communities of color, or rural communities with relatively high unemployment rates, and relatively low incomes. Many unemployed or under-employed individuals do not have the resources to support their families while they train for a new career. Work-based learning programs allow these individuals to train for a better future, while supporting their families, because these programs allow students to learn necessary skills while on-the-job. Work-based-learning programs also benefit employers, who are able to train employees for their exact needs.

Moreover, it is important to note that because demand is cyclical, the short-term demand generated by the need to build out 5G infrastructure does not ensure long-term employment for workers. As a consequence, programs designed to meet the shortage of tower workers need to look not merely to training and safety,<sup>5</sup> but also to guaranteeing to tower workers a productive future after the current boom subsides. This applies not merely to tower climbers, but to other job opportunities that will follow in the wake of deployment. Papers from the Joint Center for Political and

<sup>2</sup>Juan Pedro Tomás, “Qualcomm sees faster than expected 5G global deployment,” RCR Wireless (December 9, 2019). Available at: <https://www.rcrwireless.com/20191209/5g/qualcomm-sees-faster-than-expected-5g-global-deployment>

<sup>3</sup>Jeremy Horowitz, “CTIA: U.S. and China Lead Global 5G Race, followed by South Korea,” VentureBeat (April 2, 2019). Available at: <https://venturebeat.com/2019/04/02/ctia-u-s-and-china-lead-global-5g-race-followed-by-south-korea/>

<sup>4</sup>“The Surge for Tower Climbers to Build a 5G Network,” 3M (July 24, 2019), <https://workersafety.3m.com/surge-tower-climbers-build-5g-network/>.

<sup>5</sup>Tower climbing remains an extremely dangerous job. See US Tower Structure Related Fatalities, <http://wirelessestimator.com/content/fatalities>. A rush to hire new climbers must not result in reduced safety training or fewer safety precautions. The FCC and OSHA must continue their oversight of this vital job to ensure that worker safety remains paramount. See OSHA: Communications Towers, <https://www.osha.gov/doc/topics/communicationtower/>.

Economic Studies<sup>6</sup> and Brookings Institution<sup>7</sup> highlight the unique opportunity that 5G deployment provides for local communities to work with network providers to create local jobs and address long-standing issues of digital inequity. Carefully thought-out Federal policies designed to address not simply the immediate short-term need, but the post-5G deployment world, can have positive long-standing impact on local communities and the American tech workforce. Congress should resist the rush to look only to the immediate short-term labor needs and consider what systemic programs and work-based-learning programs can create good local jobs in traditionally marginalized rural communities and communities of color.

### Local Governments Are Partners, Not Barriers

We need not merely 5G network deployment, but 5G adoption. Historically and consistently, the rate of local adoption depends heavily on close relationships with local communities. When providers work with local communities, it creates important relationships and trust which help spurs adoption. When networks run roughshod over local communities, it generates resentment and resistance.

In 1993, as part of the revisions to the Communications Act that made the dramatic growth of mobile technology possible,<sup>8</sup> Congress carefully considered what powers to leave at the local level and what to permit the FCC to preempt to promote wireless deployment. Congress explicitly left zoning, health and safety regulation to the states.<sup>9</sup> Unfortunately, wireless networks have consistently urged that the FCC preempt local authority that Congress explicitly chose to preserve. Despite a lack of any record evidence that preemption in the name of “streamlining” has positive impact on deployment, the FCC has proven unfortunately responsive to these industry demands.<sup>10</sup> Congress should not merely reject calls from the wireless industry for further ‘streamlining,’ but should affirmatively roll back the FCC’s preemption overreach.

History shows that preemption of local authority does nothing to encourage deployment on a national basis. To the extent that localities engage in significant negotiations to protect local interests such as historical landmarks or ensure service to the entire community, they have every right to do so. After all, it is members of local governments, not representatives of carriers, who live in the community and are accountable to local residents. The history of cable franchise preemption demonstrates that preempting local governments allows carriers to short-change poorer neighborhoods and rural communities. For example, despite FCC “streamlining” of local franchise authority to encourage cable competition in 2006,<sup>11</sup> and additional “streamlining” of local franchising authority on the state level, urban neighborhoods and rural communities continue to lack access to affordable broadband.<sup>12</sup> Indeed, urban areas have seen the return of “redlining,” with broadband providers simply failing to spend money to upgrade systems in communities of color.<sup>13</sup> Similarly, rural communities have seen deregulation lead not to investment, but to ongoing problems with rotting legacy copper as deregulated carriers simply decline to invest in rural communities with low rates of return.<sup>14</sup>

For all these reasons, Congress should ignore the claims of wireless networks that without further preemption of local authority America will “lose the race to 5G.” To the contrary, by giving carriers free reign over local deployments, we will see large swaths of urban and rural America cut out of the 5G future entirely.

<sup>6</sup>Yosef Getachew, Alejandra Montoya-Boyer, and Spencer Overton, “5G, Smart Cities and Communities of Color,” (Joint Center for Political and Economic Studies 2017). Available at: <https://jointcenter.org/5g-smart-cities-communities-of-color-2/>

<sup>7</sup>Nicole Turner Lee, “Enabling Opportunities: 5G, the Internet of Things, and Communities of Color,” (Brookings 2019). Available at: <https://www.brookings.edu/research/enabling-opportunities-5g-the-internet-of-things-and-communities-of-color/>

<sup>8</sup>See Omnibus Budget Reconciliation Act of 1993, Pub. L. 103–66.

<sup>9</sup>See 47 U.S.C. § 332(c)(7).

<sup>10</sup>“Public Knowledge Response to Opposition to Public Knowledge’s Petition for Reconsideration and Motion to Hold in Abeyance,” WC Docket No. 17–84 (Filed October 15, 2018).

<sup>11</sup>Implementation of Section 621(a)(1) of the Cable Communications Policy Act of 1984 as Amended by the Cable Television Consumer Protection and Competition Act of 1992, *Report and Order and Further Notice of Proposed Rulemaking*, 22 FCC Rcd 5101 (2006).

<sup>12</sup>See FCC National Broadband Map, available at: <https://broadbandmap.fcc.gov/#/>

<sup>13</sup>See Bill Callahan, “AT&T’s Digital Redlining of Cleveland,” National Digital Inclusion Alliance Report (2017). Available at: <https://www.digitalinclusion.org/blog/2017/03/10/atts-digital-redlining-of-cleveland/>

<sup>14</sup>See, e.g., *Commission Inquiry Into the Service Quality, Customer Service, and Billing Practices of Frontier Communications, Report of the Minnesota Department of Commerce*, Docket No. P–407, 405/CI–18–122 (January 4, 2019). Available at: <http://mn.gov/commerce-stat/pdfs/frontier-service-quality-report-final.pdf>

### **Spectrum Depends on a Proper Balance of Licensed and Unlicensed Spectrum**

Congress and the FCC both recognize the importance of licensed and unlicensed spectrum to 5G. The FCC has already scheduled two significant mid-band spectrum auctions—the CBRS auction and the 2.5 GHz auction. The FCC has also indicated that it will auction 300 MHz of C-Band spectrum. Efforts to open new mid-band spectrum for WiFi 6, notably the 5.9 GHz band and the 6 GHz band, remain delayed.

Lack of sufficient spectrum for unlicensed access remains a significant barrier to the success of 5G. Many of the technologies being developed for 5G, such as Internet of things (IoT) networks, require access to WiFi 6. As with all wireless technologies capable of supporting gigabit speeds and many thousands of new devices that will be dependent on 5G, WiFi 6 requires large, contiguous blocks of spectrum. The combination of access in the 5.9 GHz band and the 6 GHz band will create these needed spectrum blocks, allowing users of unlicensed access to leverage the existing deployment in 5.8 GHz for maximum efficiency.

Since the FCC opened numerous licensed bands to unlicensed underlays in the 1980s, we have demonstrated that access to spectrum on an unlicensed basis can easily co-exist with licensed spectrum without causing harmful interference. The improvements in technology over the last 30+ years make this coexistence easier than ever. In support of the need to bring certainty to these proceedings after years of engineering study and debate, Public Knowledge attaches a letter from November 5, 2019 signed by Public Knowledge and 34 other wireless equipment manufacturers, tech companies, and public interest organizations urging FCC Chairman Ajit Pai to open the 6 GHz band to unlicensed use on a non-interfering basis with existing licensed users.

### **Conclusion**

It is understandable that wireless network providers look to the conversion to 5G as an opportunity to secure advantages over other wireless stakeholders by pushing the panic button and fostering an impression of crisis. As with the 4G “spectrum crisis,” the danger to U.S. wireless leadership has been greatly exaggerated. Certainly, Congress must take necessary steps to ensure the timely deployment of 5G to all Americans. But these steps should reflect the policy of careful balance that has served us so successfully for the last 3 decades. By ignoring the hype and fear-mongering, Congress can address the genuine obstacles to 5G deployment without leaving poorer communities in rural or urban America behind.

Thank you, and I am happy to answer any questions at this time.

## ATTACHMENT

November 5, 2019  
VIA ELECTRONIC FILING

Hon. Ajit Pai, Chairman  
Federal Communications Commission  
445 12th Street S.W.  
Washington, DC 20554

RE: *Unlicensed Use of the 6 GHz Band*, ET Docket No. 18-295; *Expanding Flexible Use in Mid-Band Spectrum between 3.7 and 24 GHz*, GN Docket No. 17-183

Dear Chairman Pai,

As members of the unlicensed spectrum community—including the Wi-Fi industry, mobile industry, fixed wireless service providers bridging the digital divide in rural areas, public interest groups, semiconductor manufacturers, and anchor institutions—we applaud your continued commitment to opening the 6 GHz band for Wi-Fi and look forward to quick action by the FCC.

The Wi-Fi industry powers 13 billion devices worldwide and is on pace to contribute \$993 billion in annual U.S. economic activity by 2023. In short, Wi-Fi has become the single most important wireless technology for American consumers and businesses.

Under your leadership, the FCC's *5G FAST Plan* has set the course for American leadership in the next generation wireless networks that will fuel the future. That is why we are proud of our efforts to help the Commission move forward on the *Unlicensed Use of the 6 GHz Band* proceeding. The unlicensed community has been steadfastly working with technical experts and conducting detailed engineering analyses that demonstrate how coexistence between incumbent and new unlicensed users will work. These analyses include very-low-power (VLP) and low-power indoor (LPI) devices and use cases that will be deployed quickly, in addition to an Automated Frequency Control (AFC) system to ensure standard-power unlicensed devices do not cause harmful interference. As you stated in Congressional testimony on October 17, 2019, "...American consumers can have the best of both worlds. They can have electric utilities using the spectrum in a way that allows them to deliver power more efficiently, and they can have the benefit of unlicensed innovation."

Opening up the 6 GHz band for these unlicensed innovations will benefit every aspect of our economy. This next generation of super-fast Wi-Fi and 5G NR Unlicensed will usher in a new era of AR/VR consumer experiences, revolutionize our agricultural economy by powering precision farming, and enable the expansion of industrial IoT, which will be the backbone of our factories of the future. Moving forward and opening up the 6 GHz band is critical. It has been more than twenty years since new mid-band spectrum was made available for Wi-Fi and other unlicensed uses, causing a severe shortage for a wireless technology that handles 75% of mobile data traffic.

We can have "the best of both worlds." Over a year of deep engineering analysis makes it clear that coexistence can be enabled while maximizing the efficiency of the 6 GHz band and utilizing the productive potential of this spectrum to its highest potential. Our collective view is aligned with your statement to the Senate, "Let's protect the incumbent users, but let's also have our eyes on the future. And the future in many cases is dependent on Wi-Fi."

Respectfully,



Mike Guidroz  
President  
**Acadiana Broadband**



Tenlong Deng  
Corporate Vice President  
**ASUSTek**



Colleen King  
Vice President, Regulatory Affairs  
**Charter Communications, Inc.**



Dr. Kamesh Medepalli  
Vice President Systems  
Engineering  
**Cypress Semiconductor Corporation**



Alan Norman  
Public Policy Director  
**Facebook**



Alan Berkema  
Distinguished Technologist  
**HP, Inc.**



Mark Radabaugh  
President  
**Amplex**



Dr. Derek Peterson  
Chief Technology Officer  
**Boingo Wireless**



Mary Brown  
Senior Director, Government  
Affairs  
**Cisco**



Alex Chiang  
Wireless Strategic Business Unit  
Director  
**D-Link Corporation**



Megan Anne Stull  
Counsel  
**Google LLC**



Eric McLaughlin  
GM, Wireless Solutions Group  
**Intel**



Maria Kirby  
Senior Policy Counsel  
**Apple Inc.**



Chris Szymanski  
Director, Product Marketing &  
Government Affairs  
**Broadcom**



Keith Krueger, CAE  
CEO  
**Consortium for School  
Networking (CoSN)**



Eric Broockman  
Chief Technology Officer  
**Extreme Networks**



Chuck Lukaszewski  
VP Wireless Strategy  
**Hewlett Packard Enterprise**



Robert Friday  
CTO, VP & Fellow  
**Juniper**





Hui-Ling Lou,  
Senior Director, Design  
Engineering  
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Todd Harpest  
External Affairs &  
Regulatory Director  
MetaLINK Technologies, Inc.



Dominic Serra  
President and CEO  
Metro Wireless International  
Inc.



Michael Daum  
Director, Technology Policy  
Microsoft



Mark Merrill  
Chief Technology Officer  
Netgear



Michael Calabrese  
Director, Wireless Future Project  
New America Foundation



Garth Nicholas  
CFO  
New Wave Net Corp



Phil Raymond  
Head, Wireless Competency &  
Solution Architecture  
Philips North America



Harold Feld  
Senior Vice President  
Public Knowledge



Cees Links  
General Manager, Wireless  
Connectivity Business  
Qorvo



John Kuzin  
Vice President and Regulatory  
Counsel  
Qualcomm Inc.



Jeff Kohler  
Co-Founder  
Rise Broadband



John Windhausen Jr.  
Executive Director  
Schools, Health & Libraries  
Broadband Coalition



Jim Morgan  
Director & Counsel  
Sony Electronics



Galen Manners  
President and Founder  
Wave Wireless



Claude Aiken  
President & CEO  
Wireless Internet Service  
Providers Association (WISPA)



Nathan Stooke  
CEO  
WisperISP

CC:  
Hon. Michael O'Rielly  
Hon. Brendan Carr  
Hon. Jessica Rosenworcel  
Hon. Geoffrey Starks

The CHAIRMAN. Well, thank you very much, and thank you to all of our witnesses for staying within the time limit.  
Ms. Bloomfield.

**STATEMENT OF SHIRLEY BLOOMFIELD, CHIEF EXECUTIVE OFFICER, NTCA-THE RURAL BROADBAND ASSOCIATION**

Ms. BLOOMFIELD. Chairman Wicker, Ranking Member Cantwell, members of the Committee, we so appreciate the opportunity to testify today talking about obstacles to broadband deployment and the need for a strong workforce to actually build these networks.

Shirley Bloomfield, CEO of NTCA-The Rural Broadband Association. We represent 850 community-based providers deploying broadband infrastructure in 46 States.

Economics of broadband are difficult if not impossible in many rural markets. The rates that rural consumers pay are rarely sufficient to cover even the cost of operating in rural areas, much less the large capital expenditures that are required to deploy broadband in these communities.

That is why ongoing support from the High-Cost Universal Service Fund program, overseen by the FCC, is so critical to making a business case for rural broadband now and into the foreseeable future.

The high-cost program supports the fixed rural broadband networks that play an essential role in the provision of mobile wireless service because wireless needs wires, and 5G is going to be a fiber-fed product. In fact, a technical paper released last year found that because 5G will require fiber installed to small cells or towers closer to the user, deploying rural 5G capable networks could actually be nearly the equivalent of simply providing fiber to the home.

NTCA is really supportive of the work that Congress has done, the FCC, and USDA over the past several years on helping make the business case for rural broadband, including this Committee's work on the Broadband Data Act, the FCC's upcoming rural digital opportunity fund, and the support for fiber-built networks from USDA's Reconnect program. Your devotion to these issues has resulted in broadband deployment in some of the most remote parts of our country, but there is still more work to be done and communities yet to serve.

However, there are other significant barriers to deployment. One obstacle to broadband deployment in rural areas continues to be Federal permitting. NTCA recognizes the need to protect our nation's natural resources and well designed permitting processes are really a part of that protection. However, we believe these goals can be achieved without significantly delaying rural broadband deployment. We have got companies that have about an average of 25 employees. Time and money spent on permitting delays translates to time and money not spent building broadband.

In South Dakota, for example, we have a small rural provider who had a multimillion dollar fiber deployment that confronted the Forest Service and wound up having a permitting delay of over a year. And we know what a short construction season you have in South Dakota.

We believe that reforms such as harmonizing agency applications, increasing staffing in local offices for permitting, providing a

categorical exclusion for the installation of communications infrastructure on previously disturbed lands would expedite both wired and wireless network deployment without harming the environment.

Another deployment issue in the process for deploying broadband networks is railroad rights-of-way. In Missouri, we have one member who waited months and spent \$50,000 for rights-of-way across just three railroads which did not even include the cost of construction, just the fees and resources required for approval. These fees are usually for boring beneath a railroad track, a job that is finished in just a few hours and does not require touching railroad property. Unfortunately, in states with laws that have capped railroad crossing fees, we are seeing increased safety or observation fees, which appear to serve as an offset.

To be clear, we are not arguing for free access to railroad rights-of-way, but common sense rules of the road are needed to ensure that we can continue the work of delivering broadband to those currently on the wrong side of the digital divide.

Pole attachments also remain a concern. In 2018, the FCC updated its pole attachment access rules to adopt a new one-touch make-ready regime under which a new attacher may perform all work to prepare a pole for that attachment. For NTCA members seeking to invoke this rule, a common barrier is the lack of properly staff or outside contractors who can perform this work even when the work is ready to begin.

So this is one area where focusing on workforce development could actually help advance broadband deployment, and it brings me to the critical workforce issues teed up by the Committee.

Networks of the future are going to be hybrid networks. We are going to need trained personnel for both fiber and wireless. 5G is an access technology that builds on fiber backbones. Many NTCA members are already partnering with local schools and technical colleges to train that homegrown talent for the innovative careers, but these demands can be overwhelming for small school districts that do not have the economies of scale that can support specialized instruction. Rural broadband providers also interestingly can play a dual role here by enabling distance education that actually bridges the geographically dispersed students and instructors and support training the very staff that they need.

So we need to encourage partnerships on the State, local, and regional level to develop apprentice programs. We need DOL to focus on telecom-specific programs, and we need continued support for benefit plans like the ones we offer at NTCA that allow us to aggregate all of our rural employees across the country so we can offer competitive benefit plans to recruit and retain talent in these rural areas.

We appreciate your leadership and we are delighted to be here today. Thank you.

[The prepared statement of Ms. Bloomfield follows:]

PREPARED STATEMENT OF SHIRLEY BLOOMFIELD, CHIEF EXECUTIVE OFFICER,  
NTCA—THE RURAL BROADBAND ASSOCIATION

### Introduction and Background

Chairman Wicker, Ranking Member Cantwell, and members of the Committee, thank you for this opportunity to testify today to discuss continued obstacles for broadband deployment and the need for a strong workforce to build out the next generation of broadband networks across America.

I am Shirley Bloomfield, CEO of NTCA—The Rural Broadband Association, which represents approximately 850 small businesses deploying broadband infrastructure in 46 states.

These cooperatives and small commercial companies serve the most rural parts of the United States, reaching areas that contain less than five percent of the U.S. population, but which are spread across more than 35 percent of the U.S. landmass, or roughly seven subscribers per square mile.

So how do we overcome the challenges of distance and density to deploy and sustain rural broadband? In the first instance, you need a business case to even consider deploying rural broadband. Questions related to deployment obstacles are important, of course—but if you can't afford to deploy the network at all, those questions never come into play.

The economics of broadband are difficult, if not impossible, in many rural markets. The rates that rural consumers pay are rarely sufficient to cover even the costs of operating in rural areas, much less the large capital expenditures required to deploy broadband in rural America.

That's why ongoing support from the High-Cost Universal Service Fund program overseen by the FCC is critical to making a business case for rural broadband, both now and into the foreseeable future.

NTCA is supportive of the work that Congress and the FCC has accomplished over the past several years on rural broadband, including this Committee's work on the *Broadband DATA Act* and the FCC's recently released *Rural Digital Opportunity Fund Order*, which will be voted on by the FCC next week and aims to distribute over \$20 billion in High Cost USF support to over ten years. Your work on these important items is essential to build the business case for small providers to deploy and then continue to operate and deliver affordable services in rural areas.

The High-Cost Program supports the fixed rural broadband networks that play an essential role in the provision of mobile wireless service. Indeed, to deliver on the greatest promise of 5G, fiber will need to be installed to small cells or towers which must be located very close to the user. But in rural America specifically, where customer density is often measured in miles rather than feet, it will take unprecedented investment in fiber to deliver 5G capabilities. In fact, a technical paper released last year found that deploying 5G-capable networks to such rural areas could be nearly the equivalent of simply providing fiber to the home, especially if using the spectrum bands that promise the highest level of 5G service and speed.

With this as backdrop, Congress should therefore implement and promote policies that will advance *both* the future of 5G wireless technology *and* the fiber networks needed to connect thousands of "small cells" and otherwise respond to consumer and business demands. For rural consumers to have a broadband experience reasonably comparable to that in urban America as the statutory mandate for universal service dictates, we must enable and support deployment of both fixed and mobile broadband networks. At bottom "wireless needs wires"—or, these days, "5G needs fiber"—if we are to ensure sufficient broadband access in rural America.

### How Permitting Reforms Can Help Overcome Digital Divides

Once the business case for rural broadband network deployment has been made in the first instance, we must address significant barriers to deployment. One outstanding obstacle to broadband deployment continues to be obtaining reasonable and timely access to rights-of-way on Federal lands. NTCA and its members recognize the need to protect our Nation's natural resources, and appropriate, well-designed permitting processes are a necessary part of such protection. However, we believe these goals can be achieved without the significant deployment delays that providers currently experience.

Smaller providers like those in NTCA's membership have neither the staff nor the resources to navigate complex regulatory structures for securing the permits needed to deploy broadband networks over vast rural expanses. For companies and cooperatives with an average of approximately 25 employees, time and money spent on permitting delays translates to time and money not spent building broadband.

In South Dakota, for example, a small, rural provider's multimillion-dollar fiber deployment requiring U.S. Forest Service approval confronted permitting delays that put completion of the construction project on hold for more than a year.

We believe sensible reforms such as harmonizing agency applications, increasing staffing in local offices for permitting, and providing a categorical exclusion for the installation of communications infrastructure on previously disturbed Federal lands would improve broadband deployment speeds without harming the environment. While legislation has attempted to take this on in the past, it has focused largely on facility deployment for mobile wireless services—but as noted above, these wireless networks require robust wired backhaul to realize their full potential, which means we need greater focus on harmonizing and rationalizing permitting rules related to deployment of fiber networks as well.

Another example of a deployment barrier is the process for constructing broadband networks across or within railroad rights-of-way. In Missouri, one NTCA member waited seven months and spent roughly \$50,000 for rights-of-way across just three railroads; these were not the costs of construction—this sum represents just the fees and the resources required for railroad right-of-way approval. In some parts of the country, such delays can push construction into the winter months, when boring into the ground is not possible. A delay of a few months then becomes a one-year or longer delay, as crews wait for the ground to thaw and soften.

Further, the "fees" are often for boring beneath a railroad track where the railroad crossing intersects state highways. In such cases, the fiber installed under the railroad does *not* touch railroad property on either side of the track and the work is completed by the broadband provider in a few hours.

Several states have recognized these issues and made efforts to address these concerns by capping railroad crossing fees. Unfortunately, in these states, members are now reporting increased "safety" or "observation" fees, which appears to serve as an offset for crossing fees and an end-run around the caps. To be clear, this is not to say that those installing networks should be given free access to railroad rights-of-way, but common-sense rules of the road are needed to ensure we can continue the work of delivering broadband to those currently on the wrong side of the digital divide.

The examples described above highlight the continued need for sensible reform of permitting procedures to ensure greater efficiency and timeliness in the process, especially when the work involves replacing or upgrading facilities in existing rights-of-way.

Finally, I would like to briefly mention the impact of "one-touch-make-ready" poles on deployment of broadband networks in rural America—and this segues into a discussion of workforce development.

In 2018, the FCC updated its pole attachment access rules. This included adoption of a new "one-touch-make-ready" (OTMR) regime under which a new attacher may opt to perform all work to prepare a pole for a new attachment.

NTCA members seeking to invoke this new rule report a common barrier in the lack of properly trained staff or outside contractors qualified and available to perform the work. Even when the process for invoking one-touch-make-ready is complete such that work can begin, the lack of qualified staff can act as another barrier to timely installation of broadband infrastructure. This is one area where focusing on workforce development could help advance broadband deployment, and brings me to a discussion of the workforce issues teed up by the committee in this hearing.

### **A Workforce for Tomorrow's Rural America**

As manufacturing, agriculture and other fields are responding to the increasing incorporation of technological development and broadband connectivity into their lines of business, some NTCA members are already working with local schools to train homegrown talent for the innovative careers that did not exist a quarter-century ago but are now among the fastest-growing sectors of job opportunities.

School curricula that evolved to meet the needs of the Industrial Revolution must evolve again to meet the demands of the tech and communications revolution. These demands, however, can seem overwhelming for small school districts challenged by economies of scale that cannot support specialized instruction. Several approaches, if not a combination of them, may be advantageous.

1. Convene local and regional industry, political leadership and school administrators to identify job and educational opportunities and to assess whether local/regional educational curricula meet those needs. With the STEM economy enjoying double-digit growth, a multi-party force to capture its gains would be pivotal for rural areas.

2. Bring rural broadband providers into the conversation to identify and/or create broadband-enabled responses such as distance education, which can bridge geographically-dispersed students and instructors. While 91 percent of urban students take AP courses, only 66 percent of rural students take those opportunities. The difference may be related to a combination of factors, but increased access would seem like one helpful step toward increasing the take-rate.
3. If they do not yet exist in the community, develop internship and apprenticeship programs that earn academic credit.
4. Encourage partnerships on the state, local or regional level to develop apprenticeship programs that can help address the current or future workforce needs.
5. Continue to support benefit plans like those offered by NTCA to our membership where, through the national scope and scale of aggregating rural broadband employees, our members can offer competitive benefit plans that at least help to recruit and retain talent in rural communities.

NTCA—The Rural Broadband Association is grateful for this committee’s continuing leadership and focus on identifying and solving barriers to broadband deployment. It will take a holistic hybrid deployment of wired and wireless networks to make 5G services a reality in rural America, and taking steps to reduce barriers to deployment of both—and training workforces to assist in the deployment and operation of both—will be key to overcoming our Nation’s digital divide. Thank you for inviting me to be with you today and I look forward to the chance to converse further with you on these topics.

The CHAIRMAN. Thank you very much and thank all of you for your excellent testimony.

I am going to defer my questions to later on in the hearing and at this point I recognize Senator Thune for whatever questions.

**STATEMENT OF HON. JOHN THUNE,  
U.S. SENATOR FROM SOUTH DAKOTA**

Senator THUNE. Thank you, Mr. Chairman, and thanks for having this hearing.

And thank you to all of you for sharing your thoughts on a really important subject.

Commissioner Carr, we always appreciate you coming to South Dakota and climbing towers and operating heavy farm equipment. Quite a proficiency at pheasant hunting too.

[Laughter.]

Senator THUNE. But you have seen I think a number of carriers that are beginning to deploy or at least invest in 5G networks across the country, including in places, more rural areas like South Dakota, my home state. And I am wondering as you look at the things that are happening out there, there is still work I think that needs to be done to ensure that all areas of the country reap the benefits of the new technology. And I am wondering maybe if you could speak to some of the items that the FCC has been working on to facilitate the deployment of 5G and whether or not Congress should build upon those efforts with legislative initiatives like the Streamlined Small Cell Deployment Act.

Mr. CARR. Thank you, Senator, for the question.

From my perspective, the end goal for us is to make sure every community in the country has a fair shot at next gen connectivity.

I spent a lot of time in South Dakota and seen firsthand the progress that is being made there. Sioux Falls has small cells live today that are providing 5G service. I think that is a much better indicator of where we stand as a country than the first time 5G lights up in New York or San Francisco.

I was on the Pine Ridge Indian reservation, and fiber is being built out there in the next couple years in nearly every location. And that is going to help power next gen services.

We are certainly not at the mission accomplished phase yet.

One important step we are taking at the FCC is our vote next week to establish the digital opportunity fund for rural America. That is going to help support even more builds across rural America.

And to your point, the bill that you all have been working on here, the Small Cell Deployment Act, would help codify and extend a lot of the modernization efforts that we have been attempting to do at the FCC, and that would mark another significant win for U.S. leadership in 5G. So I support that.

Senator THUNE. Thank you for everything that you and your fellow commissioners at the FCC are doing to advance the cause of building out; not only is the FCC working to make spectrum available but it is also working to make sure the infrastructure that is necessary to carry it is built.

Mr. Miller, do you have any additional thoughts on deploying 5G networks or how the provisions outlined in the Streamlined Small Cell Deployment Act would specifically help NATE's member companies?

Mr. MILLER. Thank you, Senator.

5G is going to have to be deployed in masses. The sheer quantity is tremendous as compared to traditional technologies that have been built. So streamlining and standardization is imperative for success from a contractor perspective.

Senator THUNE. Ms. Youngers, the MOBILE NOW Act established the Dig Once policy, and as policymakers, are there refinements that we should be considering to the Dig Once provisions?

Ms. YOUNGERS. Thank you, Senator. And thank you for the question and of course for supporting the Dig Once policies.

In general, for efficiency reasons we support Dig Once policies, and my members and our association are constantly looking at ways to improve those. We support those efforts and we stand ready to work with you on those. I do not think we have any specific recommendations at this time, but we can certainly provide them in the record. But as a general matter, our association supports those dig once policies for the efficiency reasons.

Senator THUNE. Ms. Bloomfield, anything to add to that?

Ms. BLOOMFIELD. Well, I think you know better than a lot of people how difficult it is for small companies to actually deal with a lot of those different barriers. And one of the things that I had the opportunity, serving on the FCC's BDAC Council, was to be able to see how important it is going to be to harmonize and streamline. And I think the initiatives that you put forward are things that our association very strongly endorses. So thank you for your leadership.

Senator THUNE. Commissioner Carr, as we discussed at a field hearing that I held last year in South Dakota, it is imperative that the United States lead in the deployment of next generation broadband services, and in order to achieve that goal, we got to make sure we have the necessary workforce to build out these services, particularly in rural areas. And you mentioned in your testi-

mony that you are working with the National Association of Tower Erectors to establish more community college programs like those at Southeast Tech in my home state to train and graduate more workers who are ready to help build out these next generation networks.

So could you briefly elaborate on the progress being made and whether or not the FCC is coordinating with other relevant agencies like the Departments of Labor and Education to address the workforce needs in the communications industry?

Mr. CARR. Thank you, Senator, for the question.

The FCC has convened a working group that can bring together a wide range of stakeholders to help address this issue. And to your point, I think we need to continue to work to expand community college programs. It can cost about \$13,000 over the first 6 months to train a tower tech in-house. A significant portion of those costs can be saved through short-term community college programs.

I think hearings like this are going to go a long way in helping to stand up more of those programs and creating opportunities. Your leadership helped identify this for Southeast Tech and helped them get their program across the finish line. I think if we can stand up a few more programs it is going to help open up opportunities for families but also serve the national imperative of getting this infrastructure built out.

Senator THUNE. Thank you, Mr. Chairman.

And, Mr. Chairman, I have got a letter I would like to get entered in the record too. It is from the U.S. Telecom regarding the letter of credit and the FCC's Rural Digital Opportunity Fund.

The CHAIRMAN. Without objection, it will be entered.

[The information referred to follows:]

*January 16, 2020*

Via ECFS

Hon. AJIT PAI,  
Hon. MICHAEL O'RIELLY,  
Hon. BRENDAN CARR,  
Hon. JESSICA ROSENWORCEL,  
Hon. GEOFFREY STARKS,  
Federal Communications Commission,  
Washington, DC.

Re: Rural Digital Opportunity Fund, WC Docket No. 19-126; Connect America Fund, WC Docket No. 10-90

Dear Chairman Pai and Commissioners O'Rielly, Carr, Rosenworcel and Starks:

Through the Rural Digital Opportunity Fund (RDOF), the Commission has the opportunity to bring the power and promise of a broadband future to every corner of the country. The undersigned organizations, representing broadband innovators of all shapes and sizes, deploying a range of different technologies, and collectively serving millions of Americans, support the goal of connecting every American to broadband. Many of our members are motivated about the prospects of participating in the RDOF auction this year.

The draft Order that has been circulated does an admirable job of balancing many competing issues, on which some of our organizations have differences of opinion. However, one issue that unites us all, and many other commenters in the record, is the need to significantly reduce the burdens of the letter of credit (LOC) requirements so that these obligations correspond more appropriately to the risks presented. As drafted, given the magnitude of the RDOF even as compared to prior auctions, the LOC requirements will be a gating factor to participation for many companies, large and small. If modifications to the LOC requirements are not made, many companies could be effectively barred from participation in the auction and



those that do will not be able to bid on the full amount of locations they might otherwise be able to serve because of the difficulties in obtaining and the cost of the required credit. Additionally, the LOC requirements conservatively will result in over \$1 billion in RDOF support (6–7 percent of the total Phase I funding) going to banks and other financial intermediaries rather than to building broadband in rural communities.<sup>1</sup> Also, in some cases banks are requiring cash collateral for the LOC and the carrying costs are treated as debt, both of which impair the borrowing power of support recipients.

Encouraging robust participation and prudentially managing risks to the Fund are both important goals, but should not, and need not, be mutually exclusive. We understand that the Commission has a responsibility to safeguard the funds it administers while protecting against potential defaults. We support such fiscal responsibility. Unfortunately, the compounding nature of the requirement as drafted to maintain letters of credit for multiple years of service is unsustainable and unprecedented at this scale. Nor is it necessary to fully and adequately address the underlying risk management goals for the Fund.

Each of our organizations filed comments in the record explaining our concerns on this issue, along with a number of other commenters. In order to enable the widest possible participation by our own members and other companies in the RDOF, we urge you to take seriously the concerns that have been raised and to consider modifying the LOC requirement to minimize the direct and indirect costs associated with obtaining and maintaining LOCs. In light of the existing authority that the Commission has to withhold funds from those who fail to meet their deployment commitments along with a range of other enforcement tools at its disposal, the Commission can achieve our shared goal of preserving and protecting the Fund without imposing the unreasonable, unsustainable, and ultimately unworkable multi-year LOC requirements currently in the draft order. Thus, we urge the Commission to implement more targeted mechanisms for effective risk management that will not deter or prevent their participation.

The Commission is on the cusp of a major step forward for rural Americans, bringing broadband connectivity and the opportunities that come with those connections to communities whose future depends on it. Our members are eager to serve these communities and to meet and exceed RDOF deployment milestones, starting in year one, if they have the chance to do so. A program adjustment to the LOC requirements will help to make this a reality.

Sincerely,

/s/ ANGIE KRONENBERG  
Angie Kronenberg  
Chief Advocate and General Counsel  
INCOMPAS

/s/ JENNIFER MCKEE  
Jennifer McKee  
Vice President and Associate General  
Counsel  
NCTA—The Internet & Television  
Association

/s/ BRIAN O'HARA  
Brian O'Hara  
Senior Director Regulatory Issues—  
Telecom & Broadband  
National Rural Electric Cooperative  
Association (NRECA)

/s/ MICHAEL R. ROMANO  
Michael R. Romano  
Senior Vice President, Industry Affairs &  
Business Development  
NTCA—The Rural Broadband Association

/s/ PATRICK R. HALLEY  
Patrick R. Halley  
Senior Vice President, Policy & Advocacy  
USTelecom—The Broadband Association

/s/ LOUIS PERAERTZ  
Louis Peraertz  
Vice President of Policy  
Wireless Internet Service Providers Association

/s/ DERRICK B. OWENS  
Derrick B. Owens  
Senior Vice President of Government & Industry  
Affairs  
WTA—Advocates for Rural Broadband

The CHAIRMAN. Senator Cantwell.  
Senator CANTWELL. Thank you, Mr. Chairman.

<sup>1</sup> See *e.g.*, Reply Comments of WISPA, WC Docket Nos. 19–126, 10–90 at 29–32 (filed Oct. 21, 2019); Comments of USTelecom, WC Docket Nos. 19–126, 10–90, 19–195, at 44 (filed Sept. 20, 2019); Comments of Geolinks, WC Docket Nos. 19–126, 10–90, at 9–11 (filed Sept. 20, 2019).

I feel like the testimony already is just reminding me of the history of the Northwest, the electrification of our hydro system and what we were able to achieve. And I know that some people may debate public and private power. We debated all the time in the Northwest. But I guarantee you even the private power entities are so thankful that they have access and get some support from public power. So it clearly has benefited us over and over and over and over again. We, I say, used to store apples and now we store bits. So it just shows you how diverse—what we thought was once just about basic electricity is now continuing to unfold as the change in the economy unfolds.

So I am a very big supporter of moving as fast as we can, but I also want to make clear a few issues that I do not think we have to run over interests on. I appreciate a more collaborative effort.

So, Mr. Feld, you pointed out in your testimony that the FCC has used the race to 5G to quicken action to sharply curtail authorities for State, localities, and tribes to review construction of wireless and wireless infrastructure.

Do you believe that that was a justified move on the part of the FCC, and what direction do you think we should take in the future?

Mr. FELD. I do not believe that it was justified, and I will say that history shows us whether it was cable franchising or other efforts to move wireless transitions forward, that every time we have treated local communities as barriers to be overcome rather than as collaborators it has been to our detriment and to the detriment of the local community.

I think that what we do need to see is the FCC playing a supportive role with local governments in ensuring that they understand the benefits of 5G and that there is an appropriate and suitable balance between local community concerns and the desire of carriers to deploy their networks.

Senator CANTWELL. Thank you.

Ms. Youngers, in Spokane I mentioned they have introduced a smart cities and communities—I have introduced the Smart Cities and Communities Act, but working with them because they want to be a smart city. I am very proud of what they are doing in Spokane because they are building a whole first net zero block. I mean, so they are just trying to take this sophistication as part of their campus that is in downtown Spokane, the university campus, and build out something.

Seattle is very proud of the Bullitt Center and the fact that it is the smartest building in the world. And so Spokane is going to take that to the next level.

But is that the way to do this, the collaborative effort with cities and then particularly in that collaboration, if you can identify the workforce issues? Because then you are marrying up the workforce demand along with the deployments.

Ms. YOUNGERS. Right, Senator, exactly. And I am aware of some of the efforts of Seattle and Spokane certainly leading the way as a smart city. And we agree with you and as the Fiber Broadband Association, we speak with cities that are becoming smart all the time. And one of the first things they need to do is take an inventory of where are their fiber assets because you need fiber to sup-

port smart city efforts and those smart city applications. Certainly as those cities look to those efforts, I think they can marry them with some of the workforce and some of the training efforts further into the community.

I will note we hear a lot about pole climbers as the needed skill set for 5G deployment. My members would add things like reading blueprints, being able to design a network and an architecture, being able to maintain a network, operating a backhoe and other heavy machinery, including being able to deal in trench technology. There is a lot of other skill sets as well. And certainly as cities come online to become smart, I think there are a lot of opportunities to buildup their own workforce as well as we look at these new technologies and new networks. So I agree with you and I know Seattle and Spokane are leading the way on that.

Senator CANTWELL. Thank you.

And, Mr. Miller, I would just be remiss—I went to your website. Thank you for showing your daughters and showing the diversity of women who are needed in this field as well. I am sure as a computer scientist you see the very broad applications here, and I think that is what we have to get people to see is that this is a very big task.

So I liked the fact that you mentioned the government should be involved several times in your testimony. I agree both on the training and making this happen. This is not a mystery. It is an opportunity and we need to seize it. So thank you.

The CHAIRMAN. Thank you, Senator Cantwell.

Senator Tester.

#### **STATEMENT OF HON. JON TESTER, U.S. SENATOR FROM MONTANA**

Senator TESTER. I want to thank you, Mr. Chairman, for holding this hearing today. I have always said that sleep is overrated, and you are certainly putting that to the test.

[Laughter.]

The CHAIRMAN. There are apparently Members of the House of Representatives who agree with you.

[Laughter.]

Senator TESTER. Yes, they probably do.

So I am going to start with you, Mr. Carr, and I am going to kind of follow up on the questions that Senator Thune had in that he talked about promoting a program with community colleges for tech training that would apply for these. And I got the assumption from your answers that the only school that was involved right now was Southeast Tech. I think that was the name of it. Is that correct?

Mr. CARR. There is a number. There is one in South Carolina, Aiken. There is a new one that is standing up in South Dakota. There are about five or six others that are in the pipeline thinking about it.

Senator TESTER. So I welcome you to Montana and I can connect you up with the board of regents and the community college presidents, if you want.

Mr. CARR. Great.

Senator TESTER. The challenge has been getting these folks to come to these programs. I mean, that has really been the challenge. I mean, let me give you truck driving as a prime example. There is a big demand for truck drivers out there. One of the community colleges set up a truck driving program and they could not get people to come even though the jobs were there. They were good paying jobs. Truck driving might not be for everybody but the truth is that tower climbing might not be or if they are a backhoe operator.

So how do you get the folks to get there in adequate numbers to meet the 20,000 or 40,000 people you need?

Mr. CARR. I think it is a great question. One of the chief challenges with every group that looks at this issue is highlighting and emphasizing the opportunities that are there. One company, for instance, says that it pays about \$70,000 for a qualified tower tech in their first year.

And to your point, I think there are three main challenges. One, the cost of standing up community college programs, the affordability for students to go through those programs, and to your point, making sure we have a pipeline of students so the existing programs do not dry up. And we got to tackle it at all three phases.

Senator TESTER. And this is just a suggestion. One of the things that I noticed in their program—and although different, it is still a trade that you work with your hands—is that the best people that can help funnel these people are the people in the high schools and the businesses themselves, like yours, Mr. Miller. You need people. You see somebody at an FAA convention that they may ask you to speak at. Funnel these folks to these programs. And I think it is really important. And I think it is the key, by the way.

And that is why I would love to have you come to Montana. And here is why. Just as in South Dakota and just as maybe in Mississippi too, if you train kids from rural America, they might come back and go to work there. And that is actually my question. With 5G and, look, I have been pushing you and others on the FCC to have demo projects in rural America because I think that rural America will be left out in the cold on this one just as we—and I do not mean this negatively speaking—just as we have on prior technologies.

What can we do to ensure that as this workforce is developed that we can get folks to work in rural America?

Mr. CARR. Thanks again for the question.

And that is really what we are focused on at the FCC. When I spent time in Montana earlier this summer, I went to small towns like Utica and Forsythe, and there there are construction crews that are plowing miles of new fiber. And so I think the opportunities for the jobs are going to be there in every community, and that is what we need to keep a focus on.

Senator TESTER. By the way, thank you all for being here.

Mr. Miller, you have got a firm that builds towers I assume? And is that mainly what you do?

Mr. MILLER. No, sir. Service and maintenance is primarily what we do and construction.

Senator TESTER. So you are statewide? Are you multi-state?

Mr. MILLER. Multi-state, yes, sir.

Senator TESTER. How many employees do you have?

Mr. MILLER. Approximately 70.

Senator TESTER. How many employees would you hire if they were available?

Mr. MILLER. At least a dozen right now. We are actively hiring.

Senator TESTER. How much of your work is done in rural America?

Mr. MILLER. A large percentage of our work is done in rural America. We service cell towers.

Senator TESTER. I got you.

So the challenge is—and I have used this example in this Committee many times. We can talk about all sorts of Gs in the world. When I am on the farm, I got no G on this baby. It just does not work. And so getting it out to rural America is really important.

And I think that you had talked about—I cannot remember the statistics, but the Internet speeds are 70 percent faster. I think you said that, Mr. Carr. And the digital divide is 20 percent reduced. Does that include rural America that Internet speeds are up 70 percent in rural America?

Mr. CARR. Those are averages. And when you look, for instance, the closing of the digital divide by 20 percent—

Senator TESTER. That is all rural. Right? A huge part of that is. But what about the Internet speed portion?

Mr. CARR. It is an average.

Senator TESTER. Is rural America bringing it down or is rural America raising it up?

Mr. CARR. That is a good question. I would have to unpack the data that the provider uses for that.

Senator TESTER. So I want to go over to the rural telephone folks or whatever you are called now.

Ms. BLOOMFIELD. Broadband.

Senator TESTER. Rural broadband folks.

They are co-ops. Right?

Ms. BLOOMFIELD. We have all of the co-ops in the country and community-owned and operated companies. Yes.

Senator TESTER. But these are the folks that support folks like me that live in the sticks.

Ms. BLOOMFIELD. They are your neighbors.

Senator TESTER. Yes. Right on.

So you talked about a benefit plan offered by NTCA members of national scope, aggregating—this is your words—rural broadband employees so that you could recruit and retain talent in rural America.

Does the government play a role in that?

Ms. BLOOMFIELD. Absolutely. So one of the things that we were able to do years ago was to get a preemption from State regulation so that we would be able to operate this benefit plan and actually combine scope and scale.

Senator TESTER. I got you, but what does the Federal Government do to make that work? Is it a tax benefit or what is it?

Ms. BLOOMFIELD. It is a preemption from State law. So it has come through the regulatory process that allows us to operate. But I will say also things that you have done recently, work on PBGC premium relief, some of those initiatives, health care, all of those

things that allow us to offer competitive products so that those kids who are homegrown employees have incentives to stay in those communities.

Senator TESTER. Thank you. I was not paying attention probably because I was too tired.

[Laughter.]

The CHAIRMAN. Thank you, Senator Tester.  
Senator Johnson.

**STATEMENT OF HON. RON JOHNSON,  
U.S. SENATOR FROM WISCONSIN**

Senator JOHNSON. Thank you, Mr. Chairman.

I want to first talk a little about the delineation between the Federal Government role and private sector. Obviously, in this 5G space, the Federal Government has to allocate broadband. We need to reduce, remove different barriers whether it is permitting or again just other regulatory barriers talking about the workforce, the appropriate role in terms of rural broadband where you do not have a private sector incentive there.

In terms of workforce development, we need to fix our immigration system, our legal immigration system, the 1.1 million people we are granting legal permanent residency to. Less than 10 percent have a job. It is all family reunification. We've got to go more toward a Canadian or Australian system where 60 percent are tied to some work. By the way, the full spectrum of job skills from low to high are skilled.

But I really want to go back to workforce development because coming from the private sector, before I did this silly thing, I ran a manufacturing plant. We have not been able to hire people for decades primarily because we have for decades been telling all our young people you have to get a 4-year degree, and we have made loans readily accessible. We have enticed our children to collectively incur \$1.5 trillion of student loan debt providing them degrees that employers do not value where there are real jobs.

We also have a welfare system that pays people not to work, but let us not focus on that.

Let us talk about what we really need to do. I do not believe the Federal Government is effective at providing training programs. So I am trying to dissuade you from looking to the Federal Government to hop in here for workforce development. What I am asking the associations to do is to get into the private sector. Mr. Miller, get into high schools. There is no doubt about it. You are going to have to work with the technical colleges to provide the degree programs that industry needs. We need to get to our children and encourage them and let them know that there is no first or second class way to realize their full human potential. All work has value. There are great careers in manufacturing and in construction. That is the first thing.

There is an organization in Wisconsin called Gold Collar Jobs. They literally provide coloring books for second-graders not just showing doctors and engineers but showing people welding and working.

So my point is, yes, work with technical colleges. We need to change the attitude that we have been beating into our children's

head for decades, you have to get a 4-year degree or you are some kind of second-class citizen. There are great jobs. There are great careers.

But my final thought is, as I look at my kids who are in their 30s, they've got a lot of friends that did not go on to college. Those adults now have children. They have got debt, but it is a mortgage on a house and a boat. They are living a life. The really smart kids went on to college and graduate school. Some are not even working and they are \$200,000 or \$300,000 into debt.

So I guess I will just kind of throw that open. Again, encourage your associations. Use your power. Talk to the private sector. Get them involved in middle school, in high school and change that attitude in terms of all the valuable occupations out there. Go to work, work hard, go home, forget about it, go fishing.

Would you like to comment on that? Mr. Miller?

Mr. MILLER. Senator, thank you.

In the infamous words of my daughters, we have to figure out how to make hard work cool again. I am not sure I am the right person to do that. I was not raised to—you know, coddled. And maybe that is not the right choice of words. But we have to get in these kids' heads exactly what you are saying to articulate that hard work is cool. It can be rewarding. It has a great career path. So you are exactly right.

Senator JOHNSON. I have talked to kids and when I tell them this, you can almost see relief. I do not have to go to college? No, you really do not. So again, we entice and we force so many kids to college that just really it is not for them. They would rather do something else but we are forcing them.

Yes, Ms. Youngers.

Ms. YOUNGERS. Thank you, Senator.

My construction members agree, and as I detailed in my written testimony, we have at least one member that in fact is reaching into the high schools. They are doing internships to teach them about fiber deployment construction jobs. We have another member that just launched a scholarship for high school students wanting to go on in the construction area in apprenticeships or community college work. And we have other members starting initiatives to reach back further into the high schools to develop a way to introduce them to these kind of careers. It is not just construction. You are building fiber networks. You are building 5G networks. These are the future and hopefully you make it cool. And so we do have members who are hearing what you are saying and they are reaching further in and, as you are suggesting, trying to set that up at the high school level. And we are looking at other initiatives as well that our members will work directly with trade schools or community colleges and try to develop even more programs. So they agree with you.

Senator JOHNSON. So, again, what I am telling you is the Federal Government does not need to be involved in this type of effort, but this is crucial. It is really a root cause. So focus on the Federal Government—the things that they must do, the broadband, immigration reform, but when it comes to workforce development have the private sector do that at a very early level.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Johnson.  
Senator Peters.

**STATEMENT OF HON. GARY PETERS,  
U.S. SENATOR FROM MICHIGAN**

Senator PETERS. Thank you, Mr. Chairman. Thank you for our witnesses today. It has been an interesting discussion.

Clearly, workforce is on all of our minds and I think it is on your minds as well and one that I have been focusing a great deal of effort on as well.

To Senator Johnson's point, where the Federal Government puts their money is an indication of what we prioritize, and it is clear that a substantial amount of money goes into 4-year degree programs even though that may represent roughly 35 percent of the American population that goes on to get a 4-year degree. And yet, career technical education, which could help 65 percent of the American folks out there, gets about one-tenth of the resources that we put into 4-year programs. And so many of these CT programs are underfunded. Demand far exceeds the actual seats that they have in their programs because there are folks, as I travel around Michigan, who want to get into these programs but they cannot because of the shortage of resources.

And one thing that I have also found is that we have to do a better job when it comes to apprenticeships and understanding how we work with private industry and create apprenticeship programs that allow folks to learn their trade while also learning other skills at the same time but on apprenticeship programs, one of the most effective ways to do that.

And I know there is a TIRAP program, the Telecommunications Industry Registered Apprenticeship Program. So, Mr. Miller, this is for you. I think you have some familiarity with this program.

We have two community colleges in Michigan that I know are working with Monroe County Community College and Kalamazoo Valley Community College.

Do you know how many companies are enrolled and participating in the TIRAP program?

Mr. MILLER. I think that answer is 27 companies and roughly 2,000 registered apprentices.

Senator PETERS. Mr. Carr, you are familiar with this as well?

Mr. CARR. The TIRAP program has about 30 companies in it right now, about 2,000 apprenticeships in it. The Wireless Industry Association has been working with them on those efforts.

Senator PETERS. It has 30 now. What is the goal, and do we need more?

Mr. CARR. I think we certainly need to expand our workforce. For my part, I have been focusing more of my time on the community college side to see where we can reorient those programs. WIA and others have been working with the Department of Labor to expand the TIRAP program.

Senator PETERS. You are using the TIRAP program now, Mr. Miller, in your company?

Mr. MILLER. I do not, no, sir.

Senator PETERS. Is there a reason why you do not? Are there some issues associated with it that are not attractive for you?



Mr. MILLER. Well, I am on the advisory board for TIRAP. We do most of our training in-house.

But the administrative and management piece for a small business like me—there is nothing to compel me to take that route when there are other routes I can take.

Senator PETERS. What would make that program better in your mind?

Mr. MILLER. I understand funding has been an issue with the apprenticeship program, and while their curriculum is good if not better than the community college and other avenues we have talked about here at this hearing, it is having difficulty getting traction at the Department of Labor from a funding perspective.

Senator PETERS. So it seems like it goes back to what I mentioned. Here we have a program. As you said, the curriculum is as good or better than anything available in a community college. Did I hear you correctly?

Mr. MILLER. Well, it is equivalent. It is another path that we need to make work, yes, sir, whether we take the community college, private-public partnership, apprenticeship program in-house. There is a certification body that sits on top of all that when a student is ready, he will be card-carrying that says I can do this. I am safe to climb and I am safe to rescue somebody.

The CHAIRMAN. Who issues that card, Mr. Miller?

Mr. MILLER. It is an alliance formed by NATE called the National Wireless Safety Alliance, and it is assumed to be an ANSI-approved certification body that includes a practical and a written test at different levels of certification.

The CHAIRMAN. Thank you.

Of course, Senator Peters, we will not take that out of your time. You may proceed.

Senator PETERS. That was a good question.

So that model, obviously to your point saying it is underfunded. Are there other types of apprenticeship programs that you think would be helpful to you? And I want to open this up to anyone else. What should we be thinking about in terms of an apprenticeship program?

Ms. Youngers, I know you have talked about all the variety of other skills that are necessary in the industry. Do you see any shortages or gaps in that in relation to your demands and needs?

Ms. YOUNGERS. I think my members would say they still see those shortages, and you can even hear from the different testimony today we are identifying what those right skill sets are. And so I think my members want to keep driving at solutions. Here are the other things we still need, heavy machinery operators, ability to read blueprints, ability to design a network.

And I know someone mentioned earlier, when this all stops, what happens? The employees maintain those networks. Those networks have to be maintained in an ongoing way as well.

So I think my members would say they still see shortages. We are only sort of at the beginning of identifying what all those shortages are.

Senator PETERS. And all those skills you mentioned are all skills that someone requires of an apprenticeship program for the most part.

Ms. YOUNGERS. Right. So my members like the community college approach. They also like apprenticeships. And then when they talk about on-the-job training, they believe they need that in addition to those other skills they are coming in with. They think it all can work together. So I think they would applaud any efforts to increase apprenticeship availability and certainly the community college efforts that are going on, and then they will still bolster that with their on-the-job training. And that is also continuing. That does not just stop. They have to continually train their employees as well.

Senator PETERS. Mr. Feld.

Mr. FELD. I would add to this that recruitment and targeting particular communities for recruitment is a tremendous opportunity for not simply a win but multiple wins. Back many years ago when I was starting out, I was in dropout prevention, and programs that guaranteed jobs after high school graduation, assuming that you meet certain qualifications, are extremely useful in giving students incentive to stay in school, complete the program, knowing that when they do, there will be good jobs available for them.

Additionally, I would point out that the Minority Media Telecommunications Council and Natural Urban League are supporters of TIRAP. This is an example of how reaching to a variety of audiences, including those that we do not necessarily think of in minority communities, in urban communities, that targeting these for outreach, working with community organizations, not just the community colleges but other organizations that are trusted within the community, that are embedded in the community—all of these are proven approaches and are an opportunity to reach out to urban and rural communities that have traditionally suffered from high unemployment and provide the opportunity for good, long-term paying jobs.

Senator PETERS. Thank you.

The CHAIRMAN. Thank you very much.

Senator Rosen, is that you down there at the end of the dais? You are recognized.

**STATEMENT OF HON. JACKY ROSEN,  
U.S. SENATOR FROM NEVADA**

Senator ROSEN. Good morning everyone. Thank you for being here today. Thank you for your hard work and effort in this regard.

I got to do something fun a couple weeks ago because in my home state of Nevada, we host the Consumer Electronic Show. And let me tell you what I saw there was just amazing, how technology is going to advance people with disabilities, people who are aging. It is going to improve our travel, our home, even our cooking. There are washing machines that will just about do everything for you except put away the laundry. And so it is really tremendous.

And Nevada is also home to data storage centers, emerging solar, geothermal. We are number two in the country in geothermal technology, battery storage research, and we have so many tech startups.

And so, of course, upgrading our wireless industry, doing all these things is going to require at least 20,000 new workers, skilled

workers in order to deploy all of this and use all of this technology. I know you have been talking about that.

So of course, we must invest in workforce development. In fact, Senator Blackburn and I just last week introduced the Advanced Manufacturing Jobs in America Act that is going to have the Department of Labor work with the Manufacturing Extension Partnerships, community colleges, tribal colleges, other partners to give the kinds of technical training and skills that we are going to use.

And so, Mr. Feld and Mr. Miller, would you share with us additional recommendations you may have for improving participation in the existing workforce development programs especially for our under-represented and rural communities—I have a lot of that in Nevada—and the challenges that could exist for not just rural but women, people of color, and those with disabilities? Please.

Mr. FELD. There is something called the Willie Sutton Rule which is Willie Sutton was a bank robber. He was asked why do you rob banks? He said that is where the money is.

[Laughter.]

Mr. FELD. Part of this is recruitment where the communities are. It is challenging when you tell people in these communities that you need to go to a local community college, enroll in these things, in some cases either have lengthy commutes or leave your community. For example, I would say that there are a large number of tribal governments which would be interested in workforce development programs, and these tribal governments should be seen as partners. And there should be outreach perhaps encouraged by Federal programs to employers to reach out to these communities.

Similarly, I would say that my son is an Eagle Scout, of whom I am very proud. I know that there is a lot of beginning training that is done in the scouts that leads people to careers. I would say work with youth-oriented organizations, particularly those that work with women, that work with traditionally disadvantaged communities, that these are all potential partners in the non-commercial sector who would be quite eager to work with commercial providers in providing good jobs for people.

Mr. MILLER. Thank you, Senator.

It goes back to we have got to make hard work cool again.

And another thing that is interesting about this industry is most of us—we take our cell phone for granted. It works. We talk. We send pictures, and we take it for granted.

And behind the scenes every day, thousands of towers are being climbed and maintained or being constructed. But it is all invisible to you. And it is a great thing, but it is also hidden from our workforce. So that was part of my testimony. We have got to get the word out that this is a career. It exists. It is real.

Going back to earlier discussions, we have definitely got to get at the high school level and begin the recruitment there is my thoughts.

Senator ROSEN. And I would like to—just in final, in closing, I would just like to say not just make hard work cool again because a lot of work is hard. What we have to do is try to pair somebody's talents with the work and then that is what makes the work good for you regardless of what the work is. And so that is what is important, is that there is good work out there for people. Pair your

talents, pair your passion, make a good living, build your family, build your community. That is the message I think we need to get out.

So thank you for your time. Yes?

Mr. FELD. If I could just add one last point. There is also the need to reassure people who go into this that there will be continued employment after the current boom subsides. One of the things I have heard that has deterred—in the truck industry, for example, I hear from the autonomous vehicle side that people are concerned about going into careers in trucking because they keep being told that 10 years from now those jobs will disappear. So certainly apprenticeship programs are an excellent way to keep people within the workforce, but an important element is to reassure people who sign up for these careers today that they are not going to be unemployed 5 years from now when we finish the massive deployment.

The CHAIRMAN. Thank you, Senator Rosen.

But I think, Mr. Feld, that is a phenomenon all the way across our economy. Is it not? Because what used to be a career that a person could have for 30 or 40 years, in our society the technology is changing so much and the economy is changing so much that we are going to have several careers.

Do you have anything you would like to—

Mr. FELD. I would like to put in a plug for the Digital Equity Act which tries to address some of that concern with regard to providing opportunities for training across a wide range of digital opportunities where these skills that are needed can be developed and transferred from one career to the next. So I believe that, yes, you are right. This is a very common problem. Fortunately, there are some good solutions in the pipeline.

The CHAIRMAN. Great. And, boy, for those truckers, a 10-year career and then moving on to something that might pay even more might not be so bad.

Commissioner Carr, in your written testimony, you mentioned a number of success stories. Houston, Cincinnati—these are big towns. Then you mentioned places where you might not expect such success in 5G, Sioux Falls, South Dakota; Elkmont, Alabama. What suggestion would you make to a not-so-big town so that they might have the same type of success that you have pointed to in your written testimony?

Mr. CARR. Thanks, Senator, for the question.

You know, the finish line for us is every single community getting next gen connectivity. And to your point, we have established guardrails at the Federal that build on those infrastructure policies that a lot of those State and local leaders are seeing successes put in place. So we put guardrails at the Federal level that reflect that. And I would simply encourage a lot of State and local governments that want to see 5G, that want to see the economic opportunity to continue to update and modernize their approach to infrastructure builds. That will go a long way.

The CHAIRMAN. All right.

Mr. Miller, you have come a long way for this testimony. I want to make sure that you have said all you need to say. But let me start off by asking you about the challenge in getting young people trained to work in your company and in your field, and then what

is the challenge in keeping them there. How long does it take to take someone who is interested, get them into one of these programs, and get them started making a good living? And then what is the problem in—what are our challenges in losing them?

Mr. MILLER. Thank you, Senator.

First off, the majority of the training initially for anybody in the wireless industry is safety. So it is a high risk industry. Working at heights is not normal. It takes a special person to do that. So you are looking at at least two weeks of climbing with somebody, climbing classes, rescue classes, basic rope techniques, basic rigging techniques. So everything we do up there we have to carry up or get it up there somehow. So that is the first two weeks of it. Then you have got an employee that can assist you on a tower.

After that, you move into the more technical details of it, whether it is align an antenna. There is fiber optic cable on towers. So you are dealing with more of the technical aspects of it.

But a thoroughly competent employee skilled in this industry, 8 months to a year before they really know it all.

The CHAIRMAN. That is a relatively encouraging bit of testimony because it is not a terribly long time.

Mr. MILLER. It is not. Some of the issues we do face is competing industries.

The CHAIRMAN. OK, and that brings me to part two of my question.

Mr. MILLER. Yes, sir.

The CHAIRMAN. Who is trying to hire these kids away from you?

Mr. MILLER. Two things.

First off, the height and the travel. And a lot of people are intrigued by this industry, but the travel versus family can start weighing on a person. That is one of our biggest hurdles is the travel aspect of this industry.

Second to that is more glorified jobs that perhaps have less outdoor exposure. You know, you get trapped on a tower at 300 feet when it rains or the temperatures are like today, it can be a harsh environment to work in.

The CHAIRMAN. Well, thank you very much.

Now, Mr. Feld, you made a statement that I would like for you to expand on and that is the idea of working as collaborators rather than barriers. Tell the Committee exactly specifically what you are talking about, and what needs to happen and how can we help.

Mr. FELD. Thank you.

I would point to a program in West Virginia where they provide grants to local governments to do broadband planning and make-ready. And what this allows is for the local community to pinpoint exactly what the needs are, who the potential collaborators are within the community. And therefore, when the discussion comes to providers, they are able to have informed discussions about what the concerns are, how to avoid those concerns, what assets the locality can contribute to make the deployment more economically viable and attractive. And it becomes a collaborative relationship where the issue is, look, we want to have these services, but we have very legitimate concerns. And if you put a micro-cell next to somebody's bedroom, you know, they are going to call me not the carrier. So those are the sorts of things that you want to see com-

munities work out together with carriers to develop plans that make these an opportunity and where carriers do not just come in and are trying to stick to their schedule, are not concerned about that call from an outraged voter, and make sure that things are done right.

The CHAIRMAN. Commissioner Carr, do you wish to elaborate on this issue of collaboration versus barrier?

Mr. CARR. Yes. I think it is an important topic. Again, today I think Senator Cantwell laid out State and local governments are going to play a big, big role in determining the pace and nature of 5G build-out in this country. We put some guardrails in place, as I noted, at the Federal level. But at the end of the day, it comes down to good faith negotiations, reasonableness on both providers and individual communities and State and local governments to make sure the job gets done in those places. And we have seen a tremendous up-tick in infrastructure build over the last few years, but we are not there yet. So we need to continue to see collaboration on those issues.

The CHAIRMAN. What if negotiation does not get you there?

Mr. CARR. There are some backstops that we put in place on Federal law. But to be honest, there are a lot of communities and private sector builders that were not able to bridge the gap in their negotiating positions, and since the FCC stepped in and built on some common sense local ideas, those gaps are being bridged. There are communities across the country now that have reasonable infrastructure policies in place that are a win-win for the local community and for the U.S. leadership in 5G, and I think we are going to continue to see that.

The CHAIRMAN. Thank you.

Senator Cantwell, do you have further questions?

Senator CANTWELL. I always have further things, but I saw our colleague, Senator Sinema. I do not know if she is—

The CHAIRMAN. I think she has deferred.

Senator CANTWELL. OK.

Well, Mr. Chairman, I think that the witnesses here have done a good job this morning illuminating this issue.

And, Mr. Miller, you brought something to the forefront here. I do not know if we have forgotten about hard work, but I do think that we need to illuminate how important this issue is. So in that regard, I think if we put out a statement that we are calling all of our citizens who can help us build out the system and why it is so important to build it out, I definitely think people will respond. And I think that elevating that to a bigger national priority and illuminating the fact that that is—you know, it is kind of what we have done.

Building the hydro system, as I said—I cannot wait for this movie to ever be made, *The Boys in the Boat*, because yes, it is a story about us in the Olympics, but it is about a bunch of guys who also helped build the hydroelectric system in the country. And it will help illuminate what the danger of that hard work was. People died and it was risky. But the benefits of building that out for our Nation just paid such tremendous dividends as this next phase will too.

So thank you for talking about the workforce in a way that shows the hard work that these individuals do. So thank you.

The CHAIRMAN. Thank you, Senator Cantwell.

Ms. Bloomfield, I am told you had your hand up on the last exchange. So you are recognized.

Ms. BLOOMFIELD. I just wanted to conclude. As you all are talking about collaboration, you are talking about smart cities. One of the initiatives we put underway is creating smart rural communities. And it is that collaborative spirit, and part of it is when we talk about training, we are talking about technical training. And that is very key obviously, building these networks. But the other part of it, the collaborative piece, is how do you then train your communities to actually use the broadband that you are deploying. How do you actually make these communities smart? How do you get technicians in rural health care hospitals to actually understand and not be afraid of using some of that infrastructure? So I just wanted to throw out that that is another important piece that we think about. It is the user side, not just the builder side. So again I think they kind of go hand in glove.

The CHAIRMAN. Thank you very much.

Senator Sullivan, they are already starting to turn the lights out, but you are recognized.

**STATEMENT OF HON. DAN SULLIVAN,  
U.S. SENATOR FROM ALASKA**

Senator SULLIVAN. Thank you, Mr. Chairman.

And I just want to thank the witnesses.

I have a very basic question. Commissioner Carr, maybe we can start with you, but I would like to open it up to all the panelists here.

You know, we talk about rural and we talk about my State, which is really, really rural. And you know, there is legislation. I cannot remember exactly what year it was but in the 1900s, the Telecommunications Act actually mandates—mandates—broadband deployment to all parts of America—all parts, including the most rural. And sometimes I think the FCC—no offense, but particularly with this Chairman—does not get it, does not understand it, does not recognize what the mandate of the law is. And so how do we do that? How do we do that? It is great to have it in New York City and 5G everywhere. Heck, we are still trying to get 4G, 2G, 3G in my State.

And sometimes the Federal agencies forget about us, and it is frustrating. It has been really frustrating with this FCC in particular. And I think they violate the law in a lot of ways. I think they ignore constituents in places like Alaska. So how do we get there? Because, you know, we are all Americans and sometimes these big Federal agencies in D.C. forget about the Americans who live 4,000 miles away, and it is frustrating, really, really frustrating. We ought to move the FCC to Anchorage and maybe you guys will pay attention.

Do you have any thoughts on that?

Mr. CARR. Thank you, Senator, for the question.

I think our goal has to be to make sure every single community in this country gets—

Senator SULLIVAN. Do you think every commissioner knows that?

Mr. CARR. I would hope so.

Senator SULLIVAN. I do not think they do.

Mr. CARR. For my part, I spent time up in Utqiagvik, the northernmost community in Alaska in the country.

Senator SULLIVAN. Wonderful people. Right? Some of the most patriotic Americans in the whole country.

Mr. CARR. I had a chance to climb a telephone pole there, help splice fiber, go underground in their utilidor. I was out on the Aleutian Island chain, climbed a tower there—

Senator SULLIVAN. Also great people.

Mr. CARR [continuing]. With Rodrigo who grew up on the island. He now has a job as a tower tech, a tower climber, out on one of the Aleutian Islands in Alaska.

We are not across the finish line yet. There is a lot more work that we have to do, and I am committed to continuing to make progress on this issue.

Senator SULLIVAN. So how do we do that? Do you not have a mandate to do that, first of all?

Mr. CARR. We are standing up a number of funding mechanisms.

Senator SULLIVAN. Do you have a mandate to do that?

Mr. CARR. Yes. The Communications Act, absolutely.

Senator SULLIVAN. So I just always find it a little bit frustrating that I have to remind commissioners that this is not like an option. Congress spoke. Everybody, all Americans, including my constituents. So how do we get there?

Mr. CARR. We are taking a number of steps right now to try to do that.

Senator SULLIVAN. I think the Chairman is going backward on rural health to be perfectly honest, but that is a whole other topic.

Go ahead. I apologize. I actually feel very passionately about this, as you can imagine, but I will let you answer the question.

The CHAIRMAN. The witness can answer the question.

Mr. CARR. Thank you, Senator, for your leadership on this. It is incredibly important.

I have seen the challenges that come with connecting rural and remote parts of Alaska. It is like nothing else that we have in this country. I have gone from Anchorage to a small clinic in Manokotak. It was two flights, a drive on what passed for a passable road, and you needed a four-wheel drive to get to this clinic. And when we have health care, telehealth delivered in these remote communities, it is life or death, obviously. It is also financial. It can cost \$10,000–\$70,000 to do a lifeline flight when it is available out of these communities.

When I was in Utqiagvik, I was in the airport. I was just talking to a woman who was waiting for a flight. I told her I was with the FCC. We were here to talk about telehealth and broadband expansion. She said you have no idea what it means to a member of this community to get to stay here and get health care delivered right here through telehealth or otherwise rather than having to get on a plane and go to even Anchorage. So stories like that stick with me, and we need to continue to make progress because we are not where we need to be yet.



Senator SULLIVAN. Well, look, I appreciate the fact that you have come up to Alaska a number of times and you have a real sense.

The one thing that is a bit of a frustration is the law is clear. The law is clear in my view. And yet, you hear from the FCC, well, it is really expensive. But the law does not say, of course, it is really expensive, but it still does not matter that you are not supposed to do it. There is nothing in the law that says you can do it, FCC, unless it is really expensive. Then you do not have to. That is not in the law.

So I think one of the things that frustrates me—and maybe I will just leave it open to the final panelists—is that there is no cost-benefit. You are supposed to do this. And we need your help, and I appreciate you being up there.

Do any other witnesses have thoughts on extreme rural communities for states like mine?

Ms. BLOOMFIELD. So, Senator, I represent all of the independent providers and co-ops in Alaska, and I do know the challenges firsthand they of connecting particularly their villages. And it is very unique because they actually have very dense villages but then miles and miles to carry that traffic.

So I was very excited. You have a carrier up there, Matt Nusca, MTA, that just announced that they are creating a fiber connectivity to the Lower 48 which I think will create some redundancy and some great opportunities. And USDA just announced some ReConnect money that will be going to Alaska to build some broadband infrastructure out there in some of the village communities.

So, again, trying to find a way to connect all those pieces is going to be important, but those folks have a huge challenge ahead of them.

Senator SULLIVAN. Thank you.

Mr. FELD. Senator, I would say there are a couple of concrete things that the FCC can do right away.

First is to expand the tribal window for the 2.5 gigahertz application process and to commit to doing further windows for those deployments. In a lot of tribal areas, these frequencies could be used to promote rural broadband.

Second, I do need to point out that it is one of the core central responsibilities of the Communications Act that says in its opening sentence to bring to all Americans. You are absolutely 100 percent correct about that. And we, Public Knowledge, work with the Broadband Connects America Coalition, which brings together a number of rural groups.

But I know people may not be happy to hear this, but it is Title 2 of the Communications Act that was developed during the electrification of America when we were first deploying our national phone system that contains the tools that is designed to solve this problem through the Universal Service Fund in section 254, through the responsibility of carriers to serve everyone within their service area not cherry-pick only those where it is most profitable to serve. And I realize this is unpopular with no Democrats in the room, but this should be bipartisan. But broadband is clearly the utility of the 21st century, as essential as electricity, as essential as the telephone was, and it should be classified as Title 2 so that

State and the Federal Government have the tools to bring that service to all Americans.

Senator SULLIVAN. Thank you.

Mr. Chairman, if we can have one more witness for just a comment, if that is all right.

Ms. YOUNGERS. Thank you.

And I would just add and echo we agree with you. Actually the language in the statute is that rural Americans should receive the comparable service of their urban counterparts—comparable service.

Senator SULLIVAN. It is not about cost. Right?

Ms. YOUNGERS. Right. And so we agree and we echo that.

The Fiber Broadband Association is a fiber educator. We educate entities on how to build fiber networks, and we are seeing more and more entities come to us from rural America who want to build their own high-speed fiber network because their residents need it and it brings so many other benefits. And frankly, you need fiber in the community anyway if you ever are going to have 5G certainly to support wireless networks, Internet of Things applications, and even other things that we have not even talked about. Fiber optics can also provide sensing and security applications for pipeline safety, border control. So there are a lot of reasons to have fiber in the community and we are witnessing rural communities, including either electric co-ops or municipal networks, come to us and say we are going to build our own fiber networks, sometimes a public-private partnership, but how do we do that? And so we are seeing it drive further into rural America.

I know you have particular challenges in your state, but I think the good news is we are seeing fiber drive closer to rural America.

Senator SULLIVAN. Well, thank you.

And I want to thank you, Mr. Chairman, for indulging me here, but I think the witnesses are making a really good point that sometimes, to be honest, is lost on the commission. The number of times that I have heard a commissioner or commission staff say, well, you know, you guys are really expensive up there in Alaska, so we cannot do X, Y, and Z, or we are going to cut back X, Y, Z. It is a frustration. I think you are violating the law, and we need to work together to get this to all America, which was the mandate of the Congress over two decades ago. So thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much, Senator Sullivan.

The hearing record will remain open for two weeks. During this time, Senators are asked to submit any questions for the record. Upon receipt, the witnesses are requested to submit their written answers to the Committee as soon as possible but no later than Wednesday, February 19, 2020.

So I thank the witnesses.

At this point, I want to take a point of personal privilege. My long-term staff assistant and case worker, Linda Tollison of Tupelo, Mississippi, died yesterday. She was with me when I was a struggling lawyer. When I went to Congress, she became a public servant. When I moved over to the U.S. Senate, she joined our she joined our staff there. She believed in hard work. She believed in her family, and she helped literally thousands of Americans receive the benefits to which they were entitled. And she represents thou-

sands and thousands of people like her who work for this Congress and they work diligently and serve the public.

So behalf of them, without objection, this hearing is adjourned today in honor of and in memory of Linda Tollison. Thank you.

[Whereupon, at 11:35 a.m., the hearing was adjourned.]



## A P P E N D I X

### RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. DAN SULLIVAN TO HON. BRENDAN CARR

*Question 1.* As you know, we have highly consequential, outstanding items before the Commission. Please provide a status update on the following petition: Maniilaq Association's appeal of USAC's denial of FY2017 FRNs.

Answer. The Commission has granted the waiver sought by Maniilaq Association, and directed USAC to reinstate the funding commitments within 60 days, and discontinue its recovery actions against Maniilaq. The final order can be found here: <https://docs.fcc.gov/public/attachments/DA-20-173A1.pdf>

*Question 2.* A popular band of spectrum, the C-band, is being prepped to be made available to wireless carriers. Alaska's C-band is critical for telemedicine and other important programs. In a response to a letter the Alaska delegation sent last year regarding C-band incumbents in Alaska, the FCC responded that one of the 4 principles for reallocation of this band is "protecting services that are currently delivered." As the FCC begins to reallocate critical C-band spectrum, what considerations are you giving to incumbent users who it may be impossible or impractical to relocate?

Answer. In Unalaska, I had the chance to see firsthand the important role that C-Band spectrum plays in connecting rural and remote parts of Alaska. While there, I visited the one health care clinic on the island, and it depends on C-Band to offer telehealth services. The draft decision that the FCC is scheduled to vote on at our February meeting excludes areas outside of the contiguous United States from the proposed license modifications.

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### RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. TOM UDALL TO HON. BRENDAN CARR

*Question.* Commissioner Carr, thank you for your recent visit to New Mexico and to the Mescalero Apache Reservation. As you saw firsthand, New Mexico is a beautiful state to live in—but we have many challenges to access high-speed broadband.

My friends at Mescalero Apache Telecom have done excellent work serving their customers with the infrastructure challenges they face—but you saw for yourself the significant hurdle facing school children's access to adequate broadband in that area.

In 2018, Senator Cantwell, Representative Luján, and I wrote to the Bureau of Indian Education requesting that it work with schools and, where possible, allow BIE schools to use a local broadband connection that may be more affordable and faster.

BIE refused this request with a flurry of excuses.

Mr. Chairman, I ask unanimous consent to include a copy of the letter and response in the record.

Commissioner—we all know that children in BIE schools are at an extreme disadvantage when it comes to high-speed broadband. Additionally, as the BIE cited in its response to me—90 percent of the cost of broadband for BIE schools comes from the E-Rate program. So BIE's decision not only hinders access to higher speeds, it also puts a burden on the extremely important E-Rate program. Will you commit to work with me to help our Native students gain access to high-speed broadband, including advocating to allow BIE schools to use a local broadband connection if more affordable and faster?

Answer. I greatly appreciated the chance to see firsthand the challenges that come with expanding Internet connectivity across rural New Mexico and remote stretches of the Mescalero Apache Reservation. On that visit, I had the chance to meet with students at the Mescalero Apache School and learn how they are leveraging Internet connections to expand opportunities, including in STEM. I am not familiar with the nuances of the BIE program or regulations, but I would wel-

come the chance to work with you on any ideas that would enable better and more affordable broadband connections at BIE schools.

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CONGRESS OF THE UNITED STATES  
Washington, DC, December 13, 2018

TONY L. DEARMAN,  
Director,  
Bureau of Indian Education,  
Department of the Interior,  
Washington, DC.

Dear Director Dearman,

We are concerned that Bureau of Indian Education (BIE) schools have been paying significantly greater amounts for slower broadband service than non BIE schools in the same area, and urge the BIE to take full advantage of new Federal IT procurement policies that appear to allow more flexible and improved options. As you are well aware, broadband connectivity is no longer optional for students to effectively prepare for our 21st century society and economy—including students located in remote areas of our country. Not only are these students being left behind by crumbling physical infrastructure, they are also being left behind due to needless obstacles blocking them from accessing high-speed broadband at school which do not make the best use of limited BIE funds.

For many years, every BIE school has been required to purchase telecommunications services under the General Service Administration's Networx contract. However, on June 15, 2017 the Office of Management and Budget (OMB) issued a new memorandum, M-17-26, which revised and rescinded a number of previous OMB Memoranda. This new memo rescinds and replaces M-08-26 that outlined the agencies' transition to the Networx contract. It is our understanding that now BIE schools may no longer be required to receive their information services through the GSA contract, under which services can cost as much as 23 times more than other schools pay for comparable services in the same geographic area.

We seek your confirmation that this change allows BIE schools flexibility to pursue other options outside of the GSA contract that may offer better service at lower prices. If so, we then request that you outline any specific efforts that BIE has taken and plans to take to assist BIE schools to reduce costs and obtain faster service with more flexible options to secure broadband services for BIE schools and students while complying with Federal contracting procedures.

We look forward to working with you to improve broadband service for BIE schools and request a response by January 11, 2019.

Sincerely,

TOM UDALL  
U.S. Senator

BEN RAY LUJÁN  
U.S. Representative

MARIA CANTWELL  
U.S. Senator

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UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF INDIAN EDUCATION  
Washington, DC, Apr 10, 2019

Hon. TOM UDALL,  
United States Senate,  
Washington, DC.

Dear Senator Udall:

Thank you for your letter dated December 13, 2018. On behalf of the Bureau of Indian Education (BIE) and Indian Affairs, we thank you for your continued support of Indian children and for your outreach.

The BIE in partnership with Indian Affairs more broadly supports BIE-operated schools, Tribally controlled schools, Tribal colleges and universities, adult learning centers and juvenile detention centers located on 64 reservations across 23 states serving approximately 42,000 students. The Education Native American Network (ENAN) Wide Area Network (WAN) interconnects these schools and post-secondary institutions to provide Internet access to students. Many BIE schools are located in

some of the most remote locations in the country and lack an adequate level of connectivity to the Internet. This hampers the modern demands of teaching and learning. Broadband-enabled teaching and learning has fundamentally reshaped education at all levels and has improved access to expanded educational opportunities. Broadband access is particularly important for schools located in remote locations because it can mitigate the impact that geographic isolation can have on student achievement, particularly lack of access to deep applicant pools of effective teachers and principals.

The ENAN WAN circuit costs for BIE K–12 schools are funded 90 percent by the FCC’s E-Rate Program and 10 percent by BIE’s Education IT Central Office budget. After accounting for Tribal colleges and universities, adult education centers, dormitories, and other BIE offices, which are not E-Rate eligible, E-Rate funds approximately 70 percent of the overall circuit expenses with the remaining 30 percent paid by BIE’s Education IT Central Office budget.

We have successfully upgraded 83 circuits for BIE K–12 schools to meet broadband status. However, there are currently 14 K–12 schools using BIE ENAN circuits that do not meet broadband status but at the direction of the Assistant Secretary—Indian Affairs they are being upgraded.

The OMB Memorandum 17–26 rescinded OMB Memorandum 08–26, which required agencies to procure data services using the GSA Networx contract. The successor to the Networx contract is GSA’s Enterprise Infrastructure Solutions (EIS) contract. The Department of the Interior’s Chief Information Officer (CIO) has issued a memorandum, dated August 19, 2018, directing all Bureaus and Offices to use the GSA EIS contract. An enterprise contract such as EIS allows agencies with limited staff and resources to focus on services and customer support with less time spent on administrative matters, such as billing and contract management. This will enhance BIE’s ability to provide high-speed broadband services to all BIE-funded schools, Tribal colleges and universities, at reduced costs.

There are many challenges in building and maintaining a WAN that interconnects remote sites spanning multiple states. The ENAN network circuit cost to connect remote sites typically costs more than procuring broadband service locally. The higher costs are due to guaranteed up-time of data circuits, service level agreements, and data encryption to ensure secure transmission of data, which are not typically offered by local vendors.

Indian Affairs and BIE are working on transitioning to the new GSA EIS contract. The EIS contract affords us the opportunity to assess the use of state-of-the-art technologies, such as software-defined wide-area network (SD-WAN) and Zero Trust Networking (ZTN) to replace outdated networking protocols and platforms currently in use. This could allow us to procure local broadband services using secure data transmission over the Internet. There are also other technologies currently available that we are assessing for implementation on the ENAN network, such as Virtual Private Network (VPN) technologies to allow us to procure local broadband services at reduced costs.

If the individual schools were to procure broadband circuits locally instead of using ENAN, the ability to provide a number of centralized services would be compromised and would increase costs for each school in goods, services, and labor; such as:

- Child Internet Protection Act (CIPA) Compliance
- Anti-virus software and licenses
- Centrally managed vulnerability patching
- Centrally managed/distributed computer images
- Microsoft Windows desktop/laptop licenses
- Microsoft Server licenses
- Server management
- Centrally managed directory services
- Direct access to other DOI and BIE Systems
- Centrally managed e-mail services

Indian Affairs and BIE understand the value of providing students a 21st Century education that includes access to the latest technology and support for digital learning. We will continue our work together to ensure our students have such opportunities. If you have additional concerns or require further attention, please contact our office at (202) 208–6123.

Similar letters are being sent to the Honorable Maria Cantwell and the Honorable Ben Ray Lujan.  
Sincerely,

TONY L. DEARMAN,  
*Director,*  
Bureau of Indian Education.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. KYRSTEN SINEMA TO  
HON. BRENDAN CARR

As you know, Educational Broadband Services (EBS) resides in the mid-band spectrum, in the 2.5GHz band and has helped foster programs that tackle the homework gap and digital divide by providing spectrum for broadband services. In Arizona, the Havasupai Tribe uses EBS channels for wireless routers for their members to take online classes. Last year, the Tribe was granted four new EBS channels that they intend to use for telemedicine.

Last year, the FCC finalized a rule to update the framework for licensing EBS spectrum in the 2.5 GHz band. The final rule included priority filing windows for Tribes to apply for 2.5GHz licenses before issuing licenses for any remaining spectrum through auction.

First, I want to again thank the Commission for establishing a Tribal Priority window for new EBS license issuance for Tribal National in the final rule. This decision provides Tribes with the opportunity to expand rural broadband, accelerate 5G deployment, close the digital divide, and bridge the homework gap.

*Question 1.* How will the FCC work to help recipients of these licenses meet build-out requirements?

Answer. I agree that the Rural Tribal Priority Window is a significant opportunity to improve broadband service offerings and to close the digital divide on Tribal lands. I recently spent time with Tribal leaders on the Mescalero Apache Reservation, and they conveyed their interest in the 2.5 GHz spectrum and appreciation for the expanded Priority Window. The FCC is committed to assisting Tribes through this process, including through a number of engagements lead by FCC Commissioners in the Office of Native Affairs and Policy. For example, the Commission's website contains detailed information on the Tribal window (<https://www.fcc.gov/25-ghz-rural-tribal-window>), including links to workshops, presentations, tutorials, and staff contact information.

*Question 2.* Has the FCC considered opening priority windows for tribal communities in other future license auctions?

Answer. This is the first time that I am aware of the FCC opening a priority window for Tribes. I am open to considering additional windows where doing so will further the public interest.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. KYRSTEN SINEMA TO  
JIMMY MILLER

The National Association of Tower Erectors works hard to ensure workers in the communications infrastructure industry have the training, education, and assistance necessary for workers to safely complete their duties.

*Question 1.* How can the Federal government best work with universities, colleges, and career and technical schools to best prepare students for the jobs needed to build 5G networks and leverage the potential of this technology?

Answer. Of course, recognizing and appreciating that a problem exists is the critical first step in trying to resolve it, and our industry's workforce shortage is certainly a problem. Solving it—or at least taking steps to address it—is clearly in the national interest, as critical communications capabilities and the infrastructure that support them are inextricably linked to our Nation's economy and competitiveness as well as its security. So having a strong Federal role in helping to build 5G networks, in addition to developing the associated infrastructure and smart technologies, and leveraging the potential of this technology is paramount.

As I mentioned in my oral testimony before the committee, NATE strongly supports the bipartisan "Communications Jobs Training Act" that has been introduced in the U.S. House of Representatives and is encouraging a companion version of the bill to be introduced in the U.S. Senate. I am very proud that we worked closely with the original sponsor, Congressman Dave Loebsack (D-IA), on this initiative. While the funding that the bill would authorize—\$20 million per year for each of three Federal Fiscal Years—is enormous to small businesses like mine, it is quite



modest in the Federal world. As NATE representatives discussed with your staff last year, the bill, if enacted would start the ball rolling in the development of curriculum, certificate programs and training towers at community colleges, vocational institutes and military organizations, thereby helping our industry attract and ultimately educate and train people who will be prepared to build, deploy and maintain 5G networks and other telecom infrastructure.

NATE's Workforce Development Committee has established a standardized telecommunications technician curriculum model that can be adopted by community college, technical institutes and veterans organizations interested in starting a program. Much like the Association did with the programs at Aiken Technical College in South Carolina and Southeast Technical Institute in South Dakota; we are committed to working with lawmakers, educational institutions and industry stakeholders to identify, support and facilitate programs at schools around the country. NATE would be excited to collaborate with Senator Sinema and her staff to identify potential schools in the state of Arizona that may be ideal institutions to start Wireless Infrastructure Technician programs.

In order to get the ball across the goal line, we advocate the development of a comprehensive package of telecom-related legislation, several of which have already been introduced and are pending before the Senate Commerce Committee. We believe a package stands a greater chance of enactment than individual bills do. My written testimony notes several of these bills, including:

- Sen. Sinema's "Tower Infrastructure Deployment Act," that would facilitate participation in industry-specific workforce development programs and identify ways to improve workforce development in the communications industry;
- the "Industries of the Future Act," which would ensure appropriate levels of funding for certain careers in demand due to next generation wireless networks;
- the "STREAMLINE Small Cell Deployment Act," which would reduce regulatory obstacles to deployment; and
- various apprenticeship bills, such as the "Apprentice Hubs Across America Act."

Beyond enactment of such authorizing bills, *appropriations* of authorized funds will be essential if we are to win the race to 5G and beyond.

My testimony also referenced the U.S. Department of Labor—OSHA Susan Harwood Targeted Topic Training Grant that NATE has received for the past five years. These funds, which enable us to develop curriculum and free training sessions nationwide, are subject to annual congressional appropriations; accordingly, we urge the Appropriations Committees to continue funding this important program, too.

Another key program that offers enormous potential—especially if there were to be any way to highlight the telecom industry—is the Perkins Act, which as reauthorized helps individuals gain the academic and technical skills needed to be successful in today's workforce. Providing funding for Career Technical Education (CTE) programs and job training for students, and charging states with setting and making progress on their CTE goals, will facilitate connections between secondary and postsecondary education and employers.

There are other federally supported workforce development programs that provide productive opportunities to support and expand educational opportunities, as my industry peer Lisa Youngers of the Fiber Broadband Association testified when we were on the panel together before the Commerce Committee. As she said: "The Department of Labor Employment and Training Administration provides oversight over two grant programs that can make a difference. The Workforce Opportunities for Rural Communities and the Apprenticeship Readiness grant programs are each geared toward supporting educational institutions and other programs that will provide skills training that help put people to work . . . Congress should also explore other opportunities to find new funds to support this type of training."

*Question 2.* How do we ensure that individuals of working age get the right training to obtain infrastructure and other jobs related to 5G deployment?

Answer. First and foremost, it is essential that potential workers are made aware of jobs—good jobs—in our industry. It is not enough to seek out people who are attending community colleges, vocational institutes and military organizations. We need to actively inform and solicit potential workers while they are in high school. One of the critically important things that must be done is getting the word out that we have really good paying jobs available. And, as I said during the hearing, we have to make hard work cool again.

I also testified specifically about training. My written statement noted that our "highly skilled technician positions must be filled by people sufficiently educated and trained in proper techniques and in the use of the requisite equipment. This is not a quick undertaking. Employers who train their own employees and the in-

dustry's private training company providers can often get a technician through rudimentary safety training in two weeks, but he or she needs at least a year on the job to become competent at a specialty in which the employer works."

There are many training pathways readily available to prospective workers who enter the industry, including, but not limited to, employer-based training programs, private, 3rd party training providers, transitioning military training programs and the Telecommunications Industry Registered Apprenticeship Program (TIRAP).

The industry's worker certification credentialing organization, the National Wireless Safety Alliance (NWSA), is perhaps one of the most important elements of ensuring that workers are trained in accordance with the technical skills and standards required of the 5G deployment cycle. NWSA provides nationwide, portable worker credentials to tower technicians in progressive worker categories in order to ensure continued excellence and professionalism in the industry. After workers receive training to become tower technicians, companies have an opportunity to ensure that their workers obtain NWSA certification credentials that are applicable throughout the country. Workers, regardless of their training pathway, will ultimately be required to take a standardized NWSA knowledge and field-based assessment in order to become certified.

NWSA offers worker certification credentials in the following worker categories: Telecommunications Tower Technician I (TTTI), Telecommunications Tower Technician II (TTTII), Antenna & Line Specialty and Foreman. Much like an electrician's card, the NWSA certification card is a source of pride for workers and is creating a career pathway for the industry's technician workforce to follow. This is significant as it ensures that workers can demonstrate they have the skills necessary to build, upgrade and maintain 5G networks in a quality and safe manner. NWSA certified personnel provide the wireless carriers, vertical real-estate companies and engineering firms the confidence to know that the personnel working on their infrastructure and networks are professionals.

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RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. MARSHA BLACKBURN TO  
LISA R. YOUNGERS

*Question.* You indicated in your oral statement that China has significant excess optical fiber manufacturing capacity. What will be the impact on the U.S. fiber optics industry if Chinese manufacturers are allowed to dispose of this surplus in the U.S. market? If the surplus Chinese fiber is imported and installed in our domestic networks, does it potentially threaten the security of our networks: that is, can it technically be designed to facilitate unauthorized exfiltration of data or to enable network disruption? If so, how would this technically be performed?

*Answer.* As I said in my testimony, if Chinese manufacturers are allowed unfettered access to the U.S. optical fiber market, they would likely "dump" their huge excess production capacity into the U.S. Market. China has enough excess capacity to supply the entire U.S. market all by itself. The aggressive pricing that would be required to dispose of such a large surplus would cause enormous harm to the U.S. optical fiber industry and its workers.

In addition, in such case, Chinese fiber would be deployed in the U.S. 5G network and threaten the security of the supply chain for optical fiber technology. It would also make the 5G network vulnerable to unauthorized access by an adversary.

If so motivated, an adversary could easily exfiltrate data off an optical fiber network without detection. Deloitte published an article in 2017 that explains in non-technical terms how easy it is to tap a fiber networks. The article states:

"Deloitte finds that there is a prevailing, misguided belief that fibre networks are more secure than other media, such as copper and wireless technologies. Fibre networks are vulnerable to tapping through the use of well-known techniques such as man-in-the-middle, re-routing and exploiting protocol vulnerabilities and software vulnerabilities in network devices.

There is also a perception that fiber networks are much better protected against physical interference and the installation of tapping equipment. This is a misunderstanding: fiber networks are at least as vulnerable to physical tapping as traditional copper.

Attackers can use various methods, but at present the least expensive option is using optical splitters or clip-on couplers to bend the fibre, transferring the signal in multiple directions and making it possible to tap into network traffic reserved for others."

If so motivated, an adversary could remotely disrupt a network. In an unpublished paper, Dr. Alan Willner, a renowned professor at the University of Southern

California, described how material changes can be induced by an adversary into an optical fiber to cause the denial of service. One such method is the application of light at a certain wavelength to remotely disrupt a network. The paper states that:

“High optical power can be surreptitiously injected into an optical fiber link (either at a wavelength close to or far away from the signals) to:

- (i) permanently change the material properties for absorption or partial reflection. An example could be an organic polymer-based element, which can yellow over time with light.
- (ii) be absorbed by the dopants and produce a saturable absorber, which will now absorb the data signal light as long as the powerful light is present.
- (iii) be absorbed by the material (or by a deposited film) and crack the fiber due to highly localized energy and heat.
- (iv) trigger an optical “fuse”, such that the fiber core can be made fairly thin and the optical power density becomes too high thus melting the short circuit-breaking fuse.”

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. AMY KLOBUCHAR TO  
HAROLD FELD

*Question 1.* Last year, the Justice Department and Federal Communications Commission (FCC) approved the proposed merger of T-Mobile and Sprint. One argument used to justify the merger is that it is necessary to maintain America’s leadership in deploying 5G. As the Ranking Member of the Antitrust Subcommittee and a member of the Commerce Committee, I am skeptical that further consolidation in the wireless market is the answer to our challenges concerning 5G deployment. In your view, how will further consolidation of wireless carriers impact the deployment of 5G?

Answer. Historically, consolidation slows innovation and increases prices. This is particularly true for the broadband industry. From 2009–12, when the wireless industry was essentially a duopoly between AT&T and Verizon, we saw precisely this pattern in wireless. Prices for services consistently rose, and deployment of advanced 4G networks lagged behind other countries. Bandwidth caps stifled innovation, and rural consumers remained entirely unserved. In 2011–12, regulatory interventions to promote competition—denial of the AT&T acquisition of T-Mobile and requiring significant divestitures by Verizon as a condition of acquiring spectrum from cable operators—gave T-Mobile sufficient spectrum and cash to compete vigorously. Massive investment by Softbank in Sprint followed as the industry became more competitive. The resulting 4-firm competition pushed all carriers to invest heavily in their networks and to lower prices aggressively, to the benefit of consumers.

With further consolidation, we can expect history to repeat itself. The combination of T-Mobile and Sprint creates a dangerously high level of concentration, and DISH faces the challenge of simultaneously building a state-of-the-art network while attracting customers already locked in to rival networks through equipment and long-term contracts. With three national carriers dominating the market, each has significantly less incentive to compete on either price or quality of service. To the contrary, each can hope to increase profit more by cutting capital expenditure on upgrades than by investing in expensive 5G deployment, particularly outside the most profitable markets. Should the market consolidate even further, we should expect increases in prices and decline in investment to increase dramatically.

We should expect this to impact rural areas the hardest. Rural areas already face the challenge of being more expensive to serve due to the lower population density. In addition, because rural areas generally have lower average income than urban areas, customers in rural areas tend to generate lower revenue than customers in urban areas. What drives carriers to compete in these areas—to the extent they do—is competition. Intense competition in urban areas forces carriers to expand into more rural areas in search of new customers. As competitive pressures drop, this incentive weakens. Even where carriers do expand into rural areas, the impact of higher cost and lower quality of service from consolidation disproportionately hurts rural areas due to the existing challenges of higher cost of deployment.

*Question 2.* As a strong supporter of a free and open internet, I was extremely disappointed to see the FCC’s elimination of net neutrality rules go into effect last year, especially after the bipartisan vote in the Senate to maintain those rules. I have cosponsored legislation to restore net neutrality rules and keep the Internet free and open for all Americans. Can you speak to how the FCC’s repeal of net neu-

trality protections has impacted consumers' ability to benefit from advancements in our communications networks?

Answer. The repeal of Title II and elimination of net neutrality negatively impact consumers in two ways. First, the loss of the net neutrality rules and replacement of the previous strong transparency rules with weaker rules has already had deleterious effects on wireless users—including public safety users. The weaker transparency rules allow wireless carriers to sell “unlimited” service with significant bandwidth caps.<sup>1</sup> This included throttling the Santa Clara fire department during the 2018 wildfires. Wireless ISPs have discriminated against specific streaming services, degraded video traffic from rival services, and blocked other rival services such as Skype. At other times, wireless carriers have charged additional fees for HD and 4K streaming.<sup>2</sup> We can expect similar forms of price gouging, traffic discrimination and throttling to occur on 5G networks, depriving consumers of the two most significant advantages of 5G—faster speeds and lower latency. At the same time, this will discourage innovation designed to take advantage of the faster speeds and low-latency offered by 5G. The absence of net neutrality will reverse the previous virtuous cycle to become a vicious cycle where consumers will pay more and receive less.

In addition, the loss of Title II protections will continue to perpetuate and exacerbate the digital divide, and leave consumers helpless against high prices and consumer rip offs outside of the world of net neutrality. Title II provides the source of authority for the FCC's existing “truth in billing” laws applicable to traditional phone service. Title II classification of broadband would also make broadband eligible for coverage under the Universal Service Fund (USF) contribution rules and place existing broadband eligibility of Lifeline on solid legal footing. Indeed, in *Mozilla v. FCC*, the D.C. Circuit remanded the FCC's classification of Broadband as Title I on the grounds that the FCC failed to properly consider the impact of its decision on Lifeline and other USF programs.

In short, the continued classification of broadband as a Title I information service and the elimination of net neutrality deprive consumers of access to services designed to take advantage of the higher speeds and lower latency of 5G, reducing incentive of consumers to adopt 5G. The absence of net neutrality and Title II authority retards the deployment of 5G, particularly in rural areas. It leaves consumers vulnerable to price gouging and other consumer harms, such as the misuse of their real-time location data and other sensitive personal information. Reclassification of broadband as Title II, and restoration of the 2015 net neutrality rules, would provide much needed consumer protections, enhance 5G deployment, and spur greater innovation on 5G networks when deployed.

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RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. KYRSTEN SINEMA TO  
SHIRLEY BLOOMFIELD

*Question.* According to the FCC, only 65 percent of Americans living in rural areas have access to broadband. Further, the May 2019 FCC Report on Broadband Deployment in Indian Country noted approximately 47 percent of houses on rural Tribal lands have access to broadband.

As we discuss 5G deployment, it is critical that we not forget to provide basic broadband access to all Arizonans in urban, rural, and tribal areas.

How do we continue the conversation around 5G deployment while simultaneously working to ensure that underserved and unserved communities have access to reliable connectivity?

Answer. 5G offers great capabilities and promise to help us realize higher broadband speeds across the nation, including for millions of Americans who live in the most rural and remote parts of our country. Next-generation wireless connectivity will be an important tool for reaching consumers and businesses in some rural areas, and certainly for delivering higher mobile speeds in urban areas. In practice,

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<sup>1</sup>For this example and others cited, see generally, Lindsay Stern, “Broadband Providers Are Quietly Taking Advantage of an Internet Without Net Neutrality Protections,” Public Knowledge Blog (January 29, 2019). Available at: <https://www.publicknowledge.org/blog/broadband-providers-are-quietly-taking-advantage-of-an-internet-without-net-neutrality-protections/> and Lindsay Stern, “Two Years Later, Broadband Providers Are Still Quietly Taking Advantage of an Internet Without Net Neutrality Protections,” Public Knowledge Blog (December 10, 2019). Available at: <https://www.publicknowledge.org/blog/two-years-later-broadband-providers-are-still-taking-advantage-of-an-internet-without-net-neutrality-protections/>.

<sup>2</sup>Guile Conencia, “Would You Pay an Extra \$10 to Stream 4K Service on Your Verizon Device,” Wirefly (October 25, 2017). Available at: <https://www.wirefly.com/blog/news/would-you-pay-extra-10-stream-4k-video-your-verizon-device>.

however, promised speeds won't be realized without a significant investment in fiber backhaul.

The possibilities of 5G are realized in part by placing fiber-connected radio equipment and antennas very close to the customer. Practically speaking, reaching rural Americans with 5G will require a fiber deployment to nearly every rural location to make 5G technology work as it does in urban areas. That fiber backhaul does not currently exist in many rural areas and on Tribal lands, which makes 5G technology particularly impractical and expensive for rural America.

For the preceding reasons, at this time, 5G-enabled mobile services must be a complement to robust wired broadband technologies rather than a replacement for them. Whether fixed or mobile, wireless service must be supported by a robust fiber-optic backbone to be truly successful in hard-to-serve parts of our country and to keep pace with consumer demand.

Additionally, ongoing support for the High-Cost Universal Service Fund is critical to making a business case for rural broadband. The High-Cost program supports the fixed rural broadband networks that play an essential role in the provision of mobile wireless service. Wireless needs wires, and 5G will require a fiber backbone. Well-designed Federal permitting processes and addressing railroad right-of-way issues will also help speed broadband deployments and will go a long way toward helping providers shift costs from obtaining approvals to investing in networks.

