

**CONNECTING WORKERS AND COMMUNITIES:
PREPARING AND SUPPORTING THE
BROADBAND WORKFORCE**

HEARING
BEFORE THE
SUBCOMMITTEE ON EMPLOYMENT AND WORKPLACE
SAFETY
OF THE
COMMITTEE ON HEALTH, EDUCATION,
LABOR, AND PENSIONS
UNITED STATES SENATE
ONE HUNDRED SEVENTEENTH CONGRESS
SECOND SESSION
ON
EXAMINING CONNECTING WORKERS AND COMMUNITIES, FOCUSING ON
PREPARING AND SUPPORTING THE BROADBAND WORKFORCE

MAY 3, 2022

Printed for the use of the Committee on Health, Education, Labor, and Pensions



U.S. GOVERNMENT PUBLISHING OFFICE

48-907 PDF

WASHINGTON : 2023

Available via the World Wide Web: <http://www.govinfo.gov>

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**CONNECTING WORKERS AND COMMUNITIES:
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BROADBAND WORKFORCE**

Tuesday, May 3, 2022,,

U.S. SENATE,
SUBCOMMITTEE ON EMPLOYMENT AND
WORKPLACE SAFETY,
COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS,
Washington, DC.

The Subcommittee met, pursuant to notice, at 9:35 a.m., in room 430, Dirksen Senate Office Building, Hon. John Hickenlooper, Chairman of the Subcommittee, presiding.

Present: Senators Hickenlooper [presiding], Rosen, Smith, and Braun.

OPENING STATEMENT OF SENATOR HICKENLOOPER

Senator HICKENLOOPER. The Subcommittee on Employment and Workplace Safety will come to order. Today, we are discussing the broadband workforce, specifically how we can recruit and support workers to help build the broadband infrastructure of the future.

Ranking Member Braun and I will each have an opening statement, then we will introduce the witnesses. After the witnesses give their testimony, Senators will each have 5 minutes for a round of questions.

While we are unable to have the hearing fully open to the public or media for in-person attendance, a live video is available on our Committee website help.senate.gov. We are at a critical time in our quest to expand access to high speed broadband internet to literally every American. We are at a critical time in our quest to implement our bipartisan infrastructure bill, now law, and this is going to be a historic investment in our national connectivity and will provide the resources and the tools necessary to get us where we need to go.

But we can't fully achieve these goals if we do not have a skilled, well-trained workforce ready to deploy broadband across the country. And we know that we don't have enough broadband workers now and that has been true well before the infrastructure law was passed. This critical need for skilled laborers, tower climbers, technicians to help build the broadband infrastructure in communities has only gotten worse.

We also know that we have workers who want those jobs and are ready to go through the rigorous on the job training that leads to

fulfilling careers. We are making critical investments in getting high speed internet to more Americans. We also need to be making critical investments in our workers, and in the successful programs that give them the skills to succeed.

I am delighted to welcome our excellent witness panel who are working to identify current gaps and help create a pipeline of good jobs that will take us into the future. We can work with high schools to strengthen STEM education, educate counselors about the proven benefits of apprenticeship programs. Help remove or at least diminish the stigma that goes when kids don't go on to college. We can help workers, whether current telecommunications professionals or those looking for change.

We could help them to upskill and reskill, to specialize in broadband technology. And we can help programs like Dan's to recruit not only workers, but employers looking to hire apprentices. I think it is moments like these when we know we are on the cusp of something big, of something that we have been referring to as the great transition.

The careers of the future are being built right now, and we need to seize the moment to create the appropriate promising pathways for workers of all ages so that every person in the future will have a fair shot at creating their version of the American dream and be part of what we are all trying to build for our Country.

This effort is so important. I look forward to hearing from all of our testimony from the witnesses today about how we can make—how we can create a plan and then make progress in the weeks and years ahead. Before we start, I want to ask unanimous consent to enter two letters into the hearing record from the Wireless Infrastructure Association and the Independent Electrical Contractors. Any objections? Hearing none, then so entered.

[The following information can be found on page 44 and 46 in Additional Material.]

Senator HICKENLOOPER. I would like to welcome today's witness panel. Dan Hendricks, Director of the Denver Joint Electrical Apprenticeship and Western Colorado Electrical Joint Apprenticeship. These are programs in Denver and in Colorado—in Grand Junction, in Colorado.

Then Dr. Nicol Turner Lee, Senior Fellow in Governance Studies, Director of the Center for Technology and Innovation at the Brookings Institute—Institution. And now, I would like to turn it over to Ranking Member Braun to say a few remarks and to introduce Mr. Gillum and Mr. Holcomb.

OPENING STATEMENT OF SENATOR BRAUN

Senator BRAUN. Thank you, Senator Hickenlooper. This is an interesting discussion because we are two of the rare Senators that have actually spent a lot of our career, mine mostly, in running a business. John as well has done that, and he knows what workforce is about. When I travel the state, and I visit all 92 counties every year, it is one of the fun parts of the job, workforce, workforce, workforce. And then when you don't hear that, it is rural broadband and, or affordable housing.

It is interesting that across my state and I think probably across most states, a common theme. You look at Purdue University found over 56 percent of rural residents aren't happy with their internet service. I can attest to it. I think it was over the Thanksgiving break, I was real happy to have the whole family together and we were going to download a movie. Well, that was my job.

I started it when I thought it would take maybe a few minutes of delay. And I think it was it was either Friday or Saturday evening. Well, the end result was we couldn't download it. The kids were all gone. And I think the movie came up on Monday. That is how bad internet is in many places. We have spent a decent amount of money on it. I am happy to say that in our own state we have raised it as a priority. Did a matching grant. I think put over \$250 million out there. Telecom and REMCs are running with it.

That is the kind of entrepreneurship I think we need, but it is not going to probably be enough. You are not going to get young families, you are not going to get people to start businesses in a place that has internet service like I just described.

Ironically, I am just a mile North of my hometown that I grew up in that is now a giga city. Well, you probably if you were going to err on the side of maybe wanting to run a business out of your home in the country or start one there, you would have to make the decision, maybe to move in town, so that is not good.

How do we solve it? I think a lot of it has to do with, I was on our education committee back in Indiana as a state legislator for 1 year, and I remember raising my voice that we need to look at workforce training, career and technical education to be an equal offering to kids as they go from middle school to high school. Made calls into my own school districts. Some of that work was even being stigmatized.

Not everyone is going to end up being an astronaut or a heart surgeon. And we need to make sure now that parents have had a graduate or two—since 50 percent of those that pursue a 4-year degree don't make it to the finish line, have debt and time lost.

Another third end up getting a degree that does not have a market. For us to staff the needs of telecom, the needs of rural broadband, the things that we need to do, they require better high school curriculum, and I think we are getting there. As I visit states or counties across the State of Indiana, especially rural schools are taking that to heart.

K through 12 education, especially middle school, is where it needs to start. Parents need to be involved. Maybe we can get them two jobs that average out there with that basic training coming out of high school, a little bit of polishing up, \$77,000 plus. That is far better than many 4 year degrees pay, and you have got the certainty of a job to boot.

I introduced the Freedom to Invest in Tomorrow's Workforce Act with Senator Klobuchar that would give the freedom to use 529 savings accounts to cover the cost of high quality workforce training, or maybe a certificate. Congress should also add flexibility to Pell Grants. When you do that, you get rid of the stigmatizing that

a lot of times happens from higher education and the institution of education. So a lot of things play into this. I feel confident that probably the solution will come from the bottom up, the grassroots. I see it happening across school districts.

I see states taking the bull by the horn. We at the Federal level need to make sure that where we can, we enable, and we don't impede progress. It is a big need, and I am glad we are addressing it today. I will introduce two witnesses from Indiana. Brent Gillum. He is the President and CEO of LightStream headquartered in Buffalo, Indiana. I think that is up in White County. Actually had a customer up there when I ran my own business.

That is why I knew where Buffalo was. Brent was raised in rural Indiana, and after leaving the military in 2000, he started with LightStream in 2007, became its President and CEO in 2017. He is passionate for rural broadband and sits on the Political Action Committee for NTCA, the Rural Broadband Association, as well as the Board of Directors for the Indiana Rural Broadband Association and White County Economic Development.

Ron Holcomb is the President and CEO of Tipmont REMC/Wintek. Ron joined Tipmont REMC as CEO in the summer of 2013. He has led three utilities as CEO and provides management consulting to utilities across the country.

Ron is a 30 year veteran of the electric utility industry with experience in power supply, advanced grid technologies, essential service operations, economic development, and value driven growth initiatives for combined electric and telecommunication utilities. Thank you all for being here today.

Senator HICKENLOOPER. Great. Thank you, Senator Braun. So we will now have each of you speak for 5 minutes, hopefully. Try to—and the best advice I can give anybody in these hearings is as always try to keep your answers as concise as possible, because that allows us to get more questions in, which usually almost always leads to more robust discussion. So I would just start from the left. Mr. Gillum, why don't you go ahead first and give us your opening remarks.

**STATEMENT OF BRENT GILLUM, PRESIDENT AND CEO,
LIGHTSTREAM, BUFFALO, IN**

Mr. GILLUM. Okay, thank you. Chairman Hickenlooper, Ranking Member Braun, and Members of the Subcommittee, thank you for the opportunity to testify about workforce development in the telecommunications industry. I am Brent Gillum, President and CEO of LightStream, a small rural broadband and voice provider based in Buffalo, Indiana.

LightStream first began providing telephone service in 1956 as Polaski White Rural Telephone Cooperative and is now a fiber based gigabit internet and telecommunications provider serving many parts of Northern Indiana.

My remarks today are on behalf of LightStream with input from NTCA, the Rural Broadband Association, which represents LightStream and approximately 850 other rural community based carriers that offer advanced communications services throughout the most sparsely populated areas of the Nation.

The landscape of LightStream is 168 square miles of mostly flat farmland with several interwoven rivers, lakes, and streams. 90 percent of the serving area is original cooperative, averaging 25 premises passed per square mile. 10 percent of the serving area is a competitive environment, averaging 310 premises passed per square mile.

Since 2010, LightStream has constructed 28 percent of our serving area with a worldwide—a world class fiber network. The remaining 72 percent is under construction now and will be complete no later than 2023.

A reflection of our efforts, LightStream was awarded one of four providers by NTCA in 2021 as a Smart Rural Community Showcase Award winner. Access to broadband is the backbone of a 21st century economy and deploying networks capable of delivering this vital service to every American household has become a national priority.

This hearing comes at a time when Congress and the Administration are working toward implementation of the landmark bipartisan Infrastructure Investment and Jobs Act, which, among other things, created the \$42.5 billion Broadband Equity access and Deployment Program within the National Telecommunications and Information Administration.

Through this program and other Federal and state efforts like it, millions of Americans stand poised to gain connectivity for the first time, while others will see necessary upgrades made to their networks in order to keep pace with the ever increasing customer bandwidth needs. However, the increased demand for skilled telecommunication workforce comes at a time of an already limited labor market in every state around the country.

This requires us, as a matter of national policy, to have a strategic approach to meet workforce needs for broadband network infrastructure deployment, programming and systems management, network maintenance, Internet of Things, and cybersecurity among other supported positions.

Just as with broadband deployment, no single mode can provide a one size fits all solution to solving workforce shortages. In partnership with Congress, state and local governments, educational institutions, and others, we can develop a skilled telecommunication workforce with the help of providers of all sizes deployed—to deploy robust networks and help keep them resilient and more secure.

We can achieve this goal by one, understanding the workforce needs by quantifying vacancies and project projected demand. Two, addressing barriers to telecommunication job pathways, particularly access to educational or training facilities in rural communities.

Three, creating a workforce development opportunity in secondary and post-secondary schools by developing a new and leveraging existing curriculum, STEM programs, apprenticeships, and online learning.

Four, forging local partnerships with industry, Government, educational institutions, and other economic development organiza-

tions. Community based providers like LightStream are deeply committed to the customers we serve. Given our experience and success in serving the most rural areas, we are one of the critical components of any strategic—any strategy seeking to achieve the national broadband workforce goals.

We look forward to working with the policymakers and other stakeholders to build a strong telecommunications workforce so we can ensure that all Americans have access to affordable, reliable connectivity. Thank you.

[The prepared statement of Mr. Gillum follows:]

PREPARED STATEMENT OF BRENT GILLUM

Chairman Hickenlooper, Ranking Member Braun, and Members of the Subcommittee, thank you for this opportunity to testify about workforce development in the telecommunications industry. I am Brent Gillum, President and CEO of LightStream, a small rural broadband and voice provider based in Buffalo, Indiana. LightStream, which began as the Pulaski White Telephone Cooperative, first began providing telephone service in 1956 and now provides fiber-based gigabit internet and telecommunications services to many parts of northern Indiana.

My remarks today are on behalf of LightStream, with input from NTCA—The Rural Broadband Association, which represents LightStream and approximately 850 other rural community-based carriers that offer advanced communications services throughout the most sparsely populated areas of the Nation. These cooperatives and small commercial companies serve the most rural parts of the United States, reaching areas that contain less than 5 percent of the U.S. population, but which are spread across nearly one third of the U.S. landmass. To give a further sense of the rural nature of this terrain, the average density of an NTCA member serving area is roughly seven subscribers per square mile.

The landscape of LightStream is 168 square miles of mostly flat farmland with several interwoven rivers, lakes, and streams. 90 percent of the service area is the original cooperative that averages 25 premises passed per square mile. 10 percent of the service area is a competitive environment that averages 310 premises passed per square mile.

LightStream began constructing a fiber network in 2010 that started with connecting two hospitals for improved healthcare in our communities. Since then, we have worked strategically on building a fiber network that reaches across our entire serving area. Through 2021, we've completed 50 square miles with 271 miles of fiber that passes 5,500 addresses. We have a remaining 120 square miles to complete at an estimated 357 miles of fiber that will pass nearly 4,000 addresses.

As a reflection of our efforts, LightStream was awarded as one of four providers by NTCA in 2021 as a Smart Rural Community Showcase Award winner. NTCA's SRC program is a network of communities supported by providers who are committed to creating opportunities in their communities through high-quality broadband service. Showcase Awards are given to those SRC members that best exemplify the program's goal of driving growth in rural communities. Because of access to gigabit speed internet, our rural area benefits from opportunities in education, healthcare, development, and more.

Overview

Access to broadband is the backbone of the 21st Century economy, and deploying networks capable of delivering this vital service to every American household has become a national priority. To do so, however, the telecommunications industry urgently needs an expanded trained workforce so that the United States can remain competitive in the ever-expanding range of sectors that rely on advanced broadband services. This requires us, as a matter of national policy, to have a strategic approach to meet workforce needs for broadband network infrastructure deployment, programming and system management, network maintenance, Internet of Things (IoT), and cybersecurity, among other supporting positions.

Yet, at a time of historic commitment by Congress and the administration to expanding broadband resources, our Nation faces historic labor shortages across numerous sectors. The telecommunications industry is no different in this regard and faces additional challenges as industry experts expect additional impending vacancies due to retirements to exacerbate shortages.

LightStream has experienced substantial changes in personnel over the past 3 years resulting in a more inexperienced staff. We have added more employees to help with the construction of our network, as well as utilize more contractors and subcontractors. There is more work than available staff.

We applaud Congress and the administration for passing and signing into law the bipartisan Infrastructure Investment and Jobs Act (IIJA), which among other things created the \$42.5 billion Broadband Equity, Access, and Deployment Program within the National Telecommunications and Information Administration (NTIA). Through this program and other Federal and state efforts like it, millions of Americans stand poised to gain connectivity for the first time, while others will see necessary upgrades made to their networks in order to keep pace with ever-increasing consumer bandwidth needs. These investments will greatly improve the delivery of telemedicine, virtual education, advanced agriculture technology, security, and businesses alike. However, the increased demand for a skilled telecommunications workforce comes at a time of already limited labor market in every state around the country. In short, the ultimate success of these efforts to expand the availability of broadband will turn substantially on ensuring skilled workers and sufficient supplies are available to build these networks.

A concerted effort by industry, government, and educational interests will be needed to develop a skilled workforce able to meet this challenge and fulfill this national mission by deploying next generation wired and wireless networks. To develop the telecommunications jobs needed in the short-term and mid-term, Congress could help by bolstering the capabilities of post-secondary education, including 2-year and 4-year colleges, and other institutions and providing support for employers to expand registered apprenticeships and associated technical instruction and certification costs. As a long-term matter, efforts to engage students at the secondary level will be important, as well.

Understanding Workforce Shortages

Identify Demand

While workforce shortages in the telecommunications industry are well documented, it is important to note labor shortages in construction and technicians are compounded by workforce constraints that affect vendors that supply telecommunications equipment, contributing to larger supply chain issues. And, once a network is built, broadband providers need a strong and stable workforce to manage and maintain that network, including cybersecurity specialists, computer specialists, and electrical power line installers. It is necessary for a coordinated effort between Federal, state, and local governments, the telecommunications industry, and educators to quantify the demand in order to train a new workforce to keep track with the Nation's deployment goals and for providers to be able to meet program requirements.

We welcomed the IIJA's inclusion of a provision to direct the Federal Communications Commission (FCC) and the Department of Labor to establish an interagency working group, which includes NTIA and the Department of Education, to prepare a report to Congress recommending steps to take to address the workforce needs of the telecommunications industry by January 14, 2023. While the interagency working group continues its work, we hope a goal of the group is to quantify these shortfalls in order to effectively and efficiently close the gap.

Overcome Barriers

For many prospective telecom industry workers, a first step is access to local or regional schools that offer the right training and education for telecommunications professionals. Even where distance education can supplement classroom instruction, prospective workers in telecom need tactile, hands-on experience in supervised field or lab settings to acquire the skills needed to deploy and maintain the physical network plant facilities. Preceding all of this, however, is a need to enlighten students to the broadening career paths that are available in the telecom industry and establishing the educational structures in which students can gain access to the education and training necessary to pursue them. This can help resolve issues of prospective students or workers who may be unfamiliar with the telecommunications sector and its career opportunities, and so may not seek a path to the industry.

LightStream has explored skilled workers for several years with little success. The closest post graduate school with a specific telecommunications program is a trade school located more than 3 hours from our headquarters. To help gain interest, we started a scholarship offering in 2020 that has yet to receive an applicant.

Additional resources for these programs would be instrumental to companies like LightStream that serve rural America.

Moreover, attracting workers to live and work in rural or remote areas poses its own challenges. Rural providers are committed to “growing their own” and encouraging local talent to stay. Locally based workers who live in the communities they serve ensures rapid responses to service disruptions. Broadband operators and their customers want to be sure that technicians are available and do not need to travel long distances before work on the network can begin. This is necessary to ensure that customers do not experience inconvenient service disruptions that can affect everything from work, to healthcare, to educational endeavors.

Creating Development Opportunities

Exposing students to telecommunications job pathways at an earlier point in their education could increase interest in the profession, starting in middle school and continuing through high school. We could do this by leveraging existing STEM programs. For high school students specifically, including an emphasis on these jobs through electives, advanced placements courses, and post-secondary education opportunities will help to build a strong, resilient workforce for the industry while also minimizing the amount of debt students may need to take on to further their education.

Other measures Congress may consider would be to promote the “learn and earn” model, whether through paid apprenticeships or internships. The Federal Government can assist in supporting such programs or individual students in seeking these training programs. It could also look to support individual state efforts, like those with reimbursement programs for employers who pay for their employees to further their trade by being reskilled or upskilled.

Last, taking lessons learned from the last couple years where millions of Americans have worked and learned from home, educators should consider a coordinated remote or a hybrid-learning model to further extend opportunities to students who may not be able to relocate due to a limited income or a desire to remain in their communities while they further their education. Additionally, an all-remote option may be well-suited for professionals looking to complement current skills, especially those living in rural communities without access to a local trade school, community college, or other accredited training and certificate programs. These virtual classroom experiences will often require some complementary hands-on experience that can be provided through apprenticeship or internship opportunities, or lab work. Nonetheless, making higher education more accessible to everyone through online learning where appropriate may help to bolster the telecommunications workforce, especially in rural areas.

Establishing a Workforce Development Plan

Forging Partnerships

We need like-minded organizations to promote and facilitate training and employment opportunities within the skilled trades of the telecom industry. In addition to government partners, educational institutions, and telecommunications providers and the greater industry, opportunities with state and local development offices or non-governmental organizations should not be overlooked in the larger strategy to meet workforce needs. These organizations could provide additional support, such as tuition relief or stipends for students training for jobs within the telecommunications industry. Furthermore, educational programming should look to incorporate industry professionals in teaching coursework or developing curricula. It is often the first-hand experience that proves most valuable once in the field, especially, if those students are paired with a career professional who has spent decades learning the trade.

Finally, we should be creative in meeting students and prospective workers where they are and creating the pathways necessary to bring them into rewarding careers in the telecom industry. It is those principles that many successful programs already in place across the country use to address workforce needs, and these should be viewed as a model for expanded efforts. By way of example, a group of local rural providers in Kansas took note of student preferences to enjoy traditional 4-year college experiences, such as sports and access to campus amenities. That group of rural broadband providers worked with a local technical school to provide students at the 2-year school with campus ID and access to services at a nearby 4-year college. And, at the same time, those providers identified promising students and offered support for tuition and book fees. Partnerships like these can be expanded and can include

partnerships among government and non-governmental parties. Another example is a not-for-profit development organization in Vermont that has explored stipends for students transitioning from an existing job to the telecom industry. These stipends are intended to ensure that students training for telecom positions do not suffer a wage gap if they need to reduce work hours in order to attend school.

While no single model can provide a “one size fits all solution,” the rural broadband industry has taken positive steps to formulating a menu of possibilities. As Congress considers funding programs to bolster a telecommunications workforce, it should allow for flexible program funding in order to accommodate innovative models that safely and effectively fill workforce needs. It is through this increased coordination and support from Federal, state and local sectors that we can develop these programs and, in turn, create a robust, energized and motivated workforce. And, along with it, the many industries that will improve and thrive with broadband connectivity.

Conclusion

The telecommunications industry has documented great workforce needs across the industry from network construction and maintenance to cybersecurity. In partnership with Congress, state and local governments, educational institutions, and others, we can develop a skilled telecommunications workforce to help providers of all sizes deploy robust networks and help to keep them resilient and more secure. We can achieve that goal by (1) understanding workforce needs by quantifying vacancies and projected demand; (2) addressing barriers to telecommunications job pathways, particularly access to educational or training facilities in rural communities; (3) creating workforce development opportunities in secondary and post-secondary schools by developing new and leveraging existing curricula, STEM programs, apprenticeships, and online learning; and (4) forging local partnerships with industry, governments, educational institutions, and other development organizations.

Community-based providers like LightStream are deeply committed to the customers we serve and, given our experience and success in serving the most rural areas, we are critical components of any strategy seeking to achieve the Nation’s broadband workforce goals. We look forward to working with policymakers and other stakeholders to build a strong telecommunications workforce so we can ensure that all Americans have access to affordable and reliable connectivity.

Senator HICKENLOOPER. Thank you very much. Appreciate your taking the time and coming here to testify. Now, we will go just in alphabetic order. Mr. Hendricks?

STATEMENT OF DAN HENDRICKS, DIRECTOR, DENVER JOINT ELECTRICAL APPRENTICESHIP AND WESTERN COLORADO ELECTRICAL JOINT APPRENTICESHIP, DENVER, CO

Mr. HENDRICKS. Thank you, Senator. My name is Dan Hendricks, Training Director for the Denver Joint Electrical Apprenticeship and the Western Colorado Joint Electrical Apprenticeship. I am also a master electrician in the State of Colorado. I started my electrical training in the U.S. Navy. This was a great start to my career, but for many people, this is not an option.

I want to talk to you today about a nearly unknown option that is available. There is no better way to learn a skilled trade than in a registered apprenticeship, and millions of people barely know they exist. Last year, our apprenticeship started a trades program in partnership with Sheridan High School. There, a high school senior named Tyson heard about apprenticeships for the first time.

Tyson is now working in the field, and in a few years will be a highly skilled craftsman. We need more Tysons. Thousands more, across the country. Our apprentices receive thousands of hours of on the job training, coupled with hundreds of hours of related in-

struction before they can be considered journey workers. Both aspects are vital, and the interaction of the two are what makes an apprenticeship unique.

The contractors who provide the on the job training opportunities for our apprenticeships know this system works. They know when they request an apprentice from the apprenticeship, they can count on getting a quality worker, a worker whose training they had a part in crafting, even if that person has never worked for them. Any contractor, regardless of size or contribution level, has access to highly trained apprentices.

In many cases, the apprenticeship can provide training a small, disadvantaged contractor could not afford. In the construction industry, it is very hard for contractors to make an investment in the future. All are operating on a very thin profit margin. However, the contractors that support my apprenticeships have made that investment. They know if you want journey workers now, you needed to invest in apprentices 4 years ago.

We find ourselves in the situation we are in due to our society deciding investments in teaching the skilled trades weren't profitable. Can you imagine a citizen of the United States not knowing you could go to college? It is unthinkable. Yet, I speak to people all the time who don't know apprenticeships still exist.

Here you have a program where you learn a trade, earn a wage, gain benefits, and work toward a lifelong career all at the same time, all without needing to go into debt, and people don't know it exists. Our apprenticeship spends a great deal of time attending high school job fairs and going to community centers and workforce events, all in hopes of recruiting applicants to our program. Invariably, each interaction starts with an explanation of what an apprenticeship is.

Our apprenticeship is currently under capacity. We have room for 600 apprentices. We have 360. Only 10 of those are apprentice technicians specifically trained in this broadband arena. We could have 60 future journeyman technicians training right now. I am sure the country could use an extra 50 technicians trained in fiber optics splicing, distributed antenna systems, or building and maintaining microwave towers.

We have so few because we don't have the jobs to put them on to support and reinforce the training they would receive in the classroom. Projects that demand registered apprenticeship utilization are an investment in the future journey workers we all know we need.

Finally, not only are journey workers needed for their skills on the job, but they are also needed to teach the next generation of apprentices. We need to incentivize those who have achieved this skill level to stay in the industry. They should receive a sustainable wage anywhere they choose to work. An apprenticeship completion certificate and a journeyman card are portable credentials.

Armed with these and other credentials they receive in the apprenticeship, a journey worker who has completed our program can work anywhere in the country. This makes them valuable as the

skills go with the journey worker wherever they are needed. Thank you.

[The prepared statement of Mr. Hendricks follows:]

PREPARED STATEMENT OF DAN HENDRICKS

I would like to introduce you to a debate that has gone on for years in the Construction Trades Community. The debate centers on the title, Journeyworker. Some will tell you the "journey" portion of the word comes from the French word *Journee'* meaning, day. They were dayworkers or someone who was paid a wage for a day's work. Some will tell you the "journey" portion comes from the act of a craftsman, when they had reached a certain skill level, leaving the home of their teacher and journeying to the next village to set up their own business. In both cases these craftspeople had reached a certain skill level to be able to charge a fee for the work they provided or the things they could build. Regardless of which argument is correct, we need more of these people. More of the people with the skill level to build the projects we need and to command a sustainable wage for doing so.

My name is Dan Hendricks. Training Director for the Denver Joint Electrical Apprenticeship and the Western Colorado Joint Electrical Apprenticeship. I started in the U.S. Navy. I am here today to talk about the period before a person becomes a Journeyworker. I am here to talk about the time and effort it took to learn those skills and the system set up to train Journeyworkers. There is no better way to learn a skilled trade than in a Registered Apprenticeship. Our own apprentices receive thousands of hours of on-the-job training coupled with hundreds of hours of related instruction before they can be considered Journeyworkers. Both aspects are vital and the interaction of the two are what makes an apprenticeship unique. All our apprentices receive an OSHA 10 card at the beginning of their apprenticeship. This means they have received 12 hours of safety training in the classroom. That classroom training is then reinforced on the job. Our trade can be hazardous and this training and the reinforcement of it can and does save lives.

The contractors who provide the on-the-job training opportunities for our apprentices know this system works. They know when they request an apprentice from the apprenticeship, they can count on getting a quality worker. A worker whose training they had a part in crafting even if that person has not worked for them before. Any contractor regardless of size or contribution level has access to highly trained apprentices. The contractors are partners in developing the training the apprenticeship requires. In many cases the apprenticeship can provide training a small, disadvantaged contractor could not afford. Equipment can't be taken out of production for the time it would take to train an apprentice to use it. The apprentice may have however had the opportunity to train with it at the apprenticeship. This makes the apprentice immediately productive. Employers know apprenticeship also leads to greater retention which leads to less retraining. In all it is estimated Registered Apprenticeship returns \$1.46 for every \$1 spent.

In the construction industry it is very hard for contractors to make an investment in the future. All contractors are living on a very thin profit margin. However, the contractors that support my apprenticeships have made that investment. They know if you want Journeyworkers now you needed to invest in apprentices 4 years ago. Tyson. We find ourselves in the situation we are in due to our society deciding investments in teaching the skilled trades weren't profitable. Can you imagine a citizen of the United States not knowing you could go to college, get a degree in a chosen field, and better your life by doing so? It is simply unthinkable. Yet I speak to people all the time who don't know apprenticeships still exist. Here you have a program where you learn a trade, earn a wage, gain benefits and work toward a life-long career all at the same time, all without needing to go into debt, and people don't know it exists. Our apprenticeship spends a great deal of time attending high school job fairs and going to community centers and workforce events all in the hopes of recruiting applicants to our program. Invariably each interaction starts with an explanation of what an apprenticeship is. I spend much of my time at these events talking to the counselors and teachers, so they know enough to explain it to future students or clients. If we want Journeyworkers we need to talk about apprenticeships in the same manner we talk about colleges. It's just a different way to a great career.

Our Apprenticeship is currently under capacity. We have room for 600 apprentices. We have 360. Only ten of those are Apprentice Technicians specifically trained in this broadband arena. We could have 60 future Journeyman Technicians training right now. I am sure the country could use an extra 50 technicians trained in fiber-

optic splicing, distributed antenna systems, or building and maintaining microwave towers. We have so few because we don't have the jobs to put them on to support and reinforce the training they would receive in the classroom.

Regardless of the promise of a great career, if there isn't a paycheck to sustain them while they learn their trade then many people must choose a different path. Projects that demand registered apprenticeship utilization are an investment in the future Journeyworkers we all know we need.

Finally, not only are Journeyworkers needed for their skills on the job, but they are also needed to teach the next generation of apprentices. We need to incentivize those who have achieved this skill level to stay in the industry. They should receive a sustainable wage anywhere they choose to work. An apprenticeship completion certificate and a Journeyman card are portable credentials. Armed with these and the other credentials they receive in the apprenticeship, such as BICSI Installer. A Journeyworker who has completed our program can work anywhere in the country. This makes them incredibly valuable as the knowledge and skills go with the Journeyworker wherever they are needed most.

Senator HICKENLOOPER. Great. Thank you very much. Appreciate it. Again, I know you are as busy as any of us. This young person has to commute 300 miles between his two jobs, his two offices, so thank you for taking the time as well. Mr. Holcomb?

**STATEMENT OF RON HOLCOMB, PRESIDENT AND CEO,
TIPMONT REMC/WINTEK, LINDEN, IN**

Mr. HOLCOMB. Good morning. My name is Ronald Holcomb, and I am the President and CEO of Tipmont/Wintek. Thank you to Senator Braun for the invitation today, Senator Hickenlooper for Chairing the Subcommittee, and all the Members of the Subcommittee for your service.

Tipmont/Wintek is a premier provider of energy and communication services in North Central, Indiana. Founded in 1939, Tipmont is a member owned cooperative providing electric and broadband services to over 28,000 consumers. In 2019, Tipmont acquired Wintek Corporation, a fiber internet services company, to serve as a foundation to build fiber to the home broadband in our electric service area.

The need was great, and our customers overwhelmingly supported the project. Ask my kids who are in their late twenties to choose between an excellent broadband service and a heated home, they will take the internet and wear a coat. That is why in America today, workforce development and broadband development are inextricably linked. It is difficult to have one without the other.

Reliable broadband—without reliable broadband, many people will choose to live elsewhere, especially those with technical skills and interests. In rural America, this is a persistent problem. It starts with our inadequate definition of broadband. In rural America, broadband is usually defined by the technology a carrier can deliver. It should mean a service that meets consumer's needs without limit.

Broadband is a doctor reading radiological studies in real time. It is an entrepreneur with basement servers as a startup. It is a family of four online all at the same time. That broadband was not available to our electric customers, so we chose to provide it. To do so, we have built a broadband workforce, but like many companies, we face challenges to build our team.

Rather than pursue prospective employees with deep experience, we seek motivated people in our own community and invest in their education and development. While this approach is often slower than we may like, it offers stability and strengthens both the company and the community. With broadband career outreach programs, we build tomorrow's team, today, sparking career interest early, creating a culture of industry focused apprenticeships, and building a talent pipeline.

But regardless of how employees join our broadband team, they all agree, if it is not fiber, it is not broadband. We learned this lesson from our customers. Just ask Susan Benedict, a customer with an interior design business. From her back porch, Susan can see Lafayette, Indiana, an area with 200,000 people and Purdue University. But DSL is the only service available to her. Susan's time spent offline when it fails has created a 25 percent loss of her business.

Meanwhile, Dr. Sara Huffer lost access to life saving technology for stroke victims because their home connection was too slow. As COVID-19 hit, we heard from teachers who drove thumb drives to kids without internet access or families who sent their children to live with relatives who had better service.

Rural Americans are used to work arounds because when it comes to comparable infrastructure, they are often left behind. So why is that? For the last few decades, rural broadband policy has applied a private sector business model to a public infrastructure deficiency.

If real broadband were profitable, this model would likely work, but generally it is not profitable. So it is time to admit that our model needs some reform, one that prioritizes human ROI over corporate ROI. For example, at Tipmont, we are committed to world class infrastructure, coupled with an obligation to serve.

That means infrastructure investment returns do not drive infrastructure investment decisions. Everyone has access. And you won't find a better investment than fiber broadband. In 2018, we commissioned to produce a study that found communities and the State of Indiana would receive \$4 of return on every \$1 invested in fiber broadband. If every Indiana co-op built this infrastructure, our collective return would be \$12 billion over 20 years.

We are grateful for the broadband access that support our work for—sorry. We are grateful for the broadband grant program to support our work. Without them, the sustainable business risk would certainly be higher. But as we have learned, these programs have pitfalls, from inconsistent speed requirements to flawed coverage data that prioritizes carriers over consumers.

Despite the challenges posed by grant funding, acquiring a talented workforce, and the many other challenges posed by a project of this scale and scope, it is deeply satisfying to be part of something this meaningful to the people that we serve. Most internet providers on the American Customer Satisfaction Index score are somewhere in the 60's. Tipmont/Wintek is at 85.

The last time I checked that beats Chick-Fil-A. So if only we could have some chicken sandwiches along with our internet pack-

ages. But jokes aside, that score represents years of hard work of dedicated people. We have connected 4,000 customers since 2019, and today we will connect 10 more.

So thank you very much for your indulgence to—because I ran—I did not run overtime. They are mine, so we are good to go.

[The prepared statement of Mr. Holcomb follows:]

PREPARED STATEMENT OF RON HOLCOMB

Good morning. My name is Ron Holcomb, and I am the President and CEO of Tipmont Wintek.

It is an honor to be invited to provide testimony to the U.S. Senate Subcommittee on Employment and Workplace Safety on the subject of the broadband workforce and barriers to broadband expansion.

On behalf of our entire team at Tipmont Wintek, I would like to thank Senator Braun for the invitation to testify, Senator Hickenlooper for Chairing the Subcommittee, and all Members of the Subcommittee for their work to pursue strategic and sustainable solutions on today's topics.

Tipmont Wintek: Empowering People and Communities

First, I would like to offer some background on Tipmont Wintek and our mission.

Tipmont Wintek is a premier regional provider of energy and communication services in north-central Indiana—a team of 110 that is collectively empowering people and communities with state-of-the-art essential services.

Tipmont is a rural electric membership corporation, or REMC, founded in 1939. Today, as a member-owned cooperative governed by a board of directors, our REMC provides electric service to over 25,000 people in eight Indiana counties.

In January 2019, Tipmont acquired Wintek Corporation, a technology company in Lafayette, Indiana, which had provided leading-edge technology solutions for nearly a half-century. In addition to electric service, Tipmont Wintek also builds state-of-the-art, fiber-to-the-home broadband service in the REMC's electric-service area, along with customized business technology solutions.

Workforce Development = Broadband Development

I have been asked here today to discuss workforce development and broadband development. In America today, these are indivisible notions.

If a community wants to attract top talent, it must provide broadband access that is uncomplicated and uncompromised. This expectation is especially true for young workers.

Just ask my kids, who are in their late 20's, what they would do if asked to choose between excellent broadband and heat in their homes. They would take the internet and put on a coat.

If a community lacks fast, reliable and affordable broadband, people will simply choose to live elsewhere. This has been a problem for years in our largely rural service area and in much of rural America.

The Real Definition of Broadband

The problem begins with an inadequate definition of broadband.

In rural America, "broadband" means whatever technology a carrier can deliver. Satellite internet is called broadband. DSL is called broadband. Constrained wireless technology? That is called broadband, too.

What these definitions are missing is whether the service adequately meets a customer's need.

If a doctor needs to read radiological studies from their home in real time, that is broadband. If an entrepreneur needs basement servers for a startup, that is broadband. If a family of four needs to be online all at once, that is broadband.

At Tipmont Wintek, we define broadband as whatever our customers need to pursue their goals.

That level of broadband was not available to them, for reasons I will discuss in a bit, and that is why we made the choice to build a superior broadband option for our service area.

Broadband Workforces Face Unique Challenges

To accomplish our mission, Tipmont Wintek has built a broadband workforce encompassing everyone from high-school graduates to engineers who have master's degrees.

As we built this team, we found a unique catch-22: Inferior broadband in our communities can make it hard to entice the technical professionals and tradespeople we need to build something better.

This is why we must find people inspired to improve the quality of life in the very communities they call home. We are among many businesses today that face challenges in finding these people.

Building and Nurturing a Broadband Workforce

It can be difficult to get any person to apply let alone the right one.

For example: Tipmont Wintek recently opened a position on our construction crew. The requirements were a high-school diploma or equivalent GED, along with a valid driver's license. We spoke with eight candidates on the phone and invited them all for in-person interviews. Only two showed up. Of the other six, one pursued a different opportunity and five never returned our calls about scheduling a follow-up.

As a not-for-profit, we also struggle to compete with wages offered by for-profit companies and contractors, particularly in areas of skilled-trade labor. Escalating wages is a case of supply and-demand imbalance for these skills in the market, which I do not believe will correct anytime soon.

Despite these challenges, Tipmont Wintek has thrived by reframing its approach to talent acquisition. Rather than pursue a "perfect" employee, we prioritize the development of the right people and their potential.

At Tipmont Wintek, we seek proactive problem-solvers with insatiable curiosity—the kind who crave continuous education and diversified responsibilities.

One such person is Peter Burr. A U.S. Army veteran, Peter joined us in 2021 as a Construction Specialist. His work involves outdoor engineering to run fiber along customers' properties to their homes.

Peter had no experience with fiber-optic engineering but excelled at project management. We leveraged that skill and gave Peter plenty of field time with established fiber engineers. He has since taken on responsibility for electrical engineering tasks as well as our co-op's electric solar initiatives. These were new to Peter, too, but we equipped him with classes and external resources that set him up for success.

In Peter's own words: "It has been encouraging to see how Tipmont Wintek develops people within their own organization. I am helping meet the company's long-term goals while directly benefiting from their trust in me to learn and acquire new skill sets."

We also reassessed the education levels of applicants relative to their promise and potential fit with the company.

In the past, many Tipmont Wintek broadband positions required a specialized, 4-year engineering degree. To retain essential expertise, some still do. But for more entry-level positions, we now consider candidates with 2-year degrees in computer-related fields and an eagerness to jump in and learn.

Our local Network Operations Center has become a proving ground through which to develop and diversify the skills and experiences of our broadband workforce. We give our team members meaningful projects in customer service, cybersecurity, system analysis, network engineering, computer programming, and more. It challenges, engages and motivates them while building a clear, comprehensive picture of our broadband mission.

As broadband needs evolve, so will the need to expand activities that develop a strong, engaged broadband workforce. One potential solution may be a state-facilitated broadband apprenticeship program like the Rural Electric Apprenticeship Program (REAP) facilitated by Indiana Electric Cooperatives (IEC). REAP is a 4-year program requiring 612 hours of comprehensive classroom instruction and at least 8,000 hours of on-the-job training. REAP has certainly benefited our co-op, and IEC has discussed a broadband equivalent.

Dustin Manns, one of our electric linemen, says his REAP experience provided him "an opportunity to create professional value and become a better person."

What Dustin says is a crucial notion at the front of our minds as we develop people: We can build all the skills we want, but it will mean nothing if the process does not reflect both a person's career goals and Tipmont Wintek's values of innovation, public service heart, impact, respect and passion.

Of course, finding the right people is half the battle. We must retain them with genuine professional fulfillment. There are many elements to this, but fueling their drive to learn more is chief among them.

That is why Tipmont Wintek prioritizes continuing education and training. That is why we send our broadband team to Cisco to earn the latest top-tier certification on complex network equipment. Helping our IT professionals keep pace with ever-changing technology is especially critical.

Building a broadband workforce has not been without growing pains or a bit of trial and error. But Tipmont Wintek has found a formula that works for our employees and, most of all, for our customers.

Developing Generational Broadband Talent

We also have started building tomorrow's team today.

Generation Z is transforming today's workforce. They want to make the world better, and their values inform their decisions. Deloitte's Global 2021 Millennial and Generation Z Survey showed that, in the last 2 years, 49 percent of those in Generation Z made choices about their work, and their employer, based on alignment with their personal values.

It is our obligation to channel this passion and purpose into fulfilling careers. To that end, Tipmont Wintek has developed numerous broadband career outreach programs that reach a wide continuum of ages.

Sparking Interest at Early Ages

Tipmont Wintek sponsors and participates in both the Next Generation Workforce Expo and the Construction Career & Education (C2E) Expo, which serve eighth graders through 12th graders.

Facilitated by Greater Lafayette Commerce, the Next Generation Workforce Expo features experiential activities that address facets of the manufacturing industry.

Tipmont Wintek's role is to discuss broadband and energy careers as they relate to manufacturing, the importance of broadband access for manufacturers, and the manufacturing industry's essential need for cybersecurity.

At the C2E Expo, which focuses on construction infrastructure, Tipmont Wintek initiates spirited, influential conversations with young people about everything from fiber broadband and electric engineering to careers for those overseeing the fiber installation process.

These expos engage those who may not plan to attend college after high school but want to flourish in meaningful technical careers.

Hands-On Pathways to Broadband IT Careers

Tipmont Wintek is also collaborating with Faith Christian Schools in Lafayette, Indiana, to develop a pathway program in Career Technical Education, or CTE, which will be open to 600-plus students from an eight-county area.

This hands-on, comprehensive CTE curriculum will start in the 2022–23 school year and inspire students to consider a career path in energy or broadband IT.

It will begin with an overview of basics about the energy and broadband fiber services Tipmont Wintek provides. Our professionals will visit classrooms to discuss their experiences with students—helping them envision careers and hear first-hand from those who have thrived. Students can job-shadow our electric engineers, broadband fiber engineers, and others. They will also tour our state-of-the-art data center, which provides technology solutions for hundreds of businesses in Indiana and beyond.

This is a pilot program, but we are confident that we will be able to expand this experience to additional schools in our service area, as well as the Greater Lafayette Career Academy.

Complementing Career Interest with Civic Awareness

As great as it might be for us, we realize not everyone wants to pursue careers in broadband or energy. By participating in a local Junior Achievement Finance

Park, Tipmont Wintek emphasizes the broader civic importance of affordable, reliable and equitable broadband.

At the Finance Park, seventh and eighth graders perform interactive budgeting exercises. We did such things, too, when we were younger. If you had internet in these exercises, it was likely under “leisure” or “entertainment.” Today, broadband access is no less essential than electricity. Our participation in the Finance Park helps young people understand: Equitable broadband access is a lifelong engine that moves everyone down a positive path.

A Pipeline of Phenomenal Talent

We also foster productive partnerships that have brought tremendous talent to our doorstep.

Ivy Tech Community College is a statewide system in Indiana with a large campus in our service area. Tipmont Wintek’s broadband leadership team provides Ivy Tech instructors in the School of Information Technology with practical feedback in the IT field that informs their curriculum.

In return, we gain access to a pool of bright, motivated students whose talent we can develop. Several students through this pipeline have become assets on our broadband team. Among them: David Flint, a U.S. Army veteran who joined us as he pursued his associate degree in Network Infrastructure and is now a Network Engineer; Mallory Herbert, who applies network engineering expertise toward consulting solutions for our business internet customers; and Dylan Popp, who started with us as a Network Technician and, in January, advanced to our team of Network Engineers.

Industry Apprenticeship & Community Partnership

These broadband workforce outreach programs address several goals.

They create a culture of industry-focused apprenticeships. It is Tipmont Wintek’s duty to provide a model for what young people can do with their futures and build relationships to get them there. For example: As we continue to develop these outreach programs, a high-school senior could work beside the professionals who inspired them through a post-graduation internship and then perhaps gain full-time employment with us.

These programs also affirm Tipmont Wintek’s position as a community partner. It is our obligation to invest in a community’s people and prosperity, which includes encouraging our youngest citizens.

Last but certainly not least, these programs can keep Tipmont Wintek’s broadband workforce vital by introducing individuals to exciting combinations of new skills, perspectives, voices and expertise.

Tipmont Wintek’s workforce outreach programs create meaningful outlets that can propel Generation Z, and other world-changing generations to follow, into the broadband workforce.

The Perils of Insufficient Internet

No matter what their generation is, everyone on Tipmont Wintek’s broadband team agrees: If it is not fiber, it is not broadband.

Wireless solutions have a place in select mobile applications and rural research, such as gathering, sending and analyzing agricultural data. Beyond that, it suffers from issues with network capacity, signal interference and dropped connections.

No one can run a successful business off inferior wireless technology. Just ask Susan Benedict, a Tipmont electric cooperative customer who owns an interior design business.

Susan can see the city limits of Lafayette, Indiana, from her back porch. This metro area of 200,000 people is home to Purdue University, a major international research institution. And yet the best anyone would do for Susan’s internet access was a DSL phone line.

DSL struggles with reliability. DSL speeds are generally poor—20 Mbps download and 10 Mbps upload . . . maybe. Susan told us her time spent offline—and in battles with customer support—created a 25 percent loss for her business.

The story of Dr. Sara Huffer, a neurologist who lost access to life-saving technology because of poor internet, is particularly upsetting.

Dr. Huffer’s hospital system received telemedicine equipment that allowed her to assess a stroke patient’s condition as soon as they arrived at the ER. This equip-

ment helped medical professionals more quickly provide clot-busting medication to rural patients who lacked access to specialists. The faster someone gets this medicine, the less likely they are to suffer permanent disability or death.

But Dr. Huffer's hospital had to discontinue this program—largely because her DSL home internet connection was too slow to access it. Now, people in Dr. Huffer's community lose time they do not have when faced with a life-threatening medical emergency.

In the wake of COVID 19, so many across our service area shifted on a dime to online-only interactions. This upended life even for those with reliable broadband access. Those without it faced a full-blown threat to their livelihoods, educational development, and health and wellness.

We heard from teachers who drove all over their district, delivering thumb drives loaded with resources for kids who could not get online. Families sent children to live with relatives who had a more reliable internet connection. Professionals drove to a McDonald's parking lot so they could use free WiFi to connect to work meetings.

These people are used to pulling together solutions. That is because they are used to being left behind.

When you look at the struggles faced by Susan Benedict, Dr. Sara Huffer, and countless families, children, educators, and professionals, you see a rural broadband market in crisis.

You see people who need broadband that meets their needs without compromise.

America's Broadband Policy Does Not Work For Everyone

America's rural broadband market design applies a private-sector business model to a public-infrastructure deficiency. It is time we admit that this is not working.

This policy presumes an open, competitive process in the private sector will provide customers with numerous options for robust service. Although the private sector has its place in broadband policy, its business model relies upon investments that shareholders find acceptable. This model works in sizable towns and cities but rarely in areas with low population density and high fixed costs.

In rural America, the demand for fast, affordable and reliable broadband far exceeds the supply. What little supply there is lacks both an obligation to serve people and robust performance standards as defined by consumers' needs.

In April 2022, the Center for Regional Development at Purdue University published *Home Broadband Survey Results: Connecting Indiana*. This study surveyed more than 16,000 people from 20 counties in mostly rural Indiana and reported the following findings:

- Nearly 30 percent of respondents said they do not have internet service because it is not available to them.
- Nearly half of the people said their internet service was not reliable enough to work from home, which jeopardizes their livelihoods.
- More than 40 percent of respondents had students in their home, ranging from pre-kindergarten all the way to college age. Unreliable internet can cause students to struggle with e-learning, making it difficult to develop necessary skills that lead to successful careers.
- Nearly 10 percent of those surveyed had seniors 65 or older in their home, whose reliance on telehealth and telemedicine is threatened by a lack of reliable internet access.

If rural broadband were profitable, America's broadband policy would suffice. But in most cases, it is not profitable. The results relegate rural America to second-tier status. We must consider alternatives.

Our Calling to Provide Better Broadband

Tipmont Wintek provides security, comfort and convenience through essential services. When it came to fast, reliable and affordable internet, our longtime electric customers lacked all three. That is why we chose to do what no one else would and bring them essential broadband access they deserve.

When Tipmont Wintek builds, we meet everyone's needs through equal access to superior technology. For co-ops like ours, this is simply part of our intrinsic obligation to serve.

Balancing the priorities of people, purpose and a sustainable business model is a hallmark of cooperatives. It transformed electrification in rural America, and we knew we could do the same in the space of rural broadband internet.

There is No Better Broadband Investment Than Fiber

But first, we needed to understand the impact of this investment on the communities we serve.

In 2018, Tipmont commissioned Purdue University to study and calculate the societal economic return of a fiber-broadband investment in the counties we serve. We did this because we measure success both by our own financial health and the prosperity of our customers' communities.

The study found that for every dollar Tipmont invested in fiber-optic broadband technology for a community, that community and the State of Indiana would receive \$4 in return benefits. These returns came through tax revenue, telemedicine, K-12 and adult education, consumer savings, farm income, and multiplier impacts.

In expanding this study to cover the territory of all Indiana electric co-ops, the result was staggering. If every co-op in Indiana built broadband, the statewide net present value benefit of that investment would be \$12 billion over 20 years.

Tipmont Wintek launched its broadband project without capital support, but we estimated that a 20 percent capital contribution could significantly increase sustainability and reduce project risk. In other words: That capital support would have made our decision much easier.

Bridging this capital gap triggers a project launch. Therefore, broadband grant funding is of utmost importance. But what return does the taxpayer see once Federal or state grants enter the picture?

Consider the Tipmont Wintek case. Per the 2018 study, a \$1 investment in broadband yields a societal economic return of \$4. Now, factor in a 20 percent grant capital contribution. A utility like Tipmont Wintek then contributes 80 cents of every investment dollar while Federal or state grant programs contribute 20 cents.

Taxpayers put in 20 cents and get \$4 back. That is a 20 to 1 return. Investments in America do not get better than that.

Pitfalls of the Grant Funding Process

Capital support from grant funding has been pivotal to Tipmont Wintek's fiber build. We are grateful to have received over \$20 million in funding from the State of Indiana and \$1 million in Federal funding.

However, there are areas of concern we discovered in the process.

1. Unreliable Self-Reporting of Coverage

At all government levels, broadband grant programs too often rely on outdated or inaccurate data to determine an applicant's eligibility.

For example: Service coverage data provided by the Federal Communications Commission (FCC) for use in Federal and state grant programs came from internet service providers (ISPs) that self-reported.

Unsurprisingly, these ISPs overstated their service coverage. For example: If an ISP served just one customer, often a business, it could mark an entire census block as "served."

Allowing any broadband provider to self-report broadband coverage and quality as a barometer for grant funding is like asking the fox to count the hens. It does not make sense and often denies people equitable access.

2. Disingenuous Application Challenges

Many broadband providers then used this unreliable data and overstated coverage as a basis to challenge grant applications from competing providers (who often offer superior service).

For example: In Round 2 of the State of Indiana's Next Level Connections (NLC) Broadband Grant Program, other ISPs successfully challenged 371 of Tipmont Wintek's census block applications—claiming they already received Federal funding to provide coverage in that census block.

Even if the providers who issued these challenges met Federal grant program requirements, there was no transparency as to what they intended to build or how long it would take them.

This is an inordinate amount of effort expended on blocking competition rather than serving customers in need.

Thankfully, the FCC recently has announced a new coverage verification process, with new maps scheduled for fall 2022. These maps will hopefully be based on efforts to gather accurate data from everyday Americans' self-provided speed tests rather than data reported by carriers.

I cannot overstate the importance of accurate coverage data to address rural broadband inequity, and I appreciate the efforts undertaken to obtain actual data.

Ideas to Improve Federal Broadband Grant Processes

While we appreciate any grant program advancing equitable broadband access, Tipmont Wintek has found state programs more successful than Federal programs in helping address a rural digital divide.

Here are key reasons and rationales as to why.

1. The application process for state programs is less prohibitive and cumbersome.

Federal programs impose onerous requirements before the application process even begins—registration on the System for Award Management website, a Dun & Bradstreet D-U-N-S Number, a Commercial and Government Entity (CAGE) Code, an Authorized Representative Request. Many also require a legal opinion, environmental analysis, credit thresholds, and details on equipment sourcing, contractors, engineering services, or bidding.

The application guide for the latest round of the United States Department of Agriculture's ReConnect Loan and Grant Program runs 273 pages. On average, application guides for state programs are 20 to 30 pages.

A one-size-fits-all application process also overlooks specific circumstances of rural areas in need.

For example: The FCC's Rural Development Opportunity Fund (RDOF) only allows bidding at the census block group level while ReConnect requires geographically contiguous projects. Existing infrastructure and communities do not conform to these arbitrary groupings, making it difficult to piece together projects.

2. Conditions of state programs are clearly defined.

ReConnect defines sufficient broadband speed as 100 Mbps download / 25 Mbps upload (or 100/25). RDOF defines the same thing as 25 Mbps download / 3 Mbps upload (or 25/3).

Why are these definitions different? Moreover, why are they so different? And why does neither address a consumer's real needs?

Purdue University's *Home Broadband Survey Results: Connecting Indiana* study from April 2022 published results of 5,000 speed tests from rural addresses in 20 Indiana counties. Over 60 percent of those tests—or more than 3,000 individual internet connections—failed to meet the FCC's minimum speed threshold of 25/3.

ReConnect-and RDOF-funded projects also often deliver speeds just above these speed definitions. These are not solutions for equitable broadband access in rural America. They are stop-gaps that slow economic growth, require early and costly replacement, and prolong unnecessary suffering.

Grant funding should prioritize broadband speed that is symmetrical and scalable to the customers' specific needs.

I cite the same Purdue study from April: "As more and more homes remote work and e-learn, symmetrical connections are needed—when upload speeds are as fast as download speeds."

Has your voice or video ever lagged for an agonizingly long time in an important Zoom meeting? Has your child become frustrated that their computer cannot keep pace with the tempo of e-learning? These are the perils of a broadband connection that is not symmetrical, and they jeopardize confidence, growth and even livelihoods.

As for scale: If the consumer needs a gigabit, or 1,000 Mbps, we need to provide that. If they need two gigabits, we need to provide that.

Speed thresholds in state broadband grant programs reward symmetrical, scalable connections. For example: The State of Indiana's NLC program prioritizes connections with symmetrical-speed minimums of 100 Mbps upload and download.

Tipmont Wintek's entry-level in-home fiber internet package exceeds this minimum by 150 percent, and we have been grateful to receive \$20 million from NLC since 2019—including \$3 million last month for new projects to begin in 2022.

3. Communication with state program facilitators is strong and consistent.

Beyond application deadlines, timelines for Federal broadband grant programs are nebulous. For example: Applications for the latest round of ReConnect grants were due March 9, 2022, but we do not yet know a decision deadline. That makes it hard to forecast resources when supply chain interruptions have already complicated scheduling for broadband builds.

Outside of webinars, Tipmont Wintek staff also have never spoken directly with those administering Federal broadband grant programs. If we reach out, we are lucky to receive a reply. We once spent months trying to contact a representative of ReConnect ... only to learn we now had a new representative.

Tipmont Wintek also recently partnered with Tippecanoe County—one of eight counties we serve—to pursue a grant from the National Telecommunications and Information Administration's Broadband Infrastructure Program. We did not receive the grant and were not told why. Were we somehow ineligible? Did an incumbent internet service provider (ISP) challenge our application? Was our application simply not as competitive?

Facilitators of state broadband grant programs provide a comprehensive timeline of key dates and deadlines, regular contact, and constructive feedback if an application is not accepted.

4. State programs improve processes and outcomes with accurate, manageable data.

Reporting is necessary in any broadband grant program. However, Federal program reporting is overly burdensome.

The Rural Development Reporting & Compliance User Guide for ReConnect is 103 pages. By comparison, we submit a 10-page quarterly report for each project with the State of Indiana's NLC program.

5. Administrator feedback in state grant challenge phases allows for productive adaptation.

Administrators of state broadband grant programs often request applicant feedback on their policies and processes to implement changes in future rounds of funding. For example: The State of Indiana's NLC increased its minimum speed threshold for sufficient broadband based on feedback and data from Tipmont Wintek and other applicants.

With each new round, the NLC process becomes more efficient and productive. By comparison, after three rounds of the ReConnect program, there have only been minor updates to the process.

Broadband Grants Are Best Managed at State Levels

To Tipmont, the ideal use of broadband grant program funds, as well as those provided by the American Rescue Plan Act, incorporates a strategic, swift-moving combination of Federal, state and local administration.

It is important to involve state administrators in conversations and decisions, and they should play a lead role in broadband grant management and disbursement.

I express these concerns about Federal broadband grant programs not to criticize them or their facilitators. I share them in the hope that it can lead to streamlined processes and improved outcomes that accomplish our shared mission of equitable broadband access.

Fiber is the Premier Broadband Technology

The only way to truly fulfill our shared mission is through fiber-to-the-home broadband.

Building fiber infrastructure from the ground up is not simple or quick. It requires months of planning, engineering and construction. We must pursue easements and right-of-way agreements. But as the saying goes, the right way and the hard way are often the same.

Tipmont Wintek has chosen fiber because there is no better future-proof broadband technology. The fiber lines we are laying today will work just as well decades from now. Service upgrades require only updated electronics on both ends of the connection.

Purdue's *Home Broadband Survey Results: Connecting Indiana* study from April reinforced that we have chosen the right materials to serve our customers.

The study found that fiber-optic broadband technology such as that offered by Tipmont Wintek provides the largest "bang for the buck" when it comes to internet cost, speed and satisfaction.

Fiber was a runaway winner in all points of comparison to satellite, DSL, cable, fixed wireless or cellular data. And yet of the 88 percent surveyed who have home internet, only 5.5 percent connected using fiber.

Many providers fail to give people what they need in today's world to remain truly connected and competitive. But Tipmont Wintek is determined despite the risks.

Our customers love it.

We have seen all-time highs in our score on the American Customer Satisfaction Index (ACSI), a national benchmark to assess customers' feelings about products or services they use. Compared to other service providers—who often land in the high 60's on a 100-point scale—our customer satisfaction is much higher.

Tipmont Wintek recently scored an all-time high 85 out of 100. That is enough to beat Chick-fil-A, which almost always tops the ACSI. If only we could include chicken sandwiches in our monthly packages.

4,000 People Connected ... and Counting

Jokes aside, that ACSI score is the result of demanding work from a lot of dedicated people. This work is reciprocated by the trust that our customers have placed in us to deliver for them on broadband as we have for electricity. This work also reflects our commitment to continue evolving broadband workforce development even further.

Since 2019, Tipmont Wintek has connected more than 4,000 people to our fast, reliable and affordable fiber broadband. By the time this day is over, we will have connected 10 more.

The stories we hear today are much happier.

One of our customers has a child with a disability. Their spouse stayed home with the child while they worked a job with preferable health care benefits. Once Tipmont Wintek fiber broadband became available to them, the spouse who stayed home was able to take a job and work remotely.

In just one home, our fiber broadband created employment, increased a family's income considerably, contributed to workforce development, and created new paths for resources to assist with raising a child.

Then there is Kassie Coverdale, who traded an engineering job she enjoyed for a career she was passionate about—her own professional dog training business. Just as that was taking off, COVID-19 hit. Thanks in part to our fiber broadband, Kassie did not miss a beat. She transformed her hands-on approach into a successful online business.

Multiply those stories by several thousand. These are the sorts of generational differences that a fast, reliable and affordable fiber-to-the-home connection can make.

This is how to help America's best and brightest talents consider making a home in rural communities.

This is what you can accomplish by building a broadband workforce that develops people and potential.

This is why we must reframe our definition of rural broadband and rethink broadband policy.

This is the way we can empower all rural American families, children, businesses, entrepreneurs, and educators through broadband—and improve their quality of life by ensuring their broadband service meets them where they are.

Thank you again for inviting me to testify before the Subcommittee today. I look forward to answering any questions you may have and continuing this conversation further.

Senator HICKENLOOPER. You bet. Close enough for Government work—

[Laughter.]

Senator HICKENLOOPER [continuing]. thank you also for coming such a long way.

Mr. HOLCOMB. Thank you.

Senator HICKENLOOPER. Appreciate your comments. Dr. Turner Lee, you came from probably—had the shortest commute, but I think you probably have the deepest experience on this specific aspect of how we are going to address these challenges on the workforce. So why don't you give us your opening remarks as well?

STATEMENT OF NICOL TURNER LEE, SENIOR FELLOW IN GOVERNANCE STUDIES AND DIRECTOR OF THE CENTER FOR TECHNOLOGY INNOVATION, BROOKINGS INSTITUTION, WASHINGTON, DC

Ms. Turner Lee. Well, thank you so much for having me, Chairman Hickenlooper, Ranking Member Braun, and distinguished Members of the Subcommittee. This is an important issue of the day, and I am here to speak about how we actually create new paying—high paying jobs in the broadband sector.

I am Dr. Nicole Turner Lee, the Director of the Center for Technology Innovation at the Brookings Institution, where my work focuses on these telecommunications and technology industries, but also how we solve the digital divide in the process. So excited to actually testify. Let me just say this, I laud, as everyone has, the bipartisan infrastructure bill as the most historic and landmark that we have had in this country in a long time.

Having high speed broadband access is fundamental for Americans to work, study, participate in religious or cultural activities, and socialize in parallel with traditional infrastructure. If executed properly, the bill should accelerate internet access for millions of Americans who currently live without it and in turn spur massive economic growth, granting access to millions for 21st century jobs as well as creating new career paths.

In my written testimony this morning, I just want to propose solutions on how we embolden an equitable and expansive workforce in the broadband sector of the U.S. economy. And before I do that, let me level set with some data.

Brookings researchers in 2021 found 160,000 broadband jobs would be created through the bipartisan infrastructure bill. And of these telecommunications equipment, installers, and repairers are projected to require an additional 36,000 new positions and an additional 12,000 in the areas of other installer and repair roles. These jobs are just mirroring the hard head jobs I call them.

We are not necessarily talking about the indirect opportunities that exist. The University of Massachusetts Amherst found that jobs directly created from new broadband funding will make up only 25 percent of the total number of jobs created by these monies.

Previous Brookings research found that 77 percent of workers in infrastructure jobs are going to be employed in operation of the physical assets, not necessarily the construction or design alone.

Meaning most of the infrastructure jobs that we are talking about today are long term careers in a broad variety of roles, and those are offerings that are going to be historically competitive with equitable wages, up at least 30 percent higher than other industries, and particularly useful for low income workers and women who are starting their careers for the first time.

It also provides a suite of social service supports that I think we as a country are battling with, particularly for those folks, and it has been mentioned by our distinguished Members, without a 4-year degree. Getting access to these broadband jobs and careers are imperative, and particularly at a time when we have the money to do so.

Another final recommendation, a note that I would share before I go into to recommendations, is that ultimately doing so will help us close the digital divide and potentially result in people in our communities, both urban and rural and tribal, from being moved as consumers of technology to producers and innovators who are prepared to accelerate this Nation's digital competitiveness.

Let me share some recommendations that I think complement my colleagues. First and foremost, we need to aggressively apply apprenticeships and credentialing programs. I think it has been said that apprenticeships are a gateway to careers and we as a country know how to do this with urgency. Just recently, the Department of Labor partnered with the White House and Department of Transportation on a 90 day trucking apprenticeship challenge.

We need similar challenges when it comes to broadband, engaging in other practices like community based hiring, private sector sign-ons, and accelerated career tracks. The Wireless Infrastructure Association and other industry partners in 2012 actually developed the first registered apprenticeship program for critical occupations and tower technicians, wireless technicians, utility workers, along with leads and foremen.

Second, we need to engage community colleges to provide pathways to these occupational resets. It is important that we have community colleges work with the private sector to develop partnership agreements, competency tracks, so that we can train the next broadband workforce.

Third, we need a digital service corps for new entrants, for people who need a pre step into a registered apprenticeship program. We need to partner with the Corporation for National Service to create a service corp for people to engage in experiential learning at a local level so that they understand the importance of this new economy.

It can also help us promote diversity, equity, and inclusion for marginalized workers who do not have a network in. I cannot agree more that we have to address the needs of K through 12 students, and I would implore the U.S. Department of Education to develop

an office of innovation in school districts dealing with this occupational skill setting.

Finally, as I close, we need to update our Government labor statistics. Right now, we do not have an understanding of the taxonomy of new jobs, nor do we have the right occupational classifications.

It is important for us to work with the Bureau of Labor Statistics, the Census, and OMB to ensure that we are actually codifying these jobs correctly as we place moneys into training and placement. Thank you so much, and I look forward to the questions.

[The prepared statement of Ms. Turner Lee follows:]

PREPARED STATEMENT OF NICOL TURNER LEE

Chairman Hickenlooper, Ranking Member Braun, and distinguished Members of the Health, Education, Labor & Pensions Subcommittee on Employment and Workplace Safety, thank you for the invitation to testify on the important issue of how the Infrastructure Investment and Jobs Act (IIJA) can sustainably and equitably create new, high-paying jobs in emerging industries, particularly from those created by major investments to expand universal broadband access. I am Nicol Turner Lee, Senior Fellow, Governance Studies and Director of the Center for Technology Innovation at the Brookings Institution. With a history of over 100 years, Brookings is committed to evidence-based, nonpartisan research in a range of focus areas. My research expertise encompasses data collection and analysis around regulatory and legislative policies that govern telecommunications and high-tech industries, along with the impacts of digital exclusion, artificial intelligence, and machine-learning algorithms on vulnerable populations. My forthcoming book, *Digitally invisible: How the internet is creating the new underclass* will be published by Brookings Press later this year.

The IIJA is a historic, bipartisan step to ensure that every American is equipped with the necessary tools, resources, and structures to participate in a 21st century economy.^{1, 2} The legislation includes high-speed broadband as one of the many critical infrastructure assets, which is both significant and transformative as getting online has become more of a necessity, instead of a luxury in these times.³ Having high-speed broadband access is fundamental for Americans to work, study, participate in religious or cultural activities, and socialize, in parallel with more traditional infrastructure. In other words, it is a pathway to first-class, digital citizenship. If the IIJA is executed properly, the Nation should be able to accelerate internet access for the millions of Americans who currently live without it. In turn, it will spur massive economic growth—granting access to millions of new 21st century jobs, as well as creating new career paths for livable earnings within industries enabled by direct access to more robust networks, in addition to industries indirectly benefiting from existing and emerging platforms.

In my written testimony, I propose solutions on how we can embolden an equitable and expansive workforce in the broadband sector of the U.S. economy. But first, Congress must implore the Department of Labor (DOL) to create taxonomies of the skills needed to fill vacancies in this and related technology sectors. Currently, there exists ambiguity in how we identify and define such opportunities, including fiber optics, 5G or wireless, and other related broadband infrastructure opportunities. Further, the U.S. must engage in national skilling through the creation of policies and norms that engage workers in not just job opportunities, but career paths, especially for those individuals without 4-year college degrees.⁴ These mile-

¹ “Fact Sheet: The Bipartisan Infrastructure Deal,” The White House, November 6, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/11/06/fact-sheet-the-bipartisan-infrastructure-deal>

² Infrastructure Investment and Jobs Act. Public Law 117–58. U.S. Statutes at Large 135 (2021): 429–1467.

³ [https://www.cantwell.senate.gov/imo/media/doc/Infrastructure percent20Investment percent20and percent20Jobs percent20Act percent20-%20Section percent20by percent20Section percent20Summary.pdf](https://www.cantwell.senate.gov/imo/media/doc/Infrastructure%20Investment%20and%20Jobs%20Act%20-%20Section%20by%20Section%20Summary.pdf)

⁴ Sam Sabin, “5G Worker Shortages Could Provide Many Americans with Chance to Return to Work,” Morning Consult, May 6, 2020, <https://morningconsult.com/2020/05/06/5g-wireless-workforce-shortage-coronavirus>

stones can be attained via lucrative training and placement opportunities, including apprenticeships and industry credentialing in the existing and emerging careers in wireline and wireless broadband, as well as supportive industry roles in data analyses, customer service, cloudware, and more.

More important, Federal and state governments must consider empowering the broadband workforce as a critical element of the IJA, starting with the enlistment of education and community partners like community colleges, and K–12 schools who are critical to fueling the 21st century workforce. Congress might also support funding to the Corporation for National and Community Service for a national Digital Service Corps, where several under-skilled workers can engage in more experiential learning of these trades while receiving a modest stipend as part of their pathway into jobs, and then long-term careers.

My main point of my testimony is that the Nation has a huge opportunity in the creation of new, high-paying jobs to build critical infrastructure like broadband access. These efforts should be an accelerant for entry, and involve deliberate and strategic efforts around equity, ensuring that no citizens are excluded based on their demographic background, geographic residence, or lack of competency in fairly nascent fields.

The Infrastructure Investment and Jobs Act and Careers

An additional reason for accelerating high-speed broadband access is to help close the national digital divide that separates millions of Americans from fully participating in the digital economy. The global pandemic has surfaced the importance of online connectivity as millions obliged the calls for physical social distancing and transitioned online for remote work, school, health care, government services, and regular communications with friends and family members. As technology becomes more ubiquitously available and affordable for Americans of all socioeconomic levels, it has become a game changer for how citizens transact and interact in their daily lives, and will be foundational to the development of inclusive economic growth in the U.S.⁵ Yet new online dependencies have widened the Nation’s digital divide, leaving some people of color, older and low-income populations, and those from rural (and some urban) areas unable to consume certain products and services. These vulnerable groups were greatly impacted by the pandemic’s social isolation at its onset, which restricted many people from applying for unemployment benefits, engaging in virtual education, or scheduling and receiving a vaccination.⁶

In February 2021, my testimony before the U.S. House of Representatives Committee on Economic Disparity & Fairness in Growth went into more detail about the \$65 billion toward high-speed broadband from the \$1.2 trillion IJA appropriation, and indicated that we needed a coherent and collaborative strategy to effectuate change, or a “Tech New Deal.” This is important because the IJA appropriated funds are more than quadruple the support granted in 2009 for the American Recovery and Reinvestment Act (ARRA), which allocated \$4.7 billion toward online access.⁷ In this new tranch of funding, Congress has authorized \$2.75 billion through the three Digital Equity Act programs to promote digital inclusion and increase broadband adoption—some of which must be used explicitly to consider and fund state, local, and community workforce development programs.⁸ The National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce, along with the Federal Communications Commission (FCC), are responsible for distributing these funds—first to states that are charged with developing broadband infrastructure and digital equity plans as part of their receipt of the funds.

Of the entire 2020 funds, the Digital Equity Act most likely will house the funds for local workforce development programs, but the remaining \$62.25 billion in high-speed broadband assets can also be thought of as stimulating workforce develop-

⁵ Nicol Turner Lee, “Building for the Future: Advancing Digital Competitiveness through Broadband Access and Adoption,” <https://www.brookings.edu/testimonies/building-for-the-future-advancing-digital-competitiveness-through-broadband-access-and-adoption>.

⁶ Nicol Turner Lee, “Why America Needs a ‘Tech New Deal’ to Build Back Better,” TechTank (blog), January 12, 2021, <https://www.brookings.edu/blog/techtank/2021/01/12/why-america-needs-a-tech-new-deal-to-build-back-better>.

⁷ Nicol Turner Lee, “Building for the Future: Advancing Digital Competitiveness through Broadband Access and Adoption,” <https://www.brookings.edu/testimonies/building-for-the-future-advancing-digital-competitiveness-through-broadband-access-and-adoption>.

⁸ Nicol Turner Lee, “Why America Needs a ‘Tech New Deal’ to Build Back Better,” TechTank (blog), January 12, 2021, <https://www.brookings.edu/blog/techtank/2021/01/12/why-america-needs-a-tech-new-deal-to-build-back-better>.

ment. These moneys not only will support short-term infrastructure needs: they are a prerequisite to supporting the long-term development and deployment of new, economically transformative technologies as well. For example, select areas in Chicago, Atlanta, Washington, DC, and more have already deployed 5G networks. According to Verizon, one of the major internet service providers offering 5G, networks are enabling download speeds of 1 Gbps and latency rates of less than 30 ms, which will allow a vast range of new technologies—autonomous vehicles, smart home devices, telehealth monitors, agricultural or environmental sensors, virtual reality systems, and more—to be connected to the internet.⁹ But the design and development of 5G overall has been estimated to attribute \$13.2 trillion to the global economy, and create an additional 22.3 million jobs across the world.¹⁰

That is why to harness the massive potential for job creation, broadband must be a part of a broader strategy of 21st century inclusive economic growth, especially in the production of new opportunities for individuals with or without a 4-year degree. Given the disproportionate access to broadband and the platforms and applications that it enables, an equity framework should be applied to such decisions on where to build and who to serve—at least, in the first iteration of broadband build-out and digital equity programs. The IJJA has indicated that unserved, followed by underserved, communities will be top priorities for new government spending. Simultaneously, these must be the same communities where programs investing in job creation, placement, and training for careers in these lucrative industries are focused first, offering a compounded benefit and multiplier of Federal resources. Only this way can we ensure that all individuals—regardless of their educational status—can fruitfully work and earn in the existing and emerging communications ecosystems or, at minimum, be offered opportunities to learn the necessary skills.

As mentioned, my own research offered a comprehensive framework to ensure the achievement of described milestones, which was encased in the concept of a “Tech New Deal.”¹¹ Parts of the Tech New Deal assert that “No Child Be Left Offline” to guarantee the closing of the “homework gap” because every K–12 student would have options for affordable broadband service, an internet-enabled device, hot spot, and relevant training resources for parents and other caregivers.¹² My research also presented the concept of Digital Service Corps to aid in closing the digital divide within their local communities, which will be discussed later in the testimony. Further, the creation of new broadband jobs should not solely happen among telecommunications and technology providers. There should be both critical interests and investments from industries benefiting from the technology ecosystem—from banks to retail companies. In sum, the Federal Government must develop policies that invite and reimagine public policies that include diverse industry stakeholders, as well as representatives from state and local workforce development boards, and civil society organizations to chart a path for how technology spurs economic growth and shifts in service delivery for citizens.¹³

Without a concerted, whole-of-society effort, the Nation and these industries will lose generational opportunities to advance these sectors. The digital divide will continue to complicate matters for populations without broadband access.^{14, 15} These are the reasons why the U.S. needs coordinated national, state, and local level approaches to expediting skilling and job training for the broadband workforce to avoid

⁹ Verizon. “What Is the Latency of 5G?” February 2, 2020, <https://www.verizon.com/about/our-company/5g/5g-latency>; Larry Downes, “5G: What is it good for?” *The Washington Post*, February 3, 2022, <https://www.washingtonpost.com/news/innovations/wp/2018/06/05/5g-what-is-it-good-for/>.

¹⁰ “The impact of 5G: Creating new value across industries and society,” World Economic Forum, January 2020, <https://www.weforum.org/docs/WEF—The—Impact—of—5G—Report.pdf>.

¹¹ Nicol Turner Lee, “Why America Needs a ‘Tech New Deal’ to Build Back Better,” The Brookings Institution, TechTank, January 12, 2021, <https://www.brookings.edu/blog/techtank/2021/01/12/why-america-needs-a-technew-deal-to-build-back-better>.

¹² Nicol Turner Lee, “No Child Deserves to Be Left Offline This School Year—Here’s How Congress Can Help,” The Brookings Institution, TechTank, August 2, 2021, <https://www.brookings.edu/blog/techtank/2021/08/02/no-child-deserves-to-be-left-offline-this-school-year-heres-how-congress-can-help>.

¹³ Nicol Turner Lee, “Why America Needs a ‘Tech New Deal’ to Build Back Better,” The Brookings Institution, TechTank, January 12, 2021, <https://www.brookings.edu/blog/techtank/2021/01/12/why-america-needs-a-technew-deal-to-build-back-better>.

¹⁴ Nicol Turner Lee, “Bridging Digital Divides between Schools and Communities,” The Brookings Institution, March 2, 2020, <https://www.brookings.edu/research/bridging-digital-divides-between-schools-and-communities>

¹⁵ Harmeet Kaur, “Why Rural Americans Are Having a Hard Time Working from Home,” CNN, April 29, 2020, <https://www.cnn.com/2020/04/29/us/rural-broadband-access-coronavirus-trnd/index.html>.

the slower rollout of the broad infrastructure goals and the current shortage of available workers post-pandemic.¹⁶

Jobs and the Broadband Workforce

In 2021, Brookings Center for Sustainable Development estimated 160,000 broadband job-years alone will be directly created from the Infrastructure Investment and Jobs Act.¹⁷ Of these, telecommunications equipment installers and repairers are projected to require an additional 36,000 new positions to be filled (23 percent of the total), with an additional 12,000 new positions created in other installer and repairer roles (8 percent of the total). Particularly in this set of critical initial-deployment positions, as it stands today, there are not enough available trained workers to fill these in broadband occupations—mirroring the huge vacancies in cybersecurity jobs that also required a specialized approach to recruitment and training. An added challenge in fulfilling broadband roles is the geographic distribution of workers with these skills do not often match locations where jobs are most needed, like rural areas that will be laying fiber optics.¹⁸

Yet these 160,000 broadband jobs are the beginning count of the human capital needed to advance the IJJA's broadband provisions. Projections sourced from the University of Massachusetts Amherst demonstrate that jobs directly created from new broadband funding will make up only 25 percent of the total number of jobs created by these moneys. Including indirect and induced jobs into the calculation demonstrates that the \$65 billion in broadband funding alone will likely create 650,000 new job-years in the United States, including 84,000 jobs in the manufacturing sector.¹⁹

Previous Brookings research also backs these broadband-specific assumptions. Indeed, the vast majority (77 percent) of workers in infrastructure jobs are employed in the operation of physical assets, rather than their construction or design.²⁰ The 650,000 job-years created by the IJJA's broadband funding provisions will be no different: most of these infrastructure jobs are long-term careers in a broad variety of roles, most of which are positions where “you don't have to wear a hard hat” to carry out employment functions.²¹ Infrastructure jobs have also offered historically more competitive and equitable wages—up to 30 percent higher than other industries—particularly for low-income workers and those starting careers for the first time. And in some instances, workers have collective bargaining rights, especially for the roles embedded in the trades.

For policymakers and stakeholders across Federal, state, and local governments, this should be welcome news—but equitably getting workers to the career ladder will undeniably pose challenges, especially for women and people of color who are underrepresented across these jobs.²²

While stakeholders should focus on a holistic view of broadband jobs, of particular interest to my work are the new remote or hybrid economic opportunities opened up in the technology sector to currently unserved or underserved Americans. Powered by the “Great Transition,” these stable and good-paying 21st-century jobs rank fourth in projected employment growth over the last year, and demand for emerging tech jobs (including in AI and cloud development) have grown over 200 percent in the past 5 years. Demand for these jobs is expected to continue in the next decade,

¹⁶ Joseph Kane, “Biden Needs to Create an Infrastructure Talent Pipeline, Not Just More Jobs,” *The Avenue* (blog), January 29, 2021, <https://www.brookings.edu/blog/the-avenue/2021/01/29/biden-needs-to-create-an-infrastructure-talent-pipeline-not-just-more-jobs>.

¹⁷ One job-year is equal to one job for 1 year. For example, ten job-years could be 10 jobs for 1 year, or 1 job for 10 years.

¹⁸ Marcela Escobari Strauss Dhruv Gandhi, and Sebastian, “How Federal Infrastructure Investment Can Put America to Work,” Brookings (blog), March 17, 2021, <https://www.brookings.edu/research/how-federal-infrastructure-investment-can-put-america-to-work>.

¹⁹ Robert Pollin and Shouvik Chakraborty, “Job Creation Estimates Through Proposed Economic Stimulus Measures” (Political Economy Research Institute: University of Massachusetts Amherst, September 2020), <https://peri.umass.edu/component/k2/item/1297-job-creation-estimates-through-proposed-economic-stimulus-measures>.

²⁰ Joseph Kane and Robert Puentes, “Beyond Shovel-Ready: The Extent and Impact of U.S. Infrastructure Jobs,” May 9, 2014, <https://www.brookings.edu/interactives/beyond-shovel-ready-the-extent-and-impact-of-u-s-infrastructure-jobs>.

²¹ Joseph Kane and Jack Mills, “Harnessing the Infrastructure Investment and Jobs Act to Train the Next Generation of Workers,” *The Avenue* (blog), February 23, 2022, <https://www.brookings.edu/blog/the-avenue/2022/02/23/harnessing-the-infrastructure-investment-and-jobs-act-to-train-the-next-generation-of-workers>.

²² Joseph Kane, “Five Ways Regional Leaders Can Prepare Future Infrastructure Workers Now,” *The Avenue* (blog), September 16, 2021, <https://www.brookings.edu/blog/the-avenue/2021/09/16/five-ways-regional-leaders-can-prepare-future-infrastructure-workers-now>.

with a projected growth rate twice the national jobs rate.²³ Demand from employers for qualified tech employees is currently outstripping the supply of qualified candidates, a clear sign of an “ongoing labor supply problem.”²⁴

Thus, reskilling and upskilling for workers offers an opportunity to fill the skills gap while maximizing the economic opportunities offered by (and to) newly connected Americans. Recent research from Jason Jabbari, Wenrui Huang, and Michal Grinstein-Weiss has empirically demonstrated the success of a mixed non-traditional reskilling program containing both education and apprenticeship elements. LaunchCode, a St. Louis organization, offered flexible and no-cost part-time evening programming for students interested in reskilling to tech-oriented jobs. After passing a workforce readiness check by staff, participants began paid, full-time apprenticeships, supplementing their learned technical skills with soft skills in the workplace. Not only did this program model lower barriers to participants, but it empirically improved economic outcomes for participants who completed apprenticeships, and increased the post-program odds of employment in STEM fields by 12 percentage points.²⁵ This combination of no-cost education programs that enable equity through apprenticeship programs and experiential soft skills training present promising models to pursue in the future, and could be incorporated into other similarly minded programs.^{26, 27}

While the creation of tens of thousands of good-paying broadband infrastructure jobs is a great start, IJJA moneys will also create sizable second-order demand for jobs like data analysts, customer service representatives, and more. These efforts to close the digital divide should result in people and their communities being moved from consumers to producers and innovators, who are prepared to accelerate our Nation’s global digital competitiveness.

Encouraging greater participation in the broadband workforce

To maximize the benefits of these IJJA investments, a holistic approach encompassing multiple aspects of workforce development is integral. To this, I have a few proposals to offer to the Committee: (1) apply apprenticeship and credentialing programs in the IJJA to provide development opportunities; (2) engage community colleges to provide pathways to occupational skill reset; (3) create a Digital Service Corps for new entrants; (4) increase pipeline investments for youth programs to support the next generation; and (5) update government labor statistics practices.

1. Apply apprenticeship and credentialing programs in the IJJA to provide development opportunities.

Skilled jobs in fiber optic installation, data analytics, and customer service provide livable wages and employment security for workers. The number of positions in these fields will only continue to grow as our Nation’s broadband infrastructure continues to evolve, especially in wireless or fiber jobs, or related security and network management fields. Employing credentialing systems or adopting other industry models for apprenticeships can be useful starting points. For example, the DOL partnered with the White House and Department of Transportation on a 90-Day Trucking Apprenticeship Challenge to increase participants in the Registered Apprenticeship Model, and fill the transit gaps due to increased demand.²⁸

Whereas the skillsets for some of the broadband jobs may require more proficiency in logistics and installation (which do not require a college degree), the creation of apprenticeship programs around technology could have various worker incentives, like community-based hiring, private sector sign-ons, or accelerated career tracks. Here is also where the aforementioned \$2.75 billion Digital Equity Act and \$2 bil-

²³ CompTIA, “State Of The Tech Workforce: Cyberstates 2022” (Computing Technology Industry Association, March 2022), <https://www.cyberstates.org/pdf/CompTIA—Cyberstates—2022.pdf>.

²⁴ “CompTIA Jobs Report: Tech Hiring Eases Amid Labor Supply Constraints,” My TechDecisions, March 4, 2022, <https://mytechdecisions.com/news-1/comptia-jobs-report-tech-hiring-eases-amid-labor-supply-constraints>.

²⁵ Jason Jabbari Grinstein-Weiss Wenrui Huang, and Michal, “Apprenticeships Increase Employment, Earnings, and Optimism in the Technology Sector,” TechTank (blog), January 27, 2022, <https://www.brookings.edu/blog/techtank/2022/01/27/apprenticeships-increase-employment-earnings-and-optimism-in-the-technology-sector>.

²⁶ “Six Ways to Tackle the Cloud Skills Shortage” (Deloitte), accessed April 27, 2022, <https://www.deloitte.com/us/en/pages/consulting/articles/cloud-computing-skills-shortage.html>.

²⁷ “Using Modern Apprenticeship to Reskill America” (IWSI America, February 1, 2019), <https://www.iwsiamerica.org/itstime>.

²⁸ U.S. Department of Labor, 90-Day Trucking Apprenticeship Challenge, available through <https://www.dhs.gov>, 90-Day Trucking Apprenticeship Challenge Apprenticeship.gov

lion in tribal grants can support workforce development efforts, by ensuring access to local technology in computer labs, or partnerships between community-based organizations and workforce development boards.

Finally, existing Registered Apprenticeship models can help motivate career opportunities. In 2012, DOL joined with the Wireless Infrastructure Association and other industry partners to set up the Telecommunications Industry Registered Apprenticeship Program (TIRAP), the first Registered Apprenticeship Program in the telecommunications industry that seeks to “define career paths in a growing number of critical occupations, including tower technicians, wireless technicians, and utility workers, along with leads and foremen.”²⁹ Opportunities like these create valuable opportunities for retraining and career growth, preparing workers for a workforce with growing demands for workers in broadband and telecommunications. They should be continuously supported and upgraded to keep up with the innovation.

In February 2021, the Biden administration called on the DOL to reinstate the National Advisory Committee on Apprenticeships (ACA), appointing a diverse set of stakeholders across industries and educational institutions to establish and maintain a registered apprenticeship program.³⁰ Going forward, the ACA seeks to chart the course in creating equitable access for workers to find their place in the National Apprenticeship system.

Overall, the White House, Federal and other local agencies, the private sector, and community colleges recognize the importance of apprenticeship and, in some instances, occupational credentialing programs, to create pipelines of workers for infrastructure and related support jobs. But to be effective, measurements to evaluate and track the general progress and inclusivity of such programs must be employed, in addition to evaluating the existing difficulties workers face in accessing apprenticeship programs (e.g., transportation, safety apparel, computers, etc).

2. Engage community colleges to provide pathways to occupational skill resets.

Community colleges have always played an integral role in building our workforce and bridging gaps between labor demand and skills required. They are affordable and flexible means for those seeking to acquire new skills or pivot into new careers. According to research by the Federal Reserve Bank of New York evaluating community college engagement with statewide employers, community colleges engage with more than 100 employers across a range of sectors.³¹ Such employers are involved in curriculum advisory committees and provide mentoring support to students, seeking to help students find their place in the local economy. Community colleges have played integral roles in workforce retraining initiatives, taking for example the Automotive Manufacturing Technical Education Collaborative and the Wisconsin Regional Industry Skills Education, Shifting Gear Initiative, and other educational programs launched through partnerships with employers and community colleges to reform adult education and integrate industry-specific fields and skillsets into existing curriculums.³²

In the broadband sector, community colleges can bridge labor gaps and train/re-train the future broadband workforce. Through the facilitation of partnerships between community colleges and local businesses in the forms of articulation and guaranteed work agreements, the telecommunications and technology industries can ensure the creation of a relevant curriculum based on the type of job or career, incentives that motivate worker entry of diverse candidates, relocation expenses, and even other individual and family supports, including transportation vouchers, life insurance, and bilingual training. Like with apprenticeships, evaluation data and analyses should ongoing to ensure that programs are effective and inclusive of all populations.

What is also important is that community colleges not be entirely perceived as the gap between high school and a 4-year institution. Their engagement in the ful-

²⁹ “TIRAP: Helping Build Our Nation’s Telecommunications Workforce,” TIRAP, accessed April 27, 2022, <https://www.tirap.org>.

³⁰ “Fact Sheet: Biden Administration to Take Steps to Bolster Registered Apprenticeships,” The White House, February 17, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/02/17/fact-sheet-biden-administration-to-take-steps-to-bolster-registered-apprenticeships>.

³¹ Jaison R Abel et al., “Employer Engagement by Community Colleges in New York State,” November 2018, <https://www.newyorkfed.org/medialibrary/media/outreach-and-education/workforce-development/nys-employer-engagement-community-colleges-report.pdf>.

³² U.S. Department of Education, Office of Vocational and Adult Education, “Integrating Industry-Driven Competencies in Education and Training Through Employer Engagement,” Washington, DC, 2011

fillment of the IIJA workforce needs must position these opportunities as respectable, long-term, and with some potential for promotion and/or further certifications.

3. Create a Digital Service Corps for new entrants.

In the 1930's, former President Franklin Delano Roosevelt created the New Deal, a series of projects to stabilize the market and improve the country's economy, especially through infrastructure projects, such as the Rural Electrification Administration and the Tennessee Valley Authority which brought electricity to rural areas previously unconnected to power grids. Meanwhile, job programs like the Works Progress Administration and the Civilian Conservation Corps employed millions of Americans to build schools, hospitals, roads, and other improvements across the country.³³ The New Deal programs played a major role in reducing poverty and modernizing infrastructure during the Great Depression.³⁴

In order to build and expand a broadband workforce that can meet future workforce demands, Congress could immediately allocate funds to the Corporation for National Service which is responsible for the Nation's civic service workers. The agency could initiate a national Digital Service Corps similar to the CCC, which would recruit paid volunteers to assist in the adoption, utilization, and infrastructure development.³⁵ Digital Service Corps members could fill existing gaps in the broadband workforce and help build out much-needed infrastructure to advance broadband deployment. They could also earn moneys while doing so, and engage in experiential learning around digital assets from installing fiber optics to providing internet training to seniors once the networks are built. Currently, there are no mechanisms to drive the supply of broadband workers, and leveraging the existing Federal agency can make employment in these emerging industries part of the policy imperatives of the IIJA. A national Digital Service Corps can also promote diversity, equity, and inclusion by including marginalized workers, too.

4. Increase pipeline investments for youth programs to support the next generation.

To ensure inclusion in our future broadband and technology workforce, investments in youth programs and other education initiatives are needed to improve the pipeline. Among White, Black, Latino, tribal, and other vulnerable populations, the adverse impacts of not being connected severely limit their prospects of gaining access to new opportunities. When learning moved online, many K–12 students, and those from community colleges, were not connected to the internet. In fact, 34 percent of parents said their child encountered at least one technology-related obstacle to completing schoolwork in time, with 27 percent having to do work on a cellphone,

16 percent without computer access, and 14 percent using public WiFi. Among Black teens, 25 percent were unable to complete their homework due to a lack of digital access compared to 4 percent of White teens and 6 percent of Hispanic teens, while 24 percent of teens with family income less than \$30,000 struggled compared to 9 percent of teens living in households earning \$75,000 or more a year.³⁶ Digital disparities pose educational setbacks with long-term learning impacts, and they leave many children on uneven footing, limiting their earning potential going forward. According to a 2020 analysis of U.S. Census Bureau data by McKinsey and Company, while online schooling may have set white students between four to 8 months behind in math, students of color may be six to 12 months behind.³⁷ Such setbacks can cost students \$61,000 to \$82,000 in lifetime earnings. Deprived of everyday technology, many of these future workers are slated to struggle to adapt to new coding skills and other aspects of technology work going forward.

Pipeline investments in digital inclusion, device access, and technology literacy are necessary to bridge the digital divide and resolve such inequities, providing our future workforce with the knowledge and access they need to access careers in

³³ "Civilian Conservation Corps," HISTORY.com, accessed April 27, 2022, <https://www.history.com/topics/great-depression/civilian-conservation-corps>.

³⁴ U.S. House of Representatives: History, Art & Archives. "President Harry S. Truman's Fair Deal Proposal to a Joint Session of Congress." Accessed April 27, 2021. <https://history.house.gov/Historical-Highlights/1901-1950/President-Harry-S-Truman-s-Fair-Deal-proposal-to-a-Joint-Session-of-Congress>.

³⁵ AmeriCorps, accessed April 27, 2022 <https://www.americorps.gov>.

³⁶ Katherine Schaeffer, "What We Know about Online Learning and the Homework Gap amid the Pandemic," Pew Research Center, accessed April 27, 2022, <https://www.pewresearch.org/fact-tank/2021/10/01/what-we-know-about-online-learning-and-the-homework-gap-amid-the-pandemic/>.

³⁷ Emma Dorn et al., "COVID-19 and Learning Loss—Disparities Grow and Students Need Help" (McKinsey and Company, December 8, 2020), <https://www.mckinsey.com/industries/public-and-social-sector/our-insights/covid-19-and-learning-loss-disparities-grow-and-students-need-help>.

broadband and tech. The U.S. Department of Education should establish an Office of Innovation in every school district with 21st-century occupational and knowledge skills being presented to students. While schools have been exemplary in bringing science, technology, engineering, and math (STEM) academies, they are not teaching students the basics of fiber optics, cloudware, and other necessary occupational lessons for students who may not continue into higher education.

Challenge grants and other private sector partnerships could be used to allocate resources to local projects. Lower-income and rural schools must also be prioritized for such ingenuities since many graduates may be charged to build their local infrastructures.

5. Update government labor statistics practices.

Right now, the U.S. does not fully know the first- and second-order jobs that will be supported by the \$65 billion broadband investment. That is partly due to the current format and presentation of national industry and occupational data in the Bureau of Labor Statistics (BLS) and the Census Bureau, which make it hard for all stakeholders to determine the exact industries and locations where the growth is happening, as well as the proportion of fully remote jobs created from employers in different states.

To this end, the BLS should work with the Office of Management and Budget to determine what, if any, improvements to the structure of national employment data would be most useful to better capture where and in what occupations broadband-induced economic growth is felt. In the longer term, the Census Bureau should consider how best to capture and present the scale, impact, and localized growth of the broadband workforce from the data it collects in its 2023 and 2028 Economic Censuses. This would be particularly useful in measuring the impact and effectiveness of the moneys allocated in the infrastructure bill. Finally, the DOL should develop and publish a broader taxonomy of skills and occupations encompassed by the broadband workforce for workers who are distanced from these emerging industries, or at least fund local partners to help get the word out. A more specific and immediate recommendation might be to add a banner and associated webpage to the O*NET landing page highlighting the many different career paths and desired occupational skills encompassed in the broadband workforce.

Conclusion

Chairman Hickenlooper, Ranking Member Braun, and distinguished Members of the Health, Education, Labor & Pensions Subcommittee on Employment and Workplace Safety, the issue at hand appears to be multi-faceted and complicated, primarily because we have always focused on the consumptive and not productive aspects of the digital economy. But investing in our broadband workforce goes beyond the installation of cell towers or fiber optic conduits. It is about investments in people and their communities where quality access to existing and futureproofed technologies and associated workforce development programs will contribute to their—and our nation's—economic growth and personal livelihoods—regardless of one's background and educational achievements.

Thank you again to the Members of the Subcommittee on Employment and Workplace Safety for the opportunity to testify, and I look forward to your questions. I also want to thank Brookings researchers James Seddon, Samantha Lai, and Mauricio Baker for their assistance in preparing my statement.

Senator HICKENLOOPER. Wow. What a great introduction by all of you. I really appreciate the breadth—just the breadth of your experience as a group. So I will do the first set of questions that I am going to have to run off to another, or I have to testify at another meeting and then I will come back. Senator Smith will look over things in my absence. I will just say one last time also, concise answers are all better for you, but better for all of us. We could start with Mr. Hendricks.

In broadband, as in so many other fields, we know that apprenticeship is a proven model of success. So for many who may not attend a 4-year college, it becomes the foundation for a long, hopefully successful career. What can we do at the Federal level to help

with the recruitment efforts for both interested apprentice—interested apprentices and employers?

Mr. HENDRICKS. At the Federal level, I would say we need to support the Department of Education high schools to incentivize the students to attend an apprenticeship. We need at least to get the word out. How do we start a program or a project to introduce high school students to apprenticeships? That is where we need to start. We need to start on that ground floor.

If nothing else, at least get the word out. At least let someone like myself go to the schools, talk to the counselors. For many years, people like myself, training directors from apprenticeships, the schools wanted nothing to do with us. So how do we incentivize the high schools, the same as college readiness, for apprenticeship readiness? Thank you.

Senator HICKENLOOPER. And so concise. Second, let me talk to Dr. Turner Lee. Let me ask you a question. And I—as was mentioned earlier, I think this is the beginning of the great transition. This is going to go through—we are going through a major transition on a lot of levels in this country, building opportunities that are going to become the careers of the 21st century.

I think broadband careers are going to be a big part of that future of work, just like artificial intelligence or advanced networking or computing. So, Dr. Turner Lee, what types of careers in the broadband workforce are in the highest demand right now? How can we best coordinate workforce development at the Federal level to ensure that we have the right broadband workers with the right skills so that we have what we need in the future?

Ms. Turner Lee. Yes, thank you for that question. I mean, I think what we are going to see in the broadband sector in terms of jobs, I think it is already been indicated, will be these construction like jobs where we are going to need people to install fiber optics, maintain it, etcetera. I think the other thing that we are going to see that we are not talking about, many of these new networks are software based. It doesn't mean that they are engineering based, but they are managed through software systems like 5G, etcetera.

We are going to need candidates to understand that they didn't have to be perfect in math to be able to manage software applications that are running over networks. In addition to that, there will be other jobs in customer service that will be important as we actually schedule these types of installations, so we manage customer expectations.

Then I would say that there are going to be people that need to be on the indirect side of what these networks will actually calibrate within local communities. That is why I think it is important for us to have, as it has been mentioned, like a taxonomy to share with high school students that do not stop or hinder their expectations.

I also think the United States needs a national reskilling campaign and initiative that involves the various tracks that people can undertake. And I also don't want us to forget adults, people who will need to transition as part of this that may not be nec-

essary part of the pipeline because they have aged out, but they also need those opportunities for livable wage, skilled jobs.

Senator HICKENLOOPER. The kids of all—kids of all ages, I sometimes refer to them. I will turn to Mr. Holcomb and Mr. Gillum. Obviously when we—to do this transition we are going to—it is going to require collaboration and coordination between workers and workforce training programs, employers. I think all three have to work together to get us where we need to go. And as we know, many small businesses don't have the resources to train the workers in the skills they need.

That is part of why I am so proud to be working with Senator Braun on the Partners Act to help small and medium sized businesses with their training efforts. So Mr. Holcomb and Mr. Gillum, can you discuss the importance of how you look at high quality training programs for broadband workers that you might be seeking to hire? Go ahead.

Mr. GILLUM. Yes, we—obviously very important. We, where we have a local, or not so local, a community college that we hire a lot of kids with a install a repair technician type associate degree from, they have migrated into it being a certificate of just eliminating the math and English portions of the school, to getting these kids out into our field to where they are actually trained in fiber construction and installation.

The difficulty is the school is 3 hours away, and what we have is we have hired several students from the college. And they, after a year or so, they would want to return home becoming homesick. So we started promoting within our local high schools a scholarship opportunity for those local kids to go and attend this college, and then with the mindset that they will want to return to home and have a good paying job at LightStream.

Senator HICKENLOOPER. Mr. Holcomb.

Mr. HOLCOMB. One of the things that we might be missing here is the fact that this technology rolls over very quickly, right. So a trained worker that might be 30 years old is untrained at 33, if you don't continue to provide training and guidance, and that is expensive. So when you look at the differential of education and training expenses within the company, because of this particular functional skill set, it requires a lot more training, ongoing training, so that their skills stay up.

In fact, many of the employees, they measure, the benefits the company brings them by keeping their skills sharp. So networks change over, software packages change over. It is a constant evolution. So as we are not only working to attract the new workforce, making sure that companies have the tools and the equipment to be able to train the ongoing workforce is a particularly interesting element to the problem we have.

Senator HICKENLOOPER. Great. Good answers, all of you. Thank you so much. Now turn over to questions for Senator Braun.

Senator BRAUN. Thank you, Senator. This is an interesting discussion because generally there is a broader kind of opinion on what is needed. And here I am hearing the same thing. We need something happening that is going to be more instructive from

maybe not K through five, but at least middle school through high school.

I think even if you want to extend it back further, that emphasizes a point. So I would like to start trying to put some flesh on the bones of this whole discussion. Mr. Gillum. Mr. Holcomb, in your particular companies, can you talk about what the percentage is between better polishing of skills and high school, maybe a certificate, something other than a 4-year degree, of the jobs that you have in your company?

What percentage would require one versus the other, and maybe what that starting range of wages would be starting over, say, 5 to 10 years into that career choice? Mr. Gillum, would you start.

Mr. GILLUM. Yes. I guess as a small rural broadband provider in Buffalo, Indiana, the cost of living and so forth isn't as a large city, and so—

Senator BRAUN. How many employees do you have?

Mr. GILLUM. We have 25 employees.

Senator BRAUN. Okay.

Mr. GILLUM. So we are in approximately seven installer repair technicians. We are very rapidly deploying fiber optic. Over the past few years, it has been a heavy hitting—a lot of stuff, a lot of moving parts going on. So we have hired, none of which have a 4-year degree, a lot of which have come from no background of this technology.

The ones that we have hired, that have a sort of certificate or an associate's degree from the community college that I was speaking of, they are quicker to be released on their own and go and troubleshoot and do five times faster than the ones that come with little to no experience.

Senator BRAUN. So you had seven technicians. What about the other 18 employees?

Mr. GILLUM. CSRs. We have got marketing people, salespeople, HR. Just a variety of—

Senator BRAUN. And do those necessarily require a 4-year degree, or if you had better skills, life skills, general skills coming out of high school, would you be able to train them into a productive spot?

Mr. GILLUM. Absolutely. In this industry, and I think I can speak for everyone here, all of the software and hardware and everything that we do is very proprietary. You are not going to go to a 4-year school or a 2-year school and learn the software that is needed to manage and maintain the—what we are providing, the broadband that we are providing. That is all very proprietary, and the only place that you are really going to learn it is getting your hands on it within an organization.

Senator BRAUN. And roughly what would the starting wages to a career wage be to give the public an idea, anybody listening here, in terms of what you might aspire to?

Mr. GILLUM. Yes, you are—I mean, you are from a starting technician, you are looking at the \$40,000 a year pay rate. And then depending upon work ethic and opportunity of advancement within

the organization, you know, as myself, I was hired as an IT manager, and now within 15 years, I am the President and CEO of the organization.

Senator BRAUN. And some of those career wages, after you are into it, 10 to 15 years, what would the range there be?

Mr. GILLUM. You know, potentially \$100,000 or more a year.

Senator BRAUN. I mean, that is not too far off from what many 4 year degrees would give you in terms of a spectrum of pay. Mr. Holcomb, you want to expound upon that or is that similar to your—

Mr. HOLCOMB. Yes, Senator. So I would put the ratio at a guess at about 10 to 1. So in other words, for every ten non-degreed employees we need, we need one that primarily revolve around critical infrastructure like core networks and very complex type infrastructure.

Senator BRAUN. So to be clear, if you need ten with more of a technical training versus one maybe with a 4-year degree?

Mr. HOLCOMB. Correct.

Senator BRAUN. That is a disconnect that higher education needs to listen to, especially when you put the, you know, pay range of what you might get starting versus career. Go ahead.

Mr. HOLCOMB. Right. I think the wages will start out in the \$50,000 range. Easily get to \$80,000 or \$90,000 with a very skilled career technician. I think that the way that we are approaching this to believe that a 4-year school is going to be the solution, in fact, really isn't the case. Even with a 4-year degree, as was mentioned with the proprietary system, Cisco systems, those types of things.

The real training and education dollars need to be poured into those companies that build these systems that we all use so that they have more support so they can grow a workforce that actually can operate the systems they build. Having more funding available to companies like Tipmont to recognize that the education and training costs, ongoing costs are very, very significant as compared to many other jobs that are a little more where the industry is more stable.

I would say 10 to 1 was pretty much, and the career opportunities are very significant. And hopefully we can get the word out much better than we have in the past.

Senator BRAUN. Thank you.

Senator SMITH. Thank you. Thank you, Ranking Member Braun. And I am going to defer to my colleague, Senator Rosen, because I know she has several things she has to do this morning. So please go forward, Senator Rosen.

Senator ROSEN. Well, thank you, Chair Smith and Ranking Member Braun, of course, to our witnesses for being here today. And there are always a lot of hearings every morning, so we are all going between competing hearing times. So I am going to address a little bit about the apprenticeships in a minute because workforce is really important, and a lot of changes were brought on

by the pandemic. And over the last 2 years it has really reshaped the American workforce.

Workers left the workforce, they are now returning, and in many cases, others decided to leave long time jobs to switch career fields entirely. That is why I introduced the bipartisan STEM Restart Act with Senator Hyde-Smith. Our bill would create a new program at the Department of Labor to support mid-career return ships in STEM, or those looking to transition into a return to STEM workforce, particularly in the wake of COVID.

Mr. Hendricks how could expanding opportunities for return ships, people in mid-career, or trying to upskill or reskill themselves, specifically who support workers who may want to transition—excuse me, from a non-STEM field into a STEM career like cybersecurity or broadband.

Mr. HENDRICKS. Thank you, Senator. I would like to point out that the average age of our apprentice is not the high school student we have all been talking about. Our average age is between 25 and 35. So these people are reskilling. They have experienced a career, gained life skills, and discovered that the career they are in is not for them. However, it is hard to make that transition.

How are they going to access supportive services? What are they going to do with their families and all this as they attend the apprenticeship and as they work on the job? So that help for them would be vital to bring them into this new career. Thank you.

Senator ROSEN. Thank you. And I want to move on a little bit now talking more about workshop through apprenticeships, because having just passed the Infrastructure Investment and Jobs Act, we know that hiring a skilled workforce is one of the primary challenges of implementing this historic legislation.

To help address ongoing skilled workforce shortages, earlier this year, I introduced the bipartisan Cyber Ready Workforce Act with Senator Blackburn. Our bill would direct the Department of Labor to award grants and to workforce intermediaries to increase access to registered apprenticeship program in cybersecurity that would lead to industry recognized certification, preparing Americans for in-demand jobs, including many that will be created by the new infrastructure law that will help protect our critical infrastructure and our data systems.

The registered apprenticeship model provides workers an opportunity to earn while they learn and obtain a widely recognized credential in their career field with little to no debt. So, Mr. Hendrix, again, can you talk about how expanding and building on proven models like registered apprenticeship programs, how they can help us address and fill some of the long term infrastructure workforce shortage, excuse me, shortages we are facing, particularly, again, in cybersecurity and broadband? And what can Congress do to use apprenticeships to strategically address the talent pipeline issue?

Mr. HENDRICKS. Thank you, Senator, for the question. Our apprenticeship is built. It is stable. The training is available. We are ready right now to bring more people in and train them in this area. We have the means. We have the capability. All we need is the corresponding project to put that person on.

I can recruit and I can bring people into the apprenticeship all day long. However, if I don't have the project right now to put them on, they receive the related instruction, but not the hands on training to reinforce it. I do believe the projects that you are talking about, all this broadband infrastructure that we are going to build, should demand the utilization of registered apprenticeships.

That is how we are going to get those people in, by having a greater access and a greater capability for the apprenticeship to put them on those projects.

Senator ROSEN. Well, I agree with you there. I think it is really important. And there is going to be more investment because Congress is poised to make additional investments in innovation and workforce development through the competitiveness package that is soon going to begin the conference process.

I am especially pleased that components of my bipartisan Cyber Ready Workforce Act were included in the House COMPETES Act provisions on my—excuse me, especially based on my Advanced Manufacturing Apprenticeship bill with Senator Blackburn—Blackburn, excuse me.

Dr. Turner and then Mr. Hendricks again. Are there specifics—oh, I have run out of time, so we will take these off the record. What other specific provisions should we ensure remain in the final conference version that would support workforce development or apprenticeships, and specifically for those looking to enter or grow in the broadband workforce? I know you have been waiting. Thank you for deferring. We will take those answers off the record.

Senator SMITH. Thank you very much, Senator Rosen. We will get those questions submitted to you so that you can respond to them. That will be great. Ranking Member Braun, I really appreciate this Committee hearing that you and Senator Hickenlooper, or Chair Hickenlooper have put together. I don't know about you, but when I was back in Minnesota last week, the combined issues of the opportunity of building out our infrastructure, and especially broadband infrastructure, with the great need for workforce and workforce training, I heard everywhere I went at home.

This is—and particularly hear it from students and young people that are trying to figure out what the options are for them. And as you say, Mr. Hendricks, you know, are not like fully aware of what the opportunities are. And this is so important for us to address, because we need these workers. We cannot realize the economic potential of our Country and individuals can't realize their own economic potential if we can't figure this out.

I appreciate very much that it is a bipartisan, an issue of great bipartisan interest here in the Senate. So it is great to have this hearing. I want to focus in a little bit on rural issues. And Mr. Hendricks and Mr. Gillum and Mr. Holcomb, I am going to be addressing this question to you. So together, the American Rescue Plan and the bipartisan infrastructure law will lay the fiber and make the connections that connect Americans to jobs, to education, to health care, really to the world.

We need to make sure that these historic investments that are getting out to states, hundreds of millions of dollars for mapping

and infrastructure and connectivity, that they are deployed where they are going to have the greatest impact. And similarly, I think we need to be training people in those communities, in those rural communities, so that they are able to do that work where they live.

Mr. Gillum, I am looking at you because I was smiling as you were talking about how people go away to go to school, and they get homesick. They want to be back where their families are. And so I appreciate that.

Can you talk a little bit about how do we prioritize hiring employees where training, you know—hiring employees that we are trained in local apprenticeship programs or technical colleges near where they live and trying to understand what we can do to sort of encourage that workforce development in community where we are deploying broadband, where people want to stay.

Mr. GILLUM.

[Technical problems]—sorry. Thank you very much, ma'am, for the question. Back to this small community college, this scholarship that we developed, it is only been around now, I think, for 3 years. It was an idea. Again, we lost multiple employees that had went back home to the 30 mile radius of where this small college is. We know that we need local talent to come back home.

With the scholarship we offer priority internships between their potential 2 year degree. We try to accommodate. We go to their local job fair and high school job fairs and guidance counselors to help promote. The community college itself is willing and ready to come and speak with the students and counselors. So we are very excited for the opportunity.

Senator SMITH. That is great. And Mr. Hendricks, do you find that students in your apprenticeship programs want to stay in their communities? And what have you seen about how we can encourage that local workforce development?

Mr. HENDRICKS. Thank you, Senator. Yes, absolutely. They want to stay close to home. Two weeks ago, I drove an hour from Denver to a little speck on the map, called Elizabeth, Colorado, to talk to five high school students about our program.

Two of those students, their parents actually own an electrical company, and their whole thought is to learn the trade and then go back and take over this company from their parents. And there was one young lady and one young man, and that was their intent, they were going to take over the company from their parents once they learned the trade. So they are absolutely going home.

Our thoughts on all this as far as the apprenticeship, we want to train them where they are. Years ago, we had students up in the mountains, out on the plains, and we have developed a remote training model, and this was way before COVID. We experimented with this. We developed this to train them where they are.

We are actually one step behind all of this broadband building and infrastructure, because as it expands into those areas, we are ready to train people where they are. Thank you.

Senator SMITH. I think that the registered apprenticeship programs are really the gold standard for workforce training, with an excellent return on investment for both workers and for businesses.

And, you know, I just want—I note in your testimony, you made a great point by posing this question, can you imagine a citizen of the United States not knowing that you could go to college, get a degree in a chosen field, and better your life by doing so? It is simply unthinkable.

Yet that is the case with opportunities for registered apprenticeship programs. So what else can we be doing at the Federal level to be lifting up these apprenticeships and what the kinds of—what this preparation and training can accomplish for people? Mr. Hendricks, thank you.

Mr. HENDRICKS. Thank you, Senator. As I stated, we need more exposure. We need to be put into the minds of people, and we were talking about people transitioning. I would love to have an office next to our local community college registrar's office as those people are leaving college and deciding this is not for them, and I could pull them right into my office and say, look what I have for you.

That would be, I think, one of the greatest things I could do for the apprenticeship. Now, that is not going to happen, obviously. However, I think if we were to incentivize the high schools to make people ready for registered apprenticeships the way—the same way that we incentivize them to be college ready, that is going to go a long way in introducing people to our trade.

Senator SMITH. Yes. Thank you. Dr. Lee, would you like to add anything to this discussion? I know you have thought a lot about this as well.

Ms. Turner Lee. Yes. No, thank you, Senator. I want to just add to what has already been said, the need for the supportive services.

Obviously, having transportation vouchers, ensuring that there is some type of tuition offset, as we have heard in the scholarship program, making sure that we are also being culturally efficacious when it comes to getting populations that have not seen the type of career path of interest, ensuring that we have, you know, approaches in bilingual pamphlets or narratives for folks to actually get involved with.

I want to agree with the other colleagues that the apprenticeship model has historically been a success for the U.S. The challenge is people need help getting to some of the programs. So we have got to increase the social services and support services.

Senator SMITH. Thank you. Ranking Member Braun, do you have another round of questions?

Senator BRAUN. I do.

Senator SMITH. Very good.

Senator BRAUN. Thank you. Mr. Hendricks, I asked Mr. Gillum and Holcomb earlier, because I think it is important that you put the particulars out there—so through your apprentice approach, No. 1, you said no debt. I think that resonates more loudly than almost anything good for especially parents that have, you know, been misguided along with their kids along the way and end up with debt and maybe nothing to show for it.

Why don't you explain what that range of starting wage would be, pay, through career and maybe the benefits that go along with

it? I think that is what the public needs to hear because the numbers that I heard earlier would be associated mostly with 4 year degrees. Go ahead, can you expand on that?

Mr. HENDRICKS. Absolutely. Thank you, Senator. We have two programs in our apprenticeship. One for the electrician, one for the low voltage technician. And since we are talking about the broadband arena, I will focus on the low voltage technician. Their starting wage is nearly \$16 an hour, so they are making \$32,000 a year on the check. Their benefits are another \$9 an hour to start.

We are talking an \$80,000 job out of the gate. Day one, on the job. A technician can earn up to, as the turnout and become journey workers, they can earn well over \$50,000 on the check and another \$12 in benefits. So we are talking over \$100,000 job in 4 years. I don't know if you can find a college degree where you can start at \$60,000 and go to \$100,000 in 4 years.

Senator BRAUN. I think that message that you just have given us, and what Mr. Gillum and Holcomb talked about, that needs to resonate because it is not only in broadband, it is across the rest of the spectrum. I remember back when I was in our state legislature, 60,000 to 80,000 jobs out there, high demand, high wage carried those same characteristics, and the main barrier was that you were not given an honest kind of discussion about it, especially early on in middle school and especially before you hit the ground running in high school.

Dr. Lee, I was reading your kind of affirmation of what I just said. I like from your think tank, your studies. Is this broader than just broadband when it comes to what we need to do to revolutionize a better guidance, a better education for our kids, in light of the fact that we are wrestling with \$1.6 trillion in student debt?

Ms. Turner Lee. You know, I love that question for a variety of reasons, Senator. One, because I think that there is this opportunity of transferable skills. So what I like about this panel is that I am probably the only broadband geek sitting in the square center of it. But you do need electricians and you need other types of occupations that are going through apprenticeship programs that will apply to broadband infrastructure.

But more importantly, to your question, one of the things that we do have with this \$1.2 trillion investment is we have incentive for demand and supply and demand. And I think we will miss opportunities, for example, of states don't think about ways in which they can incentivize a workforce, contribute to some of the education initiatives that you have discussed, find ways to promote apprenticeships because you are going to have to build the architecture within their local communities.

We need companies like Mr. Holcomb's to have more than 25 employees to do so. And so the more that we can incentivize and use this body of money as a way to encourage the workforce, I think we will have better results in the end. And that goes back to, I think, something you said and the Ranking Member—the Chairman, which is strategic and calibrated.

Senator BRAUN. And the other point I am hearing, too, this isn't complicated. It is simply getting businesses involved to where they

are going to do things like Toyota has done down in Southern Indiana, close connections with the local school districts. Begs the question here too, not only the \$1.6 trillion in debt that we have amassed, but the fact that we are heavily in debt as a Federal Government.

A lot of this can be done at the grassroots level and hardly cost anything. And even to the opposite effect, have a return on investment with very little other than a recalculation, a reorientation. And those are the things that excite me, because so often you get grandiose plans that come from here that you have trouble paying for, currently borrowing money to spend it, and this is within our grasp at the grassroots level.

That concludes questions that I have, and I really enjoyed the conversation with all of you.

Senator SMITH. Thank you very much, Senator Braun. I have one last question. And then pending whether Senator Hickenlooper comes back or not, I will adjourn the hearing. And my question has to do with the following, what we need to do to get, you know, outreach into people earlier in their educational careers. And it makes me think about a bill that I have with Senator Graham, which is called the Youth Workforce Readiness Act.

What our bill would do is to pull in afterschool providers, like, for example, boys and girls clubs, to help young people connect with employers early on for the purposes of job training and internships, career exploration, and registered apprenticeships, pre-apprenticeship programs to get the gears turning for young folks as they are trying to decide what direction they want to go and not waiting until they are already on a track that isn't—doesn't work for them. So I just want to pose the question to the panel.

Would anyone like to comment on how important you think it is to take this kind of an earlier approach for workforce programs starting at younger ages?

Mr. HOLCOMB. Thank you, Senator. It is a local effort for my Tipmont/Wintek. So we have a strong, ongoing relationship with Ivy Tech. I think the community colleges are absolutely a key to this, addressing this issue. We work with their professors. They give us a pipeline. We help keep them up to date on, you know, where the curriculum is going. We work with regional leaders in the community, with youth programs.

We have a STEM project that we are starting with the Catholic schools to help kind of build awareness of these types of things. So we are kind of taking the approach that we got to build the pipeline early and we got to go do it ourselves with outreach, and that is how we do that. It has been very successful in that regard, but it has been very much a localized effort.

Senator SMITH. Thank you.

Mr. GILLUM. Exactly right for us. We are very, very involved with our local community from hosting local junior board meetings in our facility, educating those students at those board meetings on exactly what LightStream is and does, to providing during the pandemic and currently free Wi-Fi throughout the city and city park so students could go and do their homework if they didn't have ac-

cess to the high speed internet. We are heavily involved in sponsoring athletic programs to prom after parties—

Senator SMITH. I understand.

[Laughter.]

Senator SMITH. It is all about building relationships.

Mr. GILLUM. That is exactly right. That is exactly right. And myself and all the employees included that. You know, we try to interject and involve ourselves with the community and we see them at church. We see them at the school, we see them at dinner, and it is very important to us. I think also kind of on the subject as we talk to you, you know, as things pop into your mind, is there starting to release or come up with the playing of the BEAD program for—sorry, \$42.5 billion.

I really strongly believe that there should be some educational applications within those grant opportunities that to help further educate. You know, as we—as bandwidth needs increase, so does the technology, then providing that bandwidth. And along with new technology comes new training. And as we are talking about existing employees and furthering that education, I think it is very important and I think it should be part of some of that money.

Senator SMITH. Thank you very much.

Ms. Turner Lee. And if I can add, I want to just followup on that. I mean, as the BEAD money is being distributed as part of the broadband infrastructure portion of the infrastructure bill, I think that we need to embed workforce training into if not the deployment side of it, but we do have the \$2 billion in digital equity. So where we are funding local intermediary—local organizations to actually assist with this, as well as workforce intermediaries who have the responsibility to ensure that they are providing access to 21st century skills, not just perhaps pushing a broom or doing other occupational skills that aren't as important.

I would just say one last thing, too. I think at the heart of this as well, particularly in rural communities, is closing the digital divide. The more that we can think about the pairing of the money that is invested in infrastructure, that is why I promoted a digital service corp, with what we are trying to do locally with people, changing their trajectory in life, they have to go hand in hand. People can't do what they can't see, experience, or imagine.

Senator SMITH. Thank you very much. That will conclude our hearing today. I would like to thank my colleagues and our witnesses for your participation. For any Senators who wish to ask additional questions, questions for the record will be due in ten business days by May 17th at 5 p.m..

The Committee will next meet on Tuesday, May 10th, for a hearing on the nomination of Kalpana Kotagal to be a member of the EEOC.

The Committee stands adjourned.

ADDITIONAL MATERIAL

JONATHAN ADELSTEIN, PRESIDENT AND CEO, WIRELESS
INFRASTRUCTURE ASSOCIATION

The Wireless Infrastructure Association (WIA) is the principal organization representing the companies that build, develop, own, and operate wireless facilities in the U.S. and throughout the world. Our members include infrastructure providers, wireless carriers, equipment manufacturers, and professional services firms. Our mission is to enable wireless broadband access everywhere.

WIA shares Congress' goal of closing the digital divide to ensure economic, educational, and health opportunity for all Americans, including rural and underserved populations. To achieve this goal, though, the U.S. needs a properly trained workforce ready to deploy broadband. Currently, neither a large enough nor a fully trained workforce is available to meet the demand for the massive future broadband buildout ahead of us that Congress envisioned. I commend this Committee for its focus on developing the broadband workforce and the wireless industry stands ready to assist you to build that workforce so that the U.S. can continue to lead the world in wireless innovation.

The telecommunications industry, like most other industries, is already seeing a shortage of workers to meet the demand for broadband network buildout. The recently enacted Infrastructure Investment and Jobs Act included historic funding for broadband deployment and will make the workforce shortage even more acute. This major new Federal investment in broadband infrastructure will create hundreds of thousands of new jobs, increasing demand on the already short supply of skilled and diverse workers. To increase the efficiency and success of this Federal funding, a corresponding initiative is needed to develop the broadband workforce through support for registered apprenticeships and the educational system. Apprenticeship is an essential way to expand the broadband workforce to speed the deployment of high-speed internet.

The Department of Labor has done great recent work in supporting a pipeline of skilled broadband workforce through apprenticeships, yet more Federal investment and focus are needed. Of the more than \$850 million in Department of Labor grants for apprenticeship, less than 1 percent has gone to support broadband or the telecommunications workforce. Current broadband buildout had already created 106,000 direct jobs in installation and engineering. At the current rate of deployment, there will be 500,000 more new direct broadband jobs through 2025.

The workforce training effort is designed to diversify the workforce with high-wage, upwardly mobile jobs of the future. It can jumpstart careers for underserved populations in an industry evenly spread across the U.S. and provide new career paths for those that lost jobs during the pandemic. Congress needs to continue to invest in developing a skilled broadband workforce by funding telecommunications and broadband registered apprenticeship through the Department of Labor. President Biden has called on Congress

to invest even more in workforce development, including apprenticeships.

We applaud the interagency efforts recognizing that workforce development and economic development are intertwined. The Administration should be lauded for funding innovative programs, with EDA's Good Jobs Challenge as an example of this kind of program. The Good Jobs Challenge is a great opportunity to invest and support the broadband workforce. We urge Congress and the Administration to fund impactful projects that will rapidly expand education and workforce development, with wireless and broadband being a high priority.

Wireless jobs are different than other jobs because they create jobs in other industries throughout the economy. Each direct wireless job results in a total employment multiplier effect of 7.7x, which is far ahead of other sectors, such as full-service restaurants at 1.5x, and hardware manufacturing at 3.9x. Each \$1 of the wireless industry's direct GDP contribution results in \$3.20 of total GDP impact across the American economy.

WIA is leading the way in broadband workforce development. Notably, WIA is the National Sponsor of the Telecommunications Industry Registered Apprenticeship Program (TIRAP), a Department of Labor registered program and the leading apprenticeship program in the wireless industry. Since 2017, WIA has administered National Standards of Apprenticeship along with the Department of Labor for approved occupations established under the program. Graduates receive a national, industry-recognized credentials that certify occupational proficiency and provides opportunities for career advancement. WIA supports employers in promoting consistency and uniformity in training across occupations to improve the safety and quality of the wireless workforce. WIA works closely with the Department of Labor and appreciates their support for TIRAP and workforce development.

In 2020, WIA received a 5-year grant from the Department of Labor to expand TIRAP, with a commitment of 5,500 new apprentices. In addition, the Department of Labor named WIA as the only industry intermediary for registered apprenticeship for the telecommunications industry, with a focus on underrepresented populations, including veterans, women, and people of color. TIRAP currently has registered 11 critical occupations, including cell tower installation, radio frequency technicians, utilities technicians, leads, and supervisors.

In addition to TIRAP, WIA is working with institutions of higher education across the country to develop and expand telecommunications programs, build curriculum, and train students and job-seekers for high-growth careers. WIA is working actively with Historically Black Colleges and Universities and a broad network of Career and Technical Education programs focused on raising awareness of wireless careers, fostering training, and attaining diversity, equity, and inclusion.

Currently, working with our partner organization the Power and Communication Contractors Association, WIA has five community and technical college pre-apprentice partners. These five institutions are: Monroe County Community College (Michigan), Somerset

Community College (Kentucky), State Technical College of Missouri, Terra State Community College (Ohio), and Northwood Technical College (Wisconsin). If there are institutions in your state that would make good partners for a pre-apprentice program, please let WIA know. Our goal is to create these programs across the country.

Thank you again for your focus on these important issues. There is undoubtedly more work ahead, and we look forward to partnering with this Committee to build a diverse and properly trained broadband workforce to advance the connectivity that has become so essential in all our lives.

INDEPENDENT ELECTRICAL CONTRACTORS
ARLINGTON, VA 22206
May 2, 2022

Hon. JOHN HICKENLOOPER, Chairman,
Hon. MIKE BRAUN, Ranking Member,
Subcommittee on Employment and Workplace Safety,
United States Senate,
Washington, DC.

DEAR CHAIRMAN HICKENLOOPER, RANKING MEMBER BRAUN, AND
SUBCOMMITTEE MEMBERS:

The Independent Electrical Contractors (IEC) welcomes the efforts of the Subcommittee on Employment and Workplace Safety to address workforce issues as it relates to construction and installation of broadband technology and appreciates the opportunity to provide comment. Given the impact of the COVID-19 pandemic, IEC believes the Federal Government must play a more significant role in supporting individuals seeking skills that will lead to new careers in fields like electrical contracting.

Established in 1957, Independent Electrical Contractors is a trade association representing over 3,600 members with more than 52 chapters and training centers nationwide. Headquartered in Arlington, VA., IEC is the Nation's premier trade association representing America's independent electrical and systems contractors. IEC National aggressively works with the industry to establish a competitive environment for the merit shop—a philosophy that promotes the concept of free enterprise, open competition, and economic opportunity for all.

IEC is uniquely situated to comment on Federal policies aimed at helping to address the industry's workforce shortages. For decades, IEC has been at the forefront of the industry providing highly skilled electricians through its registered apprenticeship program. An IEC apprentice is able to earn while they learn, incurs little to no debt and enters into a well-paying job upon graduation. According to the Bureau of Labor Statistics (BLS), the median salary for an electrician in 2021 was \$60,040. In addition to being certified by DOL's Office of Apprenticeship and 38 State Apprenticeship Councils, the American Council on Education (ACE) has recommended that students that graduate the IEC apprenticeship program be eligible for up to 46 semester hours of college credit. IEC is also a member of DOL's Registered Apprenticeship—College

Consortium (RACC), a national network of postsecondary institutions, employers, unions and associations working to create opportunities for apprentice graduates who may want to further enhance their skills by completing an associate's or bachelor's degree. RACC members have their programs evaluated by a third-party organization to determine the college credit value of the apprenticeship completion certificate. During the 2021–2022 school year, IEC's merit shop contractors and chapters will educate over 14,000 electrical apprentices across the country.

According to the 2022 Construction Hiring and Business Outlook report by the Associated General Contractors of America, 83 percent of construction businesses are having difficulty finding qualified skilled labor to fill open positions. This corresponds with IEC's merit shop electrical contractors' frustration to recruit qualified individuals to fill openings as journeyworkers or apprentices.

Congress can play a key role in assisting the construction industry with the shortage it continues to face by enacting prudent public policy and funding programs that grow the number of individuals that ultimately enter the industry. Below are a few suggestions the Subcommittee may want to consider as it continues to craft proposals to address the industry's workforce shortages.

Apprenticeship Funding

In recent years, policymakers have focused primarily on providing funding to non-traditional or new apprenticeship programs. Given that research shows that for every \$1 invested in apprenticeships leads to a public return of approximately \$28 in benefits, Congress should consider apprenticeship funding as one of the best investments it can make for all types of programs, including existing programs in the construction industry. By devoting more resources to all apprenticeship programs through tax incentives or additional grant funding, Congress would not only help the industry address its shortage, but also prove to be one the most efficient uses of taxpayer dollars.

Career and Technical Education (CTE)—Perkins

CTE programs have proven to be one of the most effective ways to expose students to construction and a career in the skilled trades. Unfortunately, it is very expensive to administer CTE programs given the nature of the classrooms, equipment, and instructors necessary to operate them effectively. IEC would recommend Congress double the funding for CTE programs to help expand programs already in place and establish programs where none currently exist.

Workforce Innovation Opportunity Act (WIOA)

WIOA can play an even bigger role than it already does in addressing the shortages the skilled trades. This can be accomplished by placing a greater emphasis on job training that will help individuals secure careers in industries like construction. By increasing WIOA funding, Congress will help more underemployed adults obtain a more secure career while at the same time reduce the burden on Federal Government and its safety net programs.

Project Labor Agreements (PLAs)

IEC urges Congress to reject discriminatory project labor agreement (PLAs) policies implemented by the Biden administration that inhibit the ability for the merit shop to grow its workforce in partnership with the Federal Government. President Biden recently signed Executive Order 14063, which requires PLAs on Federal contracts of \$35 million or more funded by the Infrastructure Investment and Jobs Act (IIJA). The U.S. Department of the Treasury then released its Final Rule for the State and Local Fiscal Recovery Funds program enacted as part of the American Rescue Plan Act, which encourages state and local government that apply for funds to use PLAs. Both include funding for broadband construction projects.

Aside from discriminating against merit shop contractors by requiring companies to agree to recognize unions as the representatives of their employees on that job and use the union hiring hall to obtain workers, PLAs are anti-competitive and increase cost to taxpayers by 12 percent to 20 percent. They also discriminate against over 87 percent of the construction workforce that freely chooses to not be part of a union. If Congress is serious about growing the workforce within the skilled trades, IEC would ask that it support policies that enables the majority of individuals in the skilled trades to work with the Federal Government and help grow our Nation's broadband workforce and infrastructure.

IEC appreciates the Subcommittee's efforts to address the construction industry's workforce issues and as it grows our Country's broadband network. As the Nation continues to recover from the COVID-19 pandemic, displaced workers are going to be seeking new opportunities and new careers. IEC's merit shop electrical contractors stand ready to work with Congress to craft policies to address these workforce challenges and help put the country's economy back on track and prosper in the years to come. Should you have any questions, feel free to contact me at jtodd@ieci.org or (703) 650-0054.

Sincerely,

JASON E. TODD,
Vice President,
Government Affairs.

[Whereupon, at 10:45 a.m., the hearing was adjourned.]