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RPTR ZAMORA

EDTR HUMKE

DEFINING AND MAPPING BROADBAND COVERAGE IN AMERICA

WEDNESDAY, JUNE 21, 2017

House of Representatives,
Subcommittee on Communications
and Technology,
Committee on Energy and Commerce,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10:00 a.m., in Room 2123, Rayburn House Office Building, Hon. Marsha Blackburn [chairman of the subcommittee] presiding.

Present: Representatives Blackburn, Lance, Shimkus, Latta, Guthrie, Olson, Kinzinger, Bilirakis, Johnson, Flores, Brooks, Collins, Walters, Costello, Walden (ex officio), Doyle, Welch, Clarke,

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Loeb sack, Ruiz, Eshoo, Butterfield, Matsui, McNerney, and Pallone (ex officio).

Staff Present: Elena Brennan, Legislative Clerk, Energy and Environment; Kelly Collins, Staff Assistant; Zachary Dareshori, Staff Assistant; Chuck Flint, Policy Coordinator, Communications and Technology; Adam Fromm, Director of Outreach and Coalitions; Gene Fullano, Detailee, Communications and Technology; Giulia Giannangeli, Legislative Clerk, Digital, Commerce, and Consumer Protection/Communications and Technology; Kelsey Guyselman, Counsel, Communications and Technology; Bijan Koochmaraie, Counsel, Digital, Commerce, and Consumer Protection; Tim Kurth, Senior Professional Staff, Communications and Technology; Lauren McCarty, Counsel, Communications and Technology; Drew McDowell, Executive Assistant; Katie McKeough, Press Assistant; Alex Miller, Video Production Side and Press Assistant; Paul Nagle, Chief Counsel, Digital, Commerce, and Consumer Protection; Dan Schneider, Press Secretary; Madeline Vey, Policy Coordinator, Digital, Commerce, and Consumer Protection; Evan Viau, Staff Assistant; Hamlin Wade, Special Advisor, External Affairs; Jeff Carroll, Minority Staff Director; Alex Debianchi, Minority Telecom Fellow; Evan Gilbert, Minority Press Assistant; David Goldman, Minority Chief Counsel, Communications and Technology; Jerry Leverich, Minority Counsel; Lori Maarbjerg, Minority FCC Detailee; and Dan Miller, Minority Policy Analyst.

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Mrs. Blackburn. The committee will come to order.

As we begin today, and before I recognize myself for an opening, I would like for us to remember Steve Scalise, a member of this committee, and also those that were involved in the shooting last week.

And I thank Mr. Doyle, who is the team manager, team leader for the Democrats' victorious baseball team, for the gesture of kindness last week in sharing the trophy.

And at this time, I recognize myself for 5 minutes for an opening. And welcome to all of you to our subcommittee hearing, which is titled "Defining and Mapping Broadband Coverage in America." Delighted to see the interest in this topic and delighted that you all are here.

And I thank our witnesses for appearing as we examine the definition of broadband and existing challenges in updating the National Broadband Map which has not occurred since June 2014, if you can believe that.

Broadband is the infrastructure challenge of this decade, and the digital divide continues to plague rural America in particular. We must be good stewards of taxpayer money by ensuring that there is access to accurate data so that areas with the greatest need for broadband services are targeted by both public and private investments.

This hearing will be divided into two discussions: Defining broadband coverage and mapping broadband coverage. The FCC redefined minimum broadband download speeds at 25 megabits per second in 2015

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as part of its broadband progress report.

This represented a dramatic shift from the previous standard of 4 megabits per second and resulted in a significant change in the number of Americans considered covered by broadband. Broadband services and usage run the gamut from basic and light to advanced and high.

Americans utilize the internet for a variety of things, and we realize that there is increasing demand for higher speeds. However, we should examine whether a totality of the circumstances test is perhaps appropriate in determining how we define broadband connectivity. Particular weight should be given to factors such as the current level of coverage, or lack thereof, and the cost of deployment.

Mapping broadband coverage will be a second discussion point. Each administration has taken action to spur broadband deployment, beginning with the Clinton administration's efforts in 1995, when GSA tried to streamline the permitting process for wireless antennas.

Approximately 7.2 billion in Federal grants and loans were awarded through NTIA's B-TOP and the RUS BIP as a part of the Obama administration's American Recovery and Reinvestment Act of 2009. \$293 million of this money went to the State broadband initiative, which numerous States used to create public/private partnerships to generate a map.

NTIA had authority over the National Broadband Map, but it was

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transferred to the FCC when B-TOP funding to update the map ran out in June 2014. More importantly, a GAO analysis of the ARRA's implementation revealed that data collection methods needed improvement in order to be more effective.

In short, billions in taxpayer money was spent on broadband deployment by the last administration but failed to achieve desired results as little more than 183,000 miles of network infrastructure was built. The economic, educational, and healthcare opportunities that come with unleashing broadband are undeniable.

I love this report. It is an essential report. And it notes that smart cities' growth could result in a \$500 billion impact on GDP over 10 years. However, accurately defining broadband and ensuring access to accurate mapping data is imperative so that hardworking taxpayer money targets areas most in need of broadband service.

Those who do not learn from the mistakes of the past are doomed to repeat them, so let's learn and let's not repeat the mistakes. We should proceed as expeditiously as possible but with caution and with wisdom from those learned mistakes.

At this time, I yield back my time, and I recognize the gentleman from Pennsylvania for his opening statement.

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[The prepared statement of Mrs. Blackburn follows:]

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Mr. Doyle. Thank you, Madam Chair. I want to thank you for holding this hearing and say thank you to the witnesses for being here.

I also want to take a moment, in light of the events last week, to reiterate to my colleagues on the Republican side of the aisle and to the public that while Republicans and Democrats may disagree on a lot, we share many of the same goals and aspirations: We love our country, and we want to do well by the people who have sent us here to represent them.

We also agree that broadband deployment is critical for the future of our Nation and for our economy. And while much progress has been made to bridge the digital divide, we are still struggling to connect unserved and underserved communities across the country.

While the FCC continues to make critical investments in broadband deployment through the Universal Service Fund, we are still falling short in terms of meeting the needs of underserved Americans.

Ranking Member Pallone, myself, and the rest of our side of the committee have put forward an infrastructure proposal that would invest an additional \$40 billion in broadband deployment. This investment could significantly close the broadband deployment gap and bring high-speed internet service to 98 percent of the country.

Representatives Loeb sack and Ruiz also have bills that respectively seek to improve mobile coverage maps and expand and improve universal service funding on Tribal lands.

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And Representatives Welch and McKinley have a bipartisan bill that directs the FCC to establish standards for what constitutes reasonably comparable service in rural and urban areas. These bills all have merit, and I strongly urge the chairman to allow this subcommittee to consider these bills.

I would also, again, urge the chairman to call the FCC before this committee for an oversight hearing. The oversight hearing that was scheduled for March 8 has never been rescheduled. The commission has received roughly 5 million comments in their proceedings to eliminate net neutrality rules, and they have yet to come before this committee to address the public's concerns. I hope that we can work together and get a hearing scheduled with the commission as soon as possible.

With that, I would like to yield 1 minute to the gentlelady from California, Ms. Matsui, and then an additional minute to Representative McNerney.

[The prepared statement of Mr. Doyle follows:]

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Ms. Matsui. Thank you very much, Mr. Doyle, for yielding me time.

I appreciate the subcommittee's continued focus on broadband infrastructure, but I am disappointed that we are having another hearing exploring the topic rather than a legislative hearing to advance the bills we have worked on. I hope that this committee takes action to ensure everyone has access to the tools they need to succeed in the digital economy.

Whether you live in an urban district, like my congressional district in Sacramento, or a rural area, there are many challenges to broadband deployment. Affordable access to truly high-speed broadband for every American is going to require significant and sustained Federal investments.

Those investments should include improving our Federal broadband data. The National Broadband Map has not been updated in 3 years, and the public is losing out without this important tool. That data was used by communities across the country whether it was connecting small businesses in New York or saving jobs in rural Utah.

We all want the United States to have world-class communications networks, and we should have the data that shows whether we are truly leading the global economy. This has been a bipartisan issue, and I urge my colleagues to work with us on real solutions.

Thank you, and I yield to my colleague.

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[The prepared statement of Ms. Matsui follows:]

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Mr. McNerney. I thank the ranking member for yielding time to me, and I thank the chair and the ranking member for holding the hearing today.

As we examine the issue of broadband access, I want to highlight the importance of this issue to our Nation's veterans. Access to broadband internet service is critical to the more than 20 million veterans across our Nation. Having broadband internet access helps veterans apply for jobs, obtain vocational training, communicate with friends and family, and access services at the VA.

Without broadband internet access, it is difficult to fully participate in today's society. Veterans face many challenges when they return home, and not having internet access makes what can be a tough transition process even harder. This is especially important for the more than 1.4 million veterans living below the Federal poverty level and the 5.3 million veterans living in rural areas.

Last Congress, I introduced bipartisan legislation that would put us on a path to helping more veterans get access to internet service. This bill passed the House. It is my hope that this year we can move this bill again and this time get the Senate to move on it -- although, we don't have any control of that.

With that, I thank the ranking member and yield back.

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[The prepared statement of Mr. McNerney follows:]

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Mr. Doyle. And, Madam Chair, just, I would like to ask unanimous consent to enter into the record letters from the City of Westminster, the Consumer Council, and the Satellite Industry Association.

Mrs. Blackburn. So ordered.

[The information follows:]

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Mr. Doyle. Thank you. I yield back.

Mrs. Blackburn. The gentleman yields back.

Mr. Johnson, we will yield to you. We are waiting for the chairman. I know he has an opening statement he wants to make.

So I yield to Mr. Johnson for 5 minutes.

Mr. Johnson. Well, thank you, Madam Chair. I won't use the entire 5 minutes, but let me just say how glad I am that we are having this hearing and others yet to follow in the coming weeks and months.

This is a tremendously important topic for people that live in rural America. I can tell you that in eastern and southeastern Ohio, I have young people that have to go to a neighboring town and drive some distance to be able to get access to do their homework and to do their school research projects.

I don't know about you, but I never had to go to Tim Hortons to do my homework, but that is where some of them have to go to a neighboring town where they can get a WiFi connection, if they can get a WiFi connection. And so it is really important.

I was in Youngstown, which is not so much rural, by the way, a very industrialized city, an island, an enclave of businesses just outside of Youngstown; yet, all they have is DSL capability, and the business is struggling. They want to grow. They are prepared to grow. They want to hire more people, but they can't advance their business because they can't get access to broadband internet capability.

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So, Madam Chair, count me in, full speed ahead. Let's get this problem solved for America.

[The prepared statement of Mr. Johnson follows:]

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Mrs. Blackburn. I thank the gentleman for his leadership on this issue.

Is there any other member on the Republican side seeking time?

A couple of points -- my Democratic colleagues have raised it -- I just want to touch on. The reason we are doing this is because we do think this hearing is important to how we close the digital divide, and we are focusing on those infrastructure needs for broadband, the mapping issue, which is important.

The FCC commissioners, to my colleague from Pennsylvania, we have been working with them to reschedule a date. We anticipate having them before us in July. We will keep you posted on this.

On the concerns that I know Mr. Pallone has about net neutrality, you know that the FCC is dealing with that, and it would be premature for us to discuss those issues before or to take an action -- not to discuss but to take an action before the commission finishes their work.

And on the privacy issue, we had a very robust debate with this around the CRA process to set aside those FCC rules that had not yet been implemented and reserve the status quo on that issue. And I will say to my colleagues, I would be happy to discuss my BROWSER act with you on the privacy issue.

And we have reached out to all the Democratic offices in the House on this issue, and I will say this: It was disappointing to me to get a response from one Democratic office that suggested when I did the

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Dear Colleague -- and I am quoting from that response -- "Can you please remove the 200 other people who have expressed no interest in engaging in this topic."

So that was disappointing. I do hope that my colleagues do want to engage on privacy and that indeed we can move forward on this issue this year.

And the chairman has arrived and I will yield to Chairman Walden, the balance of the time.

The Chairman. I thank the gentlelady. I thank the chairwoman for her leadership on these communications and privacy issues.

You know, if you asked somebody in rural America, like in my giant district in eastern Oregon, whether they have broadband access that meets the speeds quota as defined by the FCC, they likely don't know. But if you ask them whether they get internet access to match their needs, they can probably give you a quick yes or no answer.

That should be our primary objective as policymakers looking to allocate Federal resources, counting for consumer demand, putting the consumer first, and getting the most people the best access we can to a productive level of internet service.

People in the remote parts of our country, including in Oregon, and other unserved parts of our country probably would tell you they would be happy just to have a connection, because some of them don't have that today, as you all know.

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And so that is the importance of, I think, this hearing and the work that we are doing going forward is figuring out how do you connect the unconnected. They should not be left behind in America, whether you are in Montana or Wyoming or Oregon or North Dakota or an urban setting where there are issues as well.

So I think this is really important that we have this discussion about mapping. We learned a lesson frankly the hard way from our experience with the rural utilities service and the 2009 Recovery Act. As outlined by an investigator with the nonpartisan Government Accountability Office, he said, "We are left with a program that spent 3 billion. We really don't know what became of it," closed quote. And that is because at the time that went through the money went out before the maps were drawn.

And I hope this time when we look at infrastructure expansion in America to connect places that we hit the mapping first. We focused on the areas that are unserved first and connect this country to one of the most important economic and social tools in our history.

With that, Madam Chair, I yield back the balance of my time.

[The prepared statement of The Chairman follows:]

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Mrs. Blackburn. The gentleman yields back.

Mr. Pallone, you are recognized for 5 minutes.

Mr. Pallone. Thank you, Madam Chair.

Three months ago to this day, this subcommittee held a hearing on this same topic. We heard from witnesses how in these uncertain economic times deploying more secure high-speed internet means providing more opportunities for more people.

Yet, here we are, 90 days later, reopening that same hearing while we still haven't had a single hearing on important issues like net neutrality, privacy, or oversight of this administration.

And I listened, Madam Chair, to what you said as to why that wasn't happening, but I don't agree. I mean, look, first of all, let me say that it is quite clear that this administration wants to get rid of both the privacy rules at the FCC as well as net neutrality.

And I have said before that on the day when we repealed the privacy rules in the Congress, I think the next day the President's spokesperson Sean Spicer had a press conference, and he literally said, well, now we got rid of the FCC privacy rules, and we are going to get rid of net neutrality next. And then the next week the FCC started that process.

So, you know, I am not going to be naive enough to assume that the FCC on a partisan vote isn't going to get rid of net neutrality. I think that is clear. But regardless, there is no reason why we can't

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have hearings on both of these issues.

I mean, clearly if you have a hearing, you are not necessarily deciding anything. You are basically, you know, having a discussion about the issue of net neutrality and privacy and what the FCC did and what the options would be moving forward. So I think that we should have those hearings, and, again, I will make a plea on behalf of the Democrats that we do that.

And we also haven't made progress on broadband deployment even though Democratic members of this committee have introduced a number of good bills that would help deployment.

One of our bills, called the LIFT America Act, would use a reverse auction to allocate \$40 billion on new broadband deployment across the entire country. Our proposal not only would create new opportunities for millions of Americans, it would prioritize schools, libraries, and 9-1-1 services.

Congressman Loeb sack has also introduced a commonsense bill that would direct the FCC to improve its broadband data. We heard at the last hearing about all the problems with the FCC's data. We also heard unanimous support for Mr. Loeb sack's proposal.

Congressman Ruiz has introduced legislation that would make sure people living in Indian country don't get left behind and aren't ignored when it comes to broadband deployment. We should follow Congressman Ruiz's example and do everything we can to help those who live on Tribal

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lands.

And finally, Congressman Welch and McKinley put forward a bill that would let us better compare the broadband services in rural areas to those in urban areas.

But for some reason, the Republican leadership on this committee refused to recognize any of these bills for our hearing today. In fact, this is the second week in a row in which this subcommittee is holding hearings on topics addressed by our bills with no acknowledgment of the significant benefits that these bills would bring to the American people.

These democratic proposals address real problems faced by real people and will help improve our Nation's security, opportunity, and connectivity. I hope the Republicans will eventually recognize the importance of these bills and will begin to work with us in moving them forward.

And with that, I would yield the remainder of my time to Congressman Loeb sack.

[The prepared statement of Mr. Pallone follows:]

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Mr. Loebsack. Thank you, Mr. Pallone.

As has been mentioned already, 3 months ago when our committee had its last hearing on broadband development, we heard broad agreement that the FCC's data needed improvement. We heard members on both sides of the aisle comment on how these bad data shortchanged rural America. We can all agree on that in this committee. And that is why I did introduce H.R. 1546, the Rural Wireless Act. This bill directs the FCC to improve its data collection that feeds its broadband coverage map.

During our previous hearing, I was encouraged that even the Republican witnesses strongly supported my bill. They testified that my bill is necessary to give residents of rural areas a chance, and I am looking forward to hearing what some of you folks have to say about that bill as well.

And, folks, you know, that is because in Iowa and many rural communities -- and we can agree on this, I think, on a bipartisan basis -- broadband means jobs. But in Iowa, access to broadband is even more than that; it is a manner of survival, literally survival.

If rural communities in Iowa cannot get access to broadband, they simply cannot survive. And as I have said many times before, in order to make that happen, we need both dollars and data, good data. And as heartened as I was at the last hearing, I am disappointed at where we are today.

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Despite the strong expert support for my bill, this committee hasn't made any progress legislatively. This hearing is supposed to be about improving broadband data and mapping, but in 3 months since the last hearing, I have been disappointed at the lack of cooperation that we have seen within this committee.

And I am not normally one, you know, publicly to go out and complain about such things. I try to do what I can to cooperate with the other side and vice versa, but it is at a point now where we have really got to work together because this is that important.

And I thank you very much, Mr. Pallone, for the time. And I yield back.

[The prepared statement of Mr. Loeb sack follows:]

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Mrs. Blackburn. The gentleman yields back.

Anyone else seeking time?

No one else is seeking time. This concludes our opening statements. I will remind all members that pursuant to our committee rules you may enter that as a part of the record and put that opening statement in the record.

We do thank our witnesses for being here today and taking the time to testify before the subcommittee. Each of you will have the opportunity to give an opening statement. We will follow it with a round of questions from members.

Our witness panel for today's hearing include Mr. Doug Brake, who is the senior telecommunications policy analyst at the Information Technology and Innovation Foundation; Mr. Brent Legg, who is the vice president of government affairs at Connected Nation; Dr. Robert Wack, who is the president of Westminster City Council in Westminster, Maryland; Ms. Carol Matthey, who is principal at Matthey Consulting, LLC; and Mr. Bryan Darr, a good Tennessean, who is president and CEO of Mosaik.

Mr. Brake, we would begin with you. You are recognized for 5 minutes.

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STATEMENTS OF DOUG BRAKE, SENIOR ANALYST, TELECOM POLICY, INFORMATION TECHNOLOGY AND INNOVATION FOUNDATION; J. BRENT LEGG, VICE PRESIDENT OF GOVERNMENT AFFAIRS, CONNECTED NATION; DR. ROBERT WACK, PRESIDENT, WESTMINSTER CITY COUNCIL, WESTMINSTER, MARYLAND; CAROL MATTEY, PRINCIPAL, MATTEY CONSULTING, LLC; AND BRYAN DARR, PRESIDENT AND CEO, MOSAIK

STATEMENT OF DOUG BRAKE

Mr. Brake. Thank you very much, Chairman Blackburn and Ranking Member Doyle and members of the subcommittee for the opportunity to testify before you today and share the views of the Information Technology and Innovation Foundation, or ITIF, on defining and mapping broadband in the United States.

ITIF is a nonpartisan think tank whose mission is to formulate and promote public policies to advance technological innovation and productivity growth, with broadband policy a core concern.

We all understand and respect the importance of broadband access. Broadband is necessary to participate in the 21st century economy. It underpins social opportunity, economic growth, and national competitiveness. Expanding the geographic footprint of the Nation's digital infrastructure should be a significant part of any

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infrastructure package.

Thankfully, the existing private investment framework for broadband has seen tremendous achievement attracting capital expenditures that make U.S. networks an international success story. The light touch oversight of increasingly competitive broadband has worked incredibly well, overseeing dramatic increases in network coverage and capacity and supporting a flourishing U.S. digital ecosystem.

Generally speaking, innovation and investment are best encouraged when infrastructure deployment can be led by the private sector, especially in dynamic markets like broadband. However, in rural or otherwise high-cost areas, it is often impossible to achieve adequate return to see private companies invest.

A common metric for assessing the viability of a network build is the number of homes passed per mile of fiber. In rural areas, you can see that metric invert, where you are measuring miles of fiber per home passed, which begins to capture the economic challenge of covering rural America.

Considering the tremendous benefits of broadband, more can and should be done to ensure that virtually all U.S. residents have access to robust services. In addition to existing support through the Universal Service Fund, a potential infrastructure package offers a unique opportunity to considerably accelerate the deployment of both

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fixed and mobile networks.

But providing the funds to support more universal broadband is expensive, and public dollars should be targeted where they are most effective: In achieving our policy goals. Priorities should be given first to connecting the unconnected, the truly unserved, until costs grow untenable. Only after that task is completed should subsidies support increasing speeds in already served areas, aiming for cost-effective upgrades, not necessarily future proofing.

There is a misperception that the economic benefits of broadband require significantly higher speed networks. Contrary to those who insist that gigabit fiber networks are a national imperative, study after study repeatedly show that the economic benefits of broadband investment are greatest when adding additional users, even if at lower speeds.

Additional download speed sees a clear and large diminishing marginal utility, and lawmakers should avoid tunnel vision on achieving ever higher speeds. Instead, as a general matter, we should allow our understanding of broadband to evolve with networks themselves over time.

When attempting to achieve cost-effective support policymakers are essentially faced with a price and quantity problem: How much coverage at what speed can be achieved at what price. Answering those questions, deciding where Federal support is most justified, and

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achieving the biggest return on necessarily limited investment requires well-defined policy goals, mapping of existing deployment, and modeling a projected cost, all of which the FCC has experience with.

The FCC's Form 477 data collection process should be the starting point for understanding existing broadband deployments. The institutional knowledge and expertise at the FCC should be relied upon rather than standing up an expensive one-off mapping program.

However, the Form 477 collection or the related challenge process may have to be refined for particular purposes. We will always be able to imagine more perfect data. For example, the granularity of Form 477 data is a parental concern.

However -- and this is an important point -- while more information is generally better than less, if infrastructure funding is distributed through a market-based approach, such as reverse auctions, the need for highly detailed maps is greatly reduced.

To summarize, broadband support in an infrastructure package should go to where it is most effective, focusing first on the truly unserved before aiming to support reasonable speed increases by one provider in a legitimately unserved area through an auction mechanism. We must attempt to understand how much coverage at what speed can be achieved for what price, but highly granular maps are less necessary at the more bottom-up your approach is.

The FCC is experienced in both defining and mapping broadband.

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Form 477 data collection process as well as the streamline challenge process generally work well, and the FCC should be trusted to implement a broadband component of an infrastructure package.

Thank you very much for the opportunity to testify, and I look forward to your questions.

[The statement of Mr. Brake follows:]

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Mrs. Blackburn. We thank you.

And before I yield to you, Mr. Legg, I just want to make everyone aware that the moving and shaking that you are hearing is not something adverse. It is construction that is taking place in the garage of this building. So we are going to hold to that.

Mr. Legg, you are recognized for 5 minutes.

STATEMENT OF J. BRENT LEGG

Mr. Legg. Chairman Blackburn, Ranking Member Doyle, and members of the subcommittee, thank you for inviting me to share our insights in this important proceeding this morning.

My name is Brent Legg, and I am vice president of government affairs for Connected Nation, a national nonprofit organization with a 16-year history of improving lives and strengthening communities through increased access to and adoption of broadband technologies.

Headquartered in Bowling Green, Kentucky, Connected Nation's work has impacted more than 30 States, and we served as the Nation's single largest grantee under NTIA's State Broadband Initiative Grant Program.

Under SBI, we managed broadband mapping projects across 12 States and one territory, representing 42 percent of the U.S. land mass. And our techniques have widely been recognized as best practices by NTIA,

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the FCC, and others.

Today we look forward to discussing lessons learned from the SBI program and the current Form 477 process. Our intent is not to be critical but rather to foster an understanding of how we believe the process could be improved for the future.

The SBI program created by Congress in 2008 enabled States to establish broadband mapping programs and submit data to NTIA twice a year, starting in 2010 through 2014. This data was used to create the first National Broadband Map, which unfortunately has not been updated since the program ended.

In 12 States and Puerto Rico, we collected, analyzed, and mapped broadband data while also collecting feedback from the public on where revisions to the map should be made. We averaged provider participation rates of 95 percent, despite the fact that the program was largely voluntary because of the emphasis we placed on provider relationship building and our willingness to accept raw information in whatever format it was available, assisting providers that needed help.

We established relationships with more than 1,200 providers with NDAs in place with many of them to ensure protection of their proprietary information.

While our mapping efforts were highly successful, the SBI program as a whole faced a number of challenges. Since every State had its

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own mapping agent, multiple methodologies were employed in collecting and analyzing provider information and mapping the results.

This meant that providers, many of whom operate in more than one State, had to juggle not only multiple points of contact and data requests, but they had to report their information in varying ways to satisfy those requests.

Additionally, known best practices were not required to be adopted across all States. As the SBI program transitioned to the Form 477 filing process in October of 2014, we began mapping and refining this data for States that had chosen to continue their own mapping programs.

Unfortunately, a number of challenges remain. First, Form 477 requires providers to report census blocks where they provide service. Unfortunately, if one household in a given block is served, the entire block is considered as having service, resulting in a significant overstatement of availability.

This is particularly problematic in rural areas where census blocks can be very large, some being larger than the entire State of Connecticut. Yet, these are the areas where broadband availability is most lacking and needs to be most accurately defined.

Secondly, many smaller providers lack the technical capability to visualize their Form 477 filings, often resulting in misreported data.

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Thirdly, some known providers are simply missing from the 477 data, meaning that they are not even filing as required.

And fourthly, wireless coverage under Form 477 is reported by census block rather than from propagation modeling based on tower locations and signal penetration often resulting in significant overstatements of service.

With these lessons learned in mind, we would like to make a few recommendations for the future. First, Congress must prioritize the accuracy and granularity of the maps to ensure that coverage is fully understood at the street address or parcel level of detail. Census block data is not sufficiently granular to close the Nation's broadband gaps.

Second, such a level of granularity requires the protection of providers' proprietor and confidential information. The good news is that the public disclosure of that information isn't necessary to serve the public interest.

Instead, it can be protected and analyzed by a neutral agent to derive broadband footprints and speed capabilities without revealing the more sensitive characteristics of any given network. We have proven that a neutral third-party aggregator of infrastructure data can both hold that information tightly and produce accurate and granular coverage from it.

As Congress considers incentivizing broadband deployment, we

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believe that it should establish a single independent third-party clearinghouse for broadband data collection and mapping that is accountable to Congress and the public, serve all 56 State and territorial jurisdictions, and having responsibility for carrying out four primary tasks:

First, broadband data collection and analysis, working with the provider community through a rigorous nondisclosure agreement framework; secondly, GIS mapping of broadband availability and speeds produced from infrastructure and subscriber data submitted to the providers; third, field validation and audits of the maps once they are produced; and fourth, processing feedback submitted by consumers to ensure that continual refinement of the maps take place.

We hope that Congress will consider this independent clearinghouse as a path forward to informed decisionmaking on Federal investments, ensure accountability for those dollars as they are spent, and protect sensitive provider data all at the same time.

We look forward to answering your questions. Thank you, Madam Chairman.

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[The prepared statement of Mr. Legg follows:]

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Mrs. Blackburn. The gentleman yields back.

Sir, you are recognized.

STATEMENT OF DR. ROBERT WACK

Mr. Wack. Thank you, Madam Chair. Thank you members of the committee, Congressman Doyle, for having me here today to testify about broadband infrastructure.

My name is Dr. Robert Wack, and I am the president of the Westminster City Council where we are building the Mid-Atlantic region's first community-wide gigabit fiber network. The Westminster fiber network was born out of decades of frustration waiting for our incumbent providers to upgrade their infrastructure and service levels.

Although technically Westminster meets current standards for broadband service availability, the city's survey of businesses and residents revealed widespread discontent and dissatisfaction with the services available at that time.

One anecdote in particular is illustrative. A local graphic design business, a premium customer of one of the incumbents, needed to send a multi-gigabyte graphics file to a client in the Midwest for a rush job. Their business-class internet connection kept timing out because the file transfer was so slow.

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To get the client's files delivered before the deadline, the business had to put them on a memory stick and overnight them in a mailing envelope. This is unacceptable in the 21st century data-driven economy.

After extensive research and public input, Westminster settled on an innovative public/private partnership, or P3 model, to build the first community-wide gigabit fiber network in the Mid-Atlantic region.

Successful P3 projects are at their core true partnerships where both parties achieve their goals while sharing in the risks and rewards of that partnership in ways they are comfortable with and can sustain over the life of the deal.

The city of Westminster entered our discussions with potential partners with three firmly held core principles: One, public ownership of the dark fibre network; two, a multitiered service model for the network to partition risks and responsibilities to separate operational layers; and three, a commitment to open access at the retail service level as the end state of the service environment. Each of these is important on their own but also closely interrelated.

Only with public ownership and control can current problems of red lining in the growing digital divide be comprehensively addressed and solved. A commitment to public ownership enables universal access, which in turn is a major source of public support for the resource commitment that network construction requires.

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In other words, when a local government assures its citizens that all will benefit from an infrastructure project, including rural areas, public support for the necessary expenditures to implement that project become much easier to secure. That was certainly our experience in Westminster.

The multilayer service model lays the groundwork for the creation of a true open-access environments at the service level where customers can switch providers for any given service without barriers. They can try new services as they are developed and where there is better transparency on cost and quality between providers.

By lowering the barrier to entry for new providers, real competition can take place and service providers delivering better services at lower prices will be rewarded. In addition, there are no barriers to entry for new innovative services from any provider accelerating innovation and economic development. The consumer wins in all instances.

In summary, the Westminster model of public/private partnership provides a scaleable blueprint for any local government of any size to implement a community-wide broadband network in a financially sustainable manner.

By dispensing with the assumption of service delivery by vertical integrated monopolies and focusing on public ownership of the infrastructure, partitioning of the network operations by layer, and

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a commitment to open access, any community in the country can realize the economic development potential of massive broadband.

The project positions Westminster to survive and prosper through the disruptive economic transitions created by the transformational information revolution and ensures that all our residents can participate in the economic growth and prosperity of decades to come.

Thank you very much.

[The prepared statement of Mr. Wack follows:]

***** INSERT 1-3 *****

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Mrs. Blackburn. And we thank you.

Ms. Matthey, you are recognized.

STATEMENT OF CAROL MATTEY

Ms. Matthey. Thank you very much, Chairman Blackburn and Ranking Member Doyle and members of the subcommittee. I am deeply honored to appear before you today.

I have worked on advancing broadband in rural areas through the Universal Service Fund for more than a decade as deputy bureau chief at the FCC and now in my business as a consultant. I bring personal knowledge of how the FCC has used fixed broadband coverage data in the course of implementing the Connect America Fund.

I commend you for recognizing the critical role of broadband infrastructure in our country. I am heartened that this issue is a priority for you. I am firmly convinced that broadband must be built in rural areas to improve education, healthcare, agriculture, commerce, and more. It is an investment worth making.

The definition of broadband matters because where you draw the line determines which areas are considered unserved. The FCC's current definition of broadband for purposes of the Connect America Fund is 10 megabits downstream, 1 megabit upstream.

To date, the FCC has focused its efforts on trying to get access

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to broadband service in the areas of the country that are lacking all together rather than upgrading networks in areas that have some level of service. If 25/3 megabits is set as the dividing line for unserved in any future infrastructure legislation, that would expand the geographic areas that are deemed unserved compared to what the FCC considers unserved today for purposes of the Connect America Fund.

If Congress provides additional funding to expand broadband infrastructure in rural areas, it is important to consider the implications if one governmental agency is potentially providing funding to overbuild a service provider that is currently receiving funding from another government agency.

It is critically important to coordinate and harmonize various programs administered by different Federal agencies to advance broadband so that the government as a whole is tackling the problem efficiently and not working across purposes.

Now, I will turn to the issue of determining where broadband is available. In my view, any future infrastructure initiative should focus on improving the FCC's existing data collection rather than starting anew. While there may be a desire to map fixed broadband coverage in a more granular way at the sub census block level, there are practical difficulties in doing so.

I am not aware of any comprehensive current data set showing the geocoded location of every structure in the United States. Requiring

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all broadband providers in the country to report fixed deployment at the address level or by geocoded location would be a significantly more burdensome data collection than what exists today.

Reporting such detail for every census block in the country, which number over 11 million, is unnecessary given that most of those census blocks are in urban and suburban areas that are served.

There are other ways to improve the existing FCC data for use in future infrastructure initiatives. For instance, one can treat a block as served only if the provider makes service available to all locations or nearly all locations rather than just one location in the census block.

In a challenge process, the FCC Form 477 data can be used as the starting point not the end point for determining which areas are served. I have firsthand experience with this, as I oversaw the team that conducted two challenge processes to determine areas that would be eligible for Connect America funding.

One key to success is defining in advance what information is relevant to the inquiry and how it is to be submitted. There are several advantages to using a challenge process to refine the data rather than a whole-scale revision of the FCC's Form 477 data collection.

First, participation in a challenge process is voluntary, so parties can make their own determination of whether the regulatory

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benefits outweigh the regulatory burdens of such participation.

Second, a challenge process is likely to focus on a much smaller set of rural census blocks that are likely candidates for new infrastructure deployment initiatives rather than the more numerous suburban and urban census blocks that are unquestionably served.

Third, a challenge process can take into account information that is not part of the Form 477 data collection that may be of policy interest.

To conclude, I appreciate the opportunity to appear before you today, and I will be happy to answer any questions you may have.

[The prepared statement of Ms. Matthey follows:]

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Mrs. Blackburn. I thank you.

And, Mr. Darr, you are recognized for 5 minutes.

STATEMENT OF BRYAN DARR

Mr. Darr. Good morning. My name is Bryan Darr, and I am the president and chief executive officer of Mosaik Solutions. I would like to thank Chairman Blackburn, Ranking Member Doyle, and the fellow members of the subcommittee for this opportunity to speak with you.

I appeared before this committee in March 2017 and appreciate the opportunity to return the focus on defining and mapping broadband coverage. Broadband deployment is a bipartisan national priority, but expanding and accelerating broadband deployment requires reliable information and data-driven decisionmaking.

Without trusted data about coverage gaps, underserved populations, network speeds, and other indicators, we will not stimulate private sector investment, advance universal service, expand broadband into more rural areas, or improve the broadband market.

Despite healthy competition and increasingly sophisticated data analysis among private sector companies, the FCC has sought to displace this industry by mandating use of its own data analytics tools. The Wireless Telecommunications Bureau recently stated that its Form 477 coverage data is the best available we have today. It is not.

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The FCC's Form 477 mobile broadband coverage data is flawed: First, there are no defined specifications for what radio frequency conditions or methodologies are required; second, the FCC's data is out of date almost as soon as it is filed. Form 477 data is too infrequently updated and has too large of a time gap between reporting date and release date. That is precisely why Mosaik's LTE coverage data sets are updated monthly.

In the maps shown in figure 1 -- Julia --

Mrs. Blackburn. May I see the map on the screen. There we go. It is behind us, okay.

Mr. Darr. In the map shown in figure 1 we overlay the latest available Form 477 data with the most recent coverage data from T-Mobile. In the 18 months between the vintage of the FCC's data and our own, T-Mobile has added more than 339,000 square miles, covering more than 5 million people, ensuring that broadband funds go to areas that meet the no-service criteria will be more successful with access to better, fresher data.

Better data can also help to minimize the number of objections brought forth during a challenge process. Higher quality coverage can also surgically identify unserved areas and enable operators to replicate these successes across the rest of the country.

Relying exclusively on antiquated or inferior datasets threaten to harm American consumers, and the exclusion of other types of data

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threatens to crowd out private investment from U.S. companies that compete to provide far superior products about network coverage and performance.

Just as important, private companies have long-term obligations to their clients. They provide a continuity of service and are less susceptible to the natural swings in priorities that affect governments.

In a rapidly changing industry, shutting down research for even a few months can create a backlog of issues. Approximately \$350 million was spent creating the original National Broadband Map. Once funding was discontinued, most States dropped the program. Three years after its release, the map is little more than a snapshot of a brief moment in the history of the broadband industry. We can do better.

The next image, figure 3, shows how overlaying coverage for available tower assets can speed the site acquisition process. Intelligence about the surrounding telecom landscape is critical to defining priorities and understanding where the taxpayer can get the most return for their considerable investment.

Some operators offer multiple levels of signal strength on their maps. The next map, figure 4, represents this type of depiction as good, better, best, which is sometimes referred to as on street, in car, in building.

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There is no defined industry standard as to what specific signal level is used to represent the demarcation between each of these boundaries, and different spectrum blocks have different abilities to travel distances and penetrate buildings.

The map in figure 5 shows signal strength readings collected anonymously from consumer devices. This information is overlaid with the typical predictive RF model. No network can offer maximum signal quality everywhere, and frankly, that is not required to have a robust and high-performing network. Congestion can also impact the user's experience, so throughput speeds and latency also need to be considered.

We commend Congress and the FCC for recognizing the importance of data driven decisionmaking. When government agencies embrace the capabilities of private companies, instead of competing with them, taxpayers can spend less must be and policymakers can adopt more accurate and timely data decisions. Let's make sure we use the best of what the private sector has to offer.

Thank you. I look forward to answering your questions.

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[The prepared statement of Mr. Darr follows:]

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Mrs. Blackburn. The gentleman yields back. I thank each of you for your testimony, and we will now begin the question-and-answer portion of this hearing. And I yield myself 5 minutes for questions.

Mr. Legg, I want to start with you. In your testimony, you noted that pursuant to Form 477, if even one home on a block has service then the entire block is considered served. And then you talk about some of the rural census blocks can be larger than the State of Connecticut, so this shows you what a flaw there is in the data collection.

Why does this requirement exist, and how do we fix it? And how significant is the particular issue when it comes to comparing that to other flaws that are in the system? And each of you have mentioned different things that you have a flaw and the things we can change as we look at the mapping process.

Mr. Legg. Certainly, Madam Chairman. Thank you for the question.

It is certainly true that measuring broadband connectivity by census block is a major challenge because oftentimes broadband coverage that we are trying to help foster in rural areas is actually in the areas where the blocks are the largest.

There are, in fact, 3,200 census blocks in the country that are larger than the entire District of Columbia. There are five in Alaska that are bigger than the State of Connecticut, the biggest one being about the size of the State of New Jersey.

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So the unit of measure being the census block is really the most granular unit of measure that is available to the FCC to collect data. But we believe that the SBI program actually allowed for more granular representations of coverage in rural areas.

As I mentioned in my testimony, there were certainly issues with the SBI program, but granularity in rural census blocks greater than 2 square miles during the SBI program was measured at the road segment level of detail. And we think that that should at least be the minimum standard for census blocks that are larger than 2 square miles.

Mrs. Blackburn. Mr. Darr, do you want to weigh in on this?

Mr. Darr. There is no question that many of the rural census blocks are going to be problematic, to say the least, to try and cover. Looking at it differently within the rural areas than the urban areas would certainly be -- should be considered.

Mrs. Blackburn. Okay. And, Mr. Brake, let me come to you now, because you looked at the definition of broadband and the various elements that are in there. And you talk and touch on speed a factor that we need to give great weight, but there are other factors such as latency and pricing, and Ms. Matthey touched on this just a little bit too. So are you suggesting that we take a more holistic look?

Mr. Brake. Absolutely. I think a more holistic and pragmatic approach, depending on the particular policy objectives that you are trying to achieve, should be taken into account when --

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Mrs. Blackburn. Okay. So how would you prioritize that?

Mr. Brake. I think speed remains the priority, but I worry that sometimes we can have something of a tunnel vision where we focus only on speed and don't take other characteristics into account. I would say speed and latency are probably the two most important.

Mrs. Blackburn. Okay. Ms. Matthey.

Ms. Matthey. I also think --

Mrs. Blackburn. Microphone.

Ms. Matthey. I also think the amount of usage that the consumer has at what price is very important. With the advent of unlimited wireless data plans, that has changed the dynamic in how people use their wireless phones, and I think it is important to keep in mind usage at what price.

Mrs. Blackburn. Okay. Mr. Darr.

Mr. Darr. I would agree. The operators are certainly under significant price pressure right now as there has been a price war going on that has helped a lot of consumers but at the same time has also pulled away dollars necessary for additional infrastructure build.

Mrs. Blackburn. And then how would you prioritize the factors in the definition?

Mr. Darr. The areas with no service at all should certainly be looked at first. Understanding what level of service is feasible into these areas is also critical. In order for the American taxpayer to

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get the biggest bang for their buck, the more areas that can be covered, for the least number of dollars, to cover the most amount of people, and provide them with the speeds desired is going to be an important part of the analysis process moving forward.

Mrs. Blackburn. Mr. Legg, I see you shaking your head. Go ahead. I have got a couple of seconds left.

Mr. Legg. Yeah, I agree completely with Mr. Darr. I think focusing -- as my colleague here, Mr. Brake, mentioned -- on speed and latency is very important. And obviously, broadband mapping is critical to defining areas in the country that need investment.

So I think focusing on the areas where the greatest number of people can be served for the lowest possible cost should be priority, but we shouldn't forget that there are a lot of areas that are very remote in the United States where those people need access as well.

Mrs. Blackburn. Thank you. My time has expired.

Mr. Doyle, for 5 minutes.

Mr. Doyle. Thank you, Madam Chair. And I know that you had stated that you thought it would be inappropriate to have hearings on net neutrality while the FCC has a pending proceeding, and I just want to remind everyone that the subcommittee held three hearings before the FCC adopted its net neutrality protections in 2015.

Two of those hearings were specifically about the FCC's pending proceeding, and one of those hearings was an FCC oversight hearing where

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Republicans specifically raised the net neutrality proceedings in statements and questions.

Dr. Wack, you know, as we are considering options for increasing broadband deployment, using direct and partial support payments as well as regulatory streamlining, you have come to represent a really interesting and promising approach using public/private partnerships.

For your broadband deployment in Westminster, you said that the major carriers just weren't interested in deploying sufficient service. What kind of service was available? What did you need? And ultimately, what are you building?

Mr. Wack. Thank you, Congressman Doyle.

The service available at the time when we were beginning to consider this project, which was in the 2010, 2011 timeframe, we had pretty fairly widespread 25 meg, down 5 meg up service through our incumbent cable provider. There was patchy DSL service and then satellite service out in the more rural areas.

So the 25 meg service, even in 2010, 2011 was considered adequate coverage, and yet, our business community overwhelmingly said that this was insufficient for their needs for moving large files and was holding them back. They were suffocating because of inadequate access.

So that is what started us down this road, and we didn't want to just meet current standards or even sort of exceed them. We wanted to leapfrog the whole process and build something that is basically

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future proof, which meant a fiber network throughout the whole community. And we figured we might as well just go large and build for a gigabit.

I think the comments that you hear today about, oh, nobody needs a gigabit, there is certainly an element of truth to that, but that won't remain true forever. There is nothing that we use in technology that doesn't increase, whether it is process or speed, memory, bandwidth.

So we know we are going to need a gigabit, and so we want to make sure Westminster has a gigabit when Westminster needs a gigabit.

Mr. Doyle. I know that many States have restricted municipal networks. And if you had such a restriction in place, what would your community be left with in terms of service, and what options would you have had?

Mr. Wack. We would be continuing to suffocate under the current or what was the current service at that time. But I have got to tell you, we would be manning the barricades and storming the State House, storming Congress, because my constituents were not going to settle for the inadequate service that we were getting.

Mr. Doyle. As you should.

Ms. Matthey, in your testimony, you talk about the process of updating the definition of broadband at FCC periodically. Tell us why that is necessary and what happens when we let these definitions

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languish.

Ms. Mattey. Well, first of all, I think it is required by the statute. The statute says that universal service is an evolving concept, and therefore, it is important to reassess what we are aspiring for.

If the definitions remain stagnant, you run the risk of locking in the rural areas of the country at a level that is not reasonably comparable to what is available in urban areas. We started at the FCC with the definition of 4/1. The FCC moved it to 10/1. And the fact that that happened in just 3 years and what is on the horizon makes it very clear to me that the definition needs to go higher in the future.

Mr. Doyle. Very good.

Ms. Mattey, do you think the current investment in the USF fund is sufficient to close the broadband gap? You know, some have said it would take an investment of \$40 billion to \$80 billion to fully serve our country with high-speed internet.

So if Congress acts on an infrastructure spending bill that includes broadband, it seems like tax incentives alone won't be sufficient to close the gap. What do you think about this?

Ms. Mattey. I definitely think that the Universal Service Fund needs to be larger. The FCC set the budget in 2011, and it is time to reassess that budget.

Mr. Doyle. Thank you very much.

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Madam Chair, I yield back.

Mrs. Blackburn. The gentleman yields back at this time.

Mr. Lance, 5 minutes.

Mr. Lance. Thank you very much, Madam Chair.

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RPTR FORADORI

EDTR HUMKE

[11:00 a.m.]

Mr. Lance. Mr. Brake, you have noted that Light Touch Regulation has allowed the U.S. digital ecosystem to flourish. Can you please discuss how Government intervention has hurt the marketplace through heavy governmental regulation and Government-owned competition to the private sector?

Mr. Brake. Sure. I think the most explicit example of that would be the recent decision to classify broadband internet access service as a telecommunication service under Title II, Communications Act.

Mr. Lance. After Title II, yes.

Mr. Brake. Is that what you are getting at?

Mr. Lance. Yes, it is. Yes, of course.

Mr. Brake. Right. So I think Title II has likely seen a drag on investment. There are conflicting reports on exactly how those numbers shake out. But the real question is a counterfactual one, which is much more difficult to answer, right? Now, whether investment is up or down, what it would be other than Title II. And I think the evidence is there are good reasons to believe that investment would be higher if it wasn't for that reclassification.

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I also think the Title II in the particular net neutrality rules that were implemented as part of that reclassification unnecessarily constrain broadband access ability to evolve to provide new services over time. So I think returning to a Title I Light Touch approach is the right answer.

Mr. Lance. Thank you. Would anyone else on the panel like to comment?

Dr. Wack, you are a distinguished public servant. Mr. Brake has mentioned the private sector has an incentive for innovation efficiency. How do we also instill that in a governmental run provider?

Mr. Wack. Thank you, Congressman Lance. I guess the first thing to clarify is that our project is not a Government run network. We own the infrastructure, just like we own the roads. We don't dictate how the network is operated. We have set some minimum service levels and minimum customer service requirements, but we want to create a competitive open access market so that the market dictates how that innovation unfolds and what the service levels are and the price points.

So we are in the process of doing that. I realize that is not the same as other municipal networks around the country, but that is the model we have chosen.

Mr. Lance. And that was chosen by your local governmental body, is that how it worked, sir?

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Mr. Wack. That is correct. We went through an exhaustive research process, looked at other municipal networks around the country and around the world, compared pros and cons, assessed what we were capable of in terms of our local municipal resources, and frankly, the political environment. I live in a very conservative community, it is one of the most red counties in the State of Maryland.

Mr. Lance. There are red counties in the State of Maryland?

Mr. Wack. Oh. Yes, sir. Yes, sir.

Mr. Lance. I like your tie.

Mr. Wack. Thank you.

Mr. Lance. I wish we in New Jersey had a similar tie.

Mr. Wack. Not everybody can have a State of Maryland flag, sir. So, anyway, we knew that having a municipal ISP like some other communities have would be politically unacceptable in our community. So I think we found a model that, as I said in my notes, is applicable across the country in any community.

Mr. Lance. Thank you. And, Mr. Brake would, you like to comment on that? I see you were interested.

Mr. Brake. Yeah. I think it is important to realize, even in these sort of dark fiber open access models, it fundamentally shifts the sort of nature of the investment, even the retail provider is looking at improving over time.

It shifts from what economists call dynamic efficiencies, trying

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to find new ways to compete in the marketplace, offer new products, improve through R & D, and improve through technology. It shifts instead towards what economists call static efficiencies, right? So these are just simply things like price or quality of service. While those are important to improve, in a broadband market, I worry that if we move towards this dark fiber model, this municipal model over time, it zaps the incentive to invest in the long term.

Mr. Lance. And you believe that it is more likely that there will be dynamic efficiencies if this is controlled by the private sector?

Mr. Brake. Correct. Yeah.

Mr. Lance. Thank you very much. I yield back 32 seconds.

Mrs. Blackburn. I thank the gentleman. We will take that time back. And, Mr. Loeb sack, you are recognized for 5 minutes.

Mr. Loeb sack. Thank you, Madam, Chair. I have to apologize, I had a step out during a lot of the testimony and meet with constituents, so some of what I am going to ask may have already been answered, and if that is the case, if you don't mind repeating that, it would be wonderful. I appreciate that. It is sort of what happens on these committees sometimes, you know, we have a lot of things we have to be doing at the same time.

But as I mentioned in my opening statement, I often mention at these hearings, I travel to all my counties. I have 24 countries. Chairman Walden likes to remind me that while I have a big district,

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it is not nearly as big as his, but it is a pretty big area. And I do consistently hear concerns about, obviously, the lack of access to good quality broadband in rural areas.

Yet, interestingly, if you look at the claims out there from whether it be the FCC or whatever, you know, the claims having to do with the existing data, apparently most of Iowa, if not all of Iowa, is pretty much served, and we know that that is just not the case. And so I do have my own bill that I mentioned.

But without getting into the public/private controversy and all the rest, because no matter who is going to provide the service, they are going to have to have good data in the first place to know where the service is and where it isn't.

And so what I want to deal with is sort of, you know, first order questions having to do with the data that are available in the very first instance. No matter whether it is a missed for a utility or private sector or whatever that is going to end up laying the fiber and doing what we need to do to make sure that everybody has broadband.

And I just want to ask you, Dr. Wack, first have all, was the city of Westminster in the same situation like many communities in my district where they are theoretically served in the eyes of the FCC and service providers, but they are really not? And a lot of that has to do with the data issues. Is that the case?

Mr. Wack. Yes, sir. According to existing standards at the

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time, we were adequately served both in terms of service level and numbers of providers. The reality was that in terms of number of providers, the DSL service that was available in our community was very patchy, you know, as it is in most communities, limited by distance from the central office.

So even in downtown Westminster there were areas where you could not get DSL service because of the proximity to the central office. And then in terms of the cable provider, the service level just wasn't adequate for what businesses needed today. And so, you know, with all due respect to this data collection effort, it was irrelevant to us because functionally we were underserved. We were effectively underserved, even though technically we were adequately served.

Mr. Loebsack. And I find when I am traveling throughout my district, even along Interstate 80, one would think, that I should be okay along Interstate 80, a major thoroughfare and all the rest through our State, it is just simply not the case. So we have to make sure that we are all covered. And that is Interstate 80. Then we got, not to mention, the rural areas out there, right with county roads and all the rest. There is just a lot of areas that are pretty much not served at all.

I would like to ask Mr. Legg and Mr. Darr, can you speak to some of the challenges or deficiencies there currently are with the data collected by the FCC. And, again, if you already addressed those

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issues, I apologize, but I would like to hear from you.

Mr. Legg. Sure. Congressman Loeb sack, thanks for the question. The biggest challenge with regard to the Form 477 process that the FCC administers right now is that the fact that the data is collected at the census block level of detail, which is fine in urban and perhaps even some suburban areas. But in rural areas like the areas that you represent in Iowa, census blocks are quite large.

I mentioned earlier that there are more than 3200 census blocks in the country that are larger than the District of Columbia and several that are larger even than the State of Connecticut.

If reporting is happening at the census block level of detail and even one household in the given census block is served, then that entire census block is considered as having service, and that is a problem.

Mr. Loeb sack. Thank you. Mr. Darr?

Mr. Darr. Thank you. As was illustrated in one of the maps I showed earlier, there is no standard as to exactly what is defined as the level of service necessary in order to meet these requirements. The different operators have challenges that are both economic and technical, but largely economic, in order to be able to cover these areas.

There are certainly concerns with how this data is being collected at the FCC, in part because of the length of time that it takes to move from the carrier reporting it to when it is actually in place. But

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the fact that there are no standards associated with it is of significant concern as well. You may very well be able to get a text message out at the very edge of that network, but it is not good enough for a voice call. It is certainly not good enough to be able to download a video.

There are ways now, there are new technological capabilities today to understand more of what we call ground truth, which was on the last map that I had up on the screen earlier, that is collecting information directly from consumers, trying to utilize RF propagation maps to define exactly where you are going to get service or not get service is an inexact science.

We have all been in the underground parking lot in a building that, according to the coverage map, shows service. We don't really expect to be able to get it there. And so these types of issues and concerns are part of the difficulty in collecting this. The information that we have in our data sets that the FCC has used for many years is based upon the marketing maps. There is, in some cases, better data from operators, and in other cases, not.

There is a sixth slide. If I could ask Julia to pull that one up, please, that shows the ways that we grade coverage information. And if we can see it on the screen here.

We started out with what we used to call amoeba maps, they were just rough drawings of where the coverage was. Or they would just fill

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in their license area, and say, this is your rate area. But things have gotten better and better, as you can see.

The multilevel RF is the highest that we consider very good. Not all carriers share this information publicly. We have some information from the operators at this level, and not from others. Where we have it, if they have asked us to keep it proprietary, we do. Because we -- it is interesting Mr. Legg suggested a clearinghouse operation that would assist the Government in doing this. This is what we have done for over a quarter century. We are recognized as the clearinghouse by the wireless industry. And I think having something similar in place to take care of the other parts of broadband would be good as well.

Mr. Loebsack. Thank you, Mr. Darr.

Mrs. Blackburn. Great answers, and we like looking at your data. You got a good process. Mr. Loebsack, I will recoup that 2 minutes at some point in time.

Okay. Mr. Shimkus, you are recognized.

Mr. Shimkus. Thank you, Madam Chairman. Thanks for being here. Great testimony. Love to talk about technology, it just keeps moving faster and faster and there is just always a need for more.

So I have 33 counties, so the folks from the rural areas are always going to talk about how we are kind of left behind or -- and, you know, rural areas have co-ops to make sure that we can have phone

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connectivity. We have power co-ops. That is just the way rural areas have been able to -- just much like the city, they are on -- the public demanded it, they got together, they started making sure that they had services.

This accuracy of information is really important. So I have got enough, the testimony, we went through it, understanding the 477 filing and the problems with that. But Ms. Matthey mentioned this challenge thing, which I -- is that when someone says: It says I am covered, but we are not, we are going to challenge this census block? And then they may be able to get that revisited. Is that it?

Ms. Matthey. That is correct. That is what we did while I was at the FCC implementing the Connect American Fund.

Mr. Shimkus. Let me go to Mr. Legg, and actually, Mr. Darr. Because you don't talk about that process, you talk about there is other information available. So why doesn't that work?

Mr. Legg. Congressman, I think as the Federal Government, the FCC, currently there are many agencies across the Federal Government that deal with broadband infrastructure spending, NTIA, the Rural Utility Service at USDA, as those agencies are making decisions about where to invest and support broadband infrastructure buildout, they need to know on the front end --

Mr. Shimkus. There is a big lag in time just to go through the process of filing and doing an appeal? That is kind of what I was --

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Mr. Legg. That is right.

Mr. Shimkus. Mr. Darr do you want to --

Mr. Darr. The speed at which this takes place is important as well.

Mr. Shimkus. Right.

Mr. Darr. Because as decisions are being made, you are also holding up the private sector in making decisions to make their own investments.

So once the decision is made and the operators know what is going to be funded and what is not, then they know how to better direct the other funds that they have to continue to --

Mr. Shimkus. Let me go quickly, because I don't want to pull a Mr. Loeb sack and go 15 minutes past my time, --

Mr. Loeb sack. I didn't have the gavel.

Mr. Shimkus. But shouldn't we have -- if this is kind of a national incented money to help, shouldn't there be a national broadband standard as far as speed that is accepted and then can change as the time changes? We would accept that proposition, wouldn't we?

Mr. Legg. Congressman, yes, I would agree with that. I think the need for speed is going to always continue to increase. Some school districts across the country are seeing 30 to 60 percent year-over-year growth.

Mr. Shimkus. Mr. Brake, you wanted to say something?

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Mr. Brake. Right. I would generally agree that we want to have sort of a national standard if we are looking at a nationwide infrastructure buildout. But I think the point that Ms. Matthey made earlier, to have that coordinated with the existing USF support -- existing support -- and make sure that you are not working in cross purposes is incredibly important.

Mr. Shimkus. Yeah. And we will have that USF debate, too, as far as what are we are incenting and are we transferring it to something we need -- which brings up the issue, which -- no, I don't think I want to address, because the telecommunication companies are talking about the requirement to continue to pay money to keep up a copper wire system, right? Is that money well spent, Mr. Brake?

Mr. Brake. I would argue, no. To the extent that that is preventing them from transitioning to more modern networks, towards fiber networks, that is an impediment that we should be working at getting away --

Mr. Shimkus. Because the reality in the ground and in the world is that people are cutting there are own copper wire -- I mean, they are not using land lines -- I mean, the traditional copper wire anymore.

Mr. Brake. Right.

Mr. Shimkus. Although, we still by law and regulation require the companies to pay money to keep that up while they could be using that money to deal with fiberoptic technology. Am I --

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Mr. Brake. That is right. That is the gist of it. It is a big complex transition right to move wholesale from copper all the way to fiber. There are a number of legacy services that depends on copper networks, and so finding a way to make that transition is incredibly important, it is complicated. But to the extent that there are undue regulations that are preventing that from happening, that is a problem.

Mr. Shimkus. Madam Chairman, I will yield back my time, but I think that is something we should be discussing also in this debate.

Mrs. Blackburn. I agree. Good points. And let's see, Mr. McNerney, you are recognized for 5 minutes.

Mr. McNerney. I thank the chair. I thank the witnesses. Even though I missed your testimony, I read it, and it is good to hear from you.

Dr. Wack, a significant portion of my district is rural, so I understand some of the challenges that we have talked about. In your view, is it sufficient for rural areas to have broadband speeds 10-1, 10 download and 1 upload, or is that going to leave a lot of rural areas without the services they really need?

Mr. Wack. 10-1 is inadequate for doing anything of use in the 21st century.

Mr. McNerney. Thank you. Enough said. About the 5.3 million veterans we have in this country, many of them have that same 10-1 access, is that going to give them enough power to function?

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Mr. Wack. No. It is not even close.

Mr. McNerney. Thank you.

Mr. Legg, I am going to kind of go over some territory we already trotted over, but I am looking for specific answer. In your testimony you mentioned that reliable broadband mapping is a matter of critical importance to residents, businesses, and communities, anchor institutions, and there is where broadband is lacking. Can you expand on that point a little bit, please?

Mr. Legg. Yeah, absolutely. It is as Dr. Wack said, it is hard to do anything in the 21st century with inadequate broadband. It is just as important as roads, and perhaps even more so. I work a great deal on school connectivity for our organization.

School connectivity is largely lacking across the country. We are seeing that there are still many schools across the county that aren't on fiber, much less have the minimum standard of connectivity, which is regarded by the FCC at one gigabit per 1,000 student. As you can imagine, there are a lot of rural areas that can't reach anywhere near that speed. So it is critically important for the future of learning and many other services.

Mr. McNerney. Okay. Concerning the Form 477 reporting and the idea that the census blocks may just take out one person and use that as an example for the entire block. Is that more likely to result in underreporting or overreporting in terms of 25 to 3, 25 upload and 3

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download?

Mr. Legg. Certainly that means that broadband services being significantly overreported in rural areas across the country.

Mr. McNerney. So the 10 percent estimate by the FCC is probably a small number compared to the real --

Mr. Legg. If it is based on the Form 477 assessments, yes.

Mr. McNerney. Okay. Our estimates for the availability of baseline fixed broadband service in rural areas especially prone to being overstated? I am kind of asking the same question over again.

Mr. Legg. Yes. Yes, that is right.

Mr. McNerney. Well, I understand that the data reported through Form 477 can be outdated quickly. Do you have any suggestions on how that can be remedied?

Mr. Legg. Yes. During the SBI program years where we managed 13 different State and territorial mapping programs, we were effectively working with providers on a near realtime basis to update their information. We believe, as I suggest in my testimony, that a neutral third party clearinghouse, instead of updating data every 6 months to a year could be working in realtime with providers as known deployments are being made. And that is why establishing a relationship with the providers, that there is a back and forth between the two to know where new infrastructure is being built in realtime, that is incredibly important.

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Mr. McNerney. And you think that can be done?

Mr. Legg. Yes.

Mr. McNerney. Mr. Darr, do you have any comments on that?

Mr. Darr. I do. We provide this capability today for the wireless segment of the industry and we have close working relationships with almost every operator in the country, including the big four national operators, and almost every one of the rural operators, we are very engaged with RWA, CTIA, CCA, et cetera, to make sure that those relationships are maintained.

I do think that this can be done in away where the information can be collected more quickly, and that information can be provided to the Government in a way that allows them to make the best decision and direct the funds faster and more efficiently.

Mr. McNerney. Whoever wants to answer this. Is there something that this panel could do -- introduce legislation or create a statute -- or is this a regulatory issue, to increase the frequency of reporting and accuracy of the 477?

Mr. Darr. That is a good question, Congressman, I am not sure I know how to answer that. It may be both.

Mr. Legg. I believe, as we mentioned in our testimony, we do believe that there is a solution to solving this challenge. Creating a neutral independent third party clearinghouse that is responsible for mapping and data collecting and validation and consumer reporting

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across all 56 state and territorial jurisdictions, that is viable and that is something that Congress could address.

Mr. McNerney. Thank you. I yield back.

Mrs. Blackburn. Mr. Latta, you are recognized 5 minutes.

Mr. Latta. Thank you, Madam Chair. And thanks panel witnesses for being here, it is very, very informational and very, very important.

Mr. Legg, I know we have been talking and you had a lot of questions today about this. But broadband support programs aimed to increase broadband coverage in rural America where agricultural production generates significant value to the national economy and also are essential to the revenue and jobs in the rural communities.

In my area, I represent the largest farming and producing district in the State of Ohio, as well as having 60,000 manufacturing jobs. But today with modern high position farming operations, which require the high speed broadband to support advanced operations and technologies that significantly increase crop yields or decrease costs and improve the environment. A program that only seeks to measure broadband coverage based on population centers, households, and road miles, were overlooked coverage gaps in the agricultural communities.

Will you speak to the importance of ensuring that broadband mapping and coverage measurements are updated to adequately identify underserved and unserved crop land in other agricultural areas for the purposes of high speed broadband deployment?

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Mr. Legg. Certainly. Congressman Latta, thank you for the question. Rural areas across the country are the next explosion in terms of innovation of technology, is going to happen actually in rural America, we believe. And an example is the one that you cited, how farming in the United States is changing rapidly. And the only way that it can continue to change rapidly is for adequate infrastructure in those rural areas to exist.

And so, getting the mapping right is incredibly important for rural areas. That is why we have such a concern about collecting data at the census block level of detail because those are the areas that area most overrepresented in terms of current data collection processes, and yet those are the areas that we need the try to fix. Those are where the broadband coverage gaps exist.

Mr. Latta. Well, and again, maybe you can go into a little more detail, how do we fix it and make sure we got it mapped correctly?

Mr. Legg. Well, again, we believe that there is a viable path forward for creating a neutral, independent, non-Government clearinghouse for broadband data, where there is a responsibility between the providers and this clearinghouse to collect data in realtime, to map it, and to put it out there for public consumption and feedback, and then to do validation and auditing of that data to make sure that it is as accurate as possible.

This is effectually how we were so successful during the SBI

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mapping years, as we played that clearinghouse role on behalf of the 13 different State and territories.

Mr. Latta. Thank you. Mr. Darr, it is well-known that the national demand for wireless services is growing rapidly as the usage of innovation wireless applications of the internet of things proliferates, and we know that from specifics right now, by the year 2025 there could be about 50 billion interconnected devices by that time.

Essential health applications, state-of-the-art agricultural tools, educational services, business operations all employ wireless methods to improve our daily lives. And, again, in rural America wireless is often the only reasonable economic means to providing high speed broadband coverage.

In what ways can Congress or the FCC improve data collection for wireless services to identify areas where access to high speed mobile broadband is lacking or nonexistent?

Mr. Darr. I think the first thing to do is consider not only population covered, but also area covered, and specifically, agricultural farmed areas covered. Your point about OIT is absolutely dead on. We have got the technology in the field now, that it is looking at moisture content, yield, and a number of hours of sunlight per day. This could all help us dramatically increase the efficiency of our crop land.

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So as we are looking at the mapping aspect of this, taking into consideration not only where the people are that need access to broadband for education, entertainment, et cetera, but also from the standpoint of what level of service actually do these devices in the field need?

Where some devices are going to be very simple, they are simply going to spit a little bit of information out every hour every day, and run on batteries, and they have a limited life span. But you have opportunities for people in the field that may be driving a large piece of farming equipment to actually gain training and expertise and be able to communicate back and forth with the manufacturer of the vehicle.

And, of course, the vehicle manufacturers are collecting telematics information off of these vehicles as well. It is important to make sure that they are maintained properly, understand how many hours they have been running, and also gather the information on the yield off of the crop land.

So this is a critical part of this moving forward. There are going to be more devices out there that are communicating with the networks than there are people in the very, very future.

Mr. Latta. Well Thank you very much. And, Madam Chair, my time has expired.

Mrs. Blackburn. I thank the gentleman. Ms. Eshoo, you are recognized for 5 minutes.

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Ms. Eshoo. Thank you, Madam Chairwoman. And thank you to all the witnesses. First, Madam Chairwoman, you said something at the beginning of the hearing, and I want to clear it up.

In terms of outreach from your office on the issue of privacy, there was an email sent to our legislative director asking for cosponsorship, but there wasn't anything that was -- it wasn't a form of invitation to have a round table discussion about it, et cetera, et cetera. I would welcome that. You know that all of us on this side of the aisle were appalled that the Congress, like a bolt of lightning, just eliminated, -- eliminated all privacy protections on the internet.

So I am not so sure about everything that you have in your bill. I would be happy to sit down at a round table to discuss it. But the way you characterized a refusal of participation, it wasn't an invitation to sit down and talk about it. It was just: Legislative director, do you want to be a cosponsor or not. So I just wanted to clear that up.

I would like to go to Mr. Brake first, given the question that was posed by Congressman Lance to you about Title II investment. You know, of course, that CEOs of publicly held companies are obligated under the law, under the law, to put forward information that is factual and accurate relative to their forecast about investment.

Can you name any CEO of a major company in the country that stated

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to their shareholders that there was -- they anticipated lack of investment or smaller investments because of Title II?

Mr. Brake. No, not off the top of my head but I am really --

Ms. Eshoo. No, no, not just off the top of your head. If you are going to say --

Mr. Brake. No, I can't --

Ms. Eshoo. That Title II has chilled investment, then give me the example of a publicly held company and their representative, their CEO, stating to their shareholders that Title II is responsible for a chilling investment of their company.

Mr. Brake. Part of my concern is that --

Ms. Eshoo. No. Not your concern. Answer my question. You stated something earlier, I am asking you to back it up.

Mr. Brake. I am happy to submit for the record a piece we have written on this analysis --

Ms. Eshoo. No, that is not what I am asking you for.

Mr. Brake. No, I cannot point to --

Ms. Eshoo. I don't think you have an answer. I just don't think you have an answer. You can't give me the name of one CEO or one company that has stated that to their shareholders.

Mr. Brake. That is correct. I am happy to discuss the issue further. But the answer is --

Ms. Eschoo. No, we don't have to. You finally gave me the

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answer, which I thought was -- would be the case anyway. People come in and make all these wild statements and they don't have anything to back them up, and that is point that I wanted to make.

I would like to go to Dr. Wack. I served in local government, and I have a real reverence for it, so bravo to you and what you have accomplished.

We have a real problem in the country in that we are getting close to half of the States in our country now have put laws in place preventing or restricting local communities from building out their own networks, which I think helps constituents get the better broadband service that you came here and testified about, and it really concerns me. I think that we should be paying more attention to that.

In your experience in Westminster, did you encounter any kind of resistance from incumbent ISPs when it went down -- when you went down the path of building your own fiber networks?

Mr. Wack. Thank you, Congresswoman. We did not. Our networks, for whatever reason, was either too small or they just didn't believe we were going to do or it would work or something.

Ms. Eshoo. What is the population?

Mr. Wack. 18,000 inside the city limits and then 38,000 in the greater Westminster area. And so we have been ignored for the most part. I suspect that is probably not going to last very much longer.

Ms. Eshoo. I would like to go to, is it Mr. Darr that spoke about

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the -- No I don't think it was Mr. Darr, I think it was Mr. Legg -- about an independent clearinghouse. What would the cost of that be?

Mr. Legg. That is a good question, Congresswoman. I don't know the answer to that question off the top of my head, but that is certainly something we could calculate.

Ms. Eshoo. Good. Thank you. My time is expired. I have some more questions for the other witnesses, but I will submit them in writing. Thank you.

Mrs. Blackburn. The gentlelady yields back. Mr. Guthrie, you are recognized for 5 minutes.

Mr. Guthrie. Thank you, Madam Chairwoman. I appreciate it very much. I appreciate the opportunity to be here. Mr. Legg thanks for coming up from home. I appreciate you being here.

I remember when your organization first came to pass. President Ransdell of Western Kentucky University convened. I was in the State legislature at the time. Some of us together with professors like Linda Johnson Vitale, and this is -- we were going to go figure out how to do broadband throughout the Commonwealth, I think we then became Connected Kentucky and then Connected Nation. And I appreciate all the hard work and the things and the difference that you guys have made.

But we just want to talk about something. The other day we had somebody called our office who lives about a 20 minute drive from Bowling Green. So I explained to the people who don't understand the

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chamber of commerce picture of Bowling Green, is one of the fastest growing cities in Kentucky, an hour from Nashville. A lot of the development going forward. If you went to -- it is like Spartanburg, South Carolina, a new south growing town, not a rural community at about 165,000 in the immediate area and serves about 250,000.

We got a phone call for someone that said -- a university there, and all the great things, about 20 minutes away, and say, they don't have access to broadband. And you know my district, if you were three or four counties away, it is extremely rural, it is as rural as probably anywhere in the country.

But Bowling Green is really not but that close. Is that a matter of mapping? Is that a census track? I know you talked about that quite a bit. And just where those holes are within our community, which as you get outside of our immediate area it gets even bigger?

Mr. Legg. Absolutely. Congressman Guthrie, it is good to see you again, and thank you for your question.

Yes, I believe that it is an issue of inaccurate mapping. I don't know exactly where the household or business is that you are referring to, but I can imagine, knowing the Bowling Green area and that part of Kentucky north of Nashville, that there are census blocks that are considered as having service, according to the FCC's Form 477 data, where service doesn't actually exist to every household within that block.

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And that points to the issue that I was referring to earlier, is that the size of the block and the way the information is reported and collected, naturally lends itself to overstatement in rural areas.

And so I would guess that the Federal Government views that area as served, when in fact it is not.

Mr. Guthrie. I think it is an entire neighborhood. So you have talked about in your testimony earlier, I believe, the need to send deployment network engineers. So how can you do that in these kind of communities within a reasonable amount of time, and quite honestly, with a reasonable amount of resources?

Mr. Legg. Sure. We believe as part of any clearinghouse role that there should be a validation and audit process, and that those areas where consumers provide feedback to the clearinghouse, that, hey, this mapping information doesn't quite look correct, we need you to check it out. Then there should be a process for actually deploying field engineers on the ground to check whether the data represented on the map is correct. And this is a constant or a continual refinement process that would need to happen over time.

No map, no map, is going to be absolutely, 100 percent accurate from day one, but there should be a validation audit and refinement process involved. And we believe, based on our experience under the SBI program, where we did deploy field engineers to check provider submitted data, that that process is viable if the country is divided

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up into regions of jurisdiction for the purposes of mapping data collection and audit.

Mr. Guthrie. Thank you. And, Mr. Darr, I know you specialize in wireless. Can you explain briefly how technology itself has been able to broaden the coverage amount?

Mr. Darr. How technology --

Mr. Guthrie. Just the wireless. Not just fiber broadband, but wireless and all the others been able to expand the map?

Mr. Darr. If you look back at the beginnings of the industry we all just had car phones early on, we didn't have these wonderful little computers in our pockets.

Mr. Guthrie. Bag phones.

Mr. Darr. Bag phones. Eventually portables. And the systems were engineered for us to use the phones in our vehicles or outside. One of the difficulties that -- I think it comes from mapping overall, has to do with the fact that people are now using these devices in their homes, in their offices, in the library, in this building here.

There is an expectation that these devices are going to work inside. There are new technologies that are coming along today that have been out for a number of years, distributed antenna systems, small cells, picocells that are even suitable for residential homes, that can assist boosting that signal indoors. And that is going to be a critical part of the mixture going forward.

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It can play a role within the rural areas as well. The maps show what you should expect outside, the type of construction on the structure is going to have a significant impact on whether or not the signal can penetrate --

Mr. Guthrie. Thanks. My time has expired and I yield back. I appreciate it. Appreciate it.

Mrs. Blackburn. Mr. Pallone for 5 minutes.

Mr. Pallone. I am sorry. Thank you. Okay. The Democratic members of the Energy and Commerce Committee recently introduced the Leading Infrastructure for Tomorrow's America Act for the LIFT America Act, I mentioned it in my opening. And that bill focuses on areas within the committee's jurisdiction where we can work on solving our country's infrastructure problems.

Part of the LIFT America Act includes \$40 billion for broadband deployment /and recent reports suggest that is how much it will cost to build out to 98 percent of the country. And as part of our initial draft we used a competitive bidding system to award this \$40 billion.

So I wanted to ask initially, Mr. Brake, do you think this is the right mechanism to disburse funding for broadband deployment?

Mr. Brake. Thank you, Representative Pallone. The devil is always in the details, but absolutely, the general framework and the competitive bidding mechanism laid out in the LIFT America Act is the right approach -- the right place to start, yeah.

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Mr. Pallone. Okay. Thanks. Now, of course, many here in Washington are talking about using tax cuts as a way to improve broadband deployment. So I wanted to ask you, do you think using tax cuts or certainly using tax cuts alone in lieu of direct spending is sufficient to bridge the urban/rural divide?

Mr. Brake. I would say no. I think the tax incentives as well as looking at ways in which localities can reduce barriers to new -- or in upgrading existing networks that are important for steps, but alone they are not sufficient, we should be looking at direct grant and Federal spending to accelerate deployment.

Mr. Pallone. All right. Thank you.

I wanted to now move to Dr. Wack. Earlier this year I had the opportunity to speak to small businesses in Asbury Park, which is a community in my district, about how a free and open internet can be a boost to the local economy and create jobs, which it certainly has in Asbury Park.

So, Dr. Wack, has the deployment of broadband with open access have similar effect on the economy in Westminster in terms of boosting the local economy and creating jobs?

Mr. Wack. Thank you, Congressman Pallone. I would love to tell you a big story today that that is exactly the case, but it is too early yet. Our network has only really been operational for a less than 2 years, and we are only about 40 percent of the way through our

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construction. However, there are anecdotal instances where businesses have either hired additional staff or expanded their capabilities because of the gigabit service that they now have access to at very affordable prices.

We see early signs of this, but I can't really tell you definitively that the economic development question has been answered in Westminster because of our broadband project, but stay tuned.

Mr. Pallone. Okay. Now, what about your model. Do you think the model you used to deploy broadband could work in other communities?

Mr. Wack. I do. I do.

Mr. Pallone. Okay. Then I wanted to ask you a little bit about the data. We have heard a general consensus on this committee that the data the FCC uses to determine broadband deployment is flawed, and I am concerned that the FCC is nonetheless basing many of its current policy decisions on this flawed data.

So, Dr. Wack, in your experience in Westminster, do you think this data is a reliable source for policymaking?

Mr. Wack. Short answer, no. I think not only is the data possibly corrupt, but the underlying premise of the data collection exercise is probably off as well. What the data collection exercise is really doing is ratifying the status quo of vertically integrated incumbent monopolies.

There are other models that can work, which make the data

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collection exercise irrelevant. So it is a policy question for you all, but I don't think, as we demonstrated in Westminster, it is irrelevant for us. We are looking to the future, and so current service levels are irrelevant to our policy decisions. We are looking 20 years to the future.

Mr. Pallone. Well I was going to ask the next question, but I think you have already answered it.

But let me just say, how helpful do you think it would be for small communities like yours or mine in New Jersey if the FCC spent more time figuring out how to correct this data before rushing into larger projects.

Mr. Wack. Again, I think it is going to be irrelevant. It is like assessing your future water capacity based on drinking straws or your road capacity based on bicycles. That may work today, but in 10, 15, 20 years, all those numbers are going to be irrelevant. And these are long term investments. Fiber projects are or expensive, they are difficult, they take a long time. So this is a long game here. And talking about current service levels, it is a waste of time. Sorry.

Mr. Pallone. That is all right. You don't have to be sorry. That is my question. Thank you for answering it. Thank you, Madam Chair.

Mrs. Blackburn. The gentleman yields back. Mr. Bilirakis, you are recognized.

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Mr. Bilirakis. Thank you, Madam Chair. I appreciate it so much, and I appreciate the panel being here. Thank you for your testimony. My first question, it is clear that we must have the most up-to-date and complete information to avoid wasting taxpayer dollars. I am particularly interested in ensuring that funds are distributed efficiently and effectively to Americans with no broadband access.

Each of you identified the need for continually updated maps to show where broadband has been deployed. Considering the rapid changes in broadband data, it may be also advisable to include information where there has been a commitment under a Federal or State subsidy program to deploy broadband to an area.

Mr. Darr and Mr. Brake, what are your thoughts on including committed broadband subsidies in future maps as opposed to ongoing deployment efforts? We will start with Mr. Darr, please.

Mr. Darr. The challenge with the mapping -- if I could get you to please repeat the last sentence -- last two sentences.

Mr. Bilirakis. Yeah, let me go on to do that. What are your thoughts on including committed broadband subsidies in future maps as opposed to just ongoing deployment efforts?

Mr. Darr. If I understand the question correctly, yeah. Serving these areas is not just a matter of getting an initial -- getting over an initial hump. Many of these areas are going to be -- continue to be more expensive to serve than the revenues that

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can be generated from them.

You have got to have continuous mapping going on and understanding how the landscape overall is changing because the needs, as has been discussed on the panel already, what we may need 10 years from now could be very, very different. The opportunity to present this type of service to the rural areas, what meets their needs today may not meet their needs in 2, 3, 5 years.

Mr. Bilirakis. Okay. Mr. Brake, do you want to comment on that?

Mr. Brake. Right. So I worry -- there has been a lot of talk about the challenges with 477 process. I think, again, as I stated in my testimony, if you work towards a more bottom up distribution method, as well as incorporating a more market-based approach as was outlined with the challenge process. There are ways in which we can improve this data collection process.

We are already collecting data twice a year, right? So the need to move to a wholesale different system in order to find more accurate data -- you can either go to a more granular 477 reporting or there are other ways in which we can really solve this information problem, rather than throwing hundreds of millions of dollars at a one-off mapping project.

Mr. Bilirakis. Okay. Let me get on to the next question. Mr. Brake, you discussed the definition of broadband and various elements of how it is defined. If I understand your testimony correctly, speed

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is a factor we should give great weight, but other factors as well, such as latency and pricing are also relevant.

Are you suggesting that we take a holistic approach to defining broadband? And how should we prioritize factors other than speed?

Mr. Brake. I think that is right. So obviously the speed is the predominant metric by which we define different service levels of broadband and how we define underserved areas, right? But my primary concern is much more long term. Right? I worry that broadband networks will continue to evolve to support different services over a multi-decade timeframe.

So if in legislation we lock in a particular very narrow understanding of what broadband -- what broadband is, it doesn't give room for these programs to change over time. And so, absolutely, speed is most important. But I think we have to be holistic and pragmatic, and here the FCC, again, has lead the way, at least within the USF program.

Mr. Bilirakis. Very good. Again, for you, Mr. Brake, you referenced the FCC's 2016 broadband progress report, and statements by then Chairman Wheeler about the marked reduction of unserved Americans over the course of the year. Do you or does anyone else on the panel know how much of that progress was actually connected to nonserved areas, meaning zero coverage?

And how much was simply bumping up speeds of those who already

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had the 4-1 or 10-1 download or upload speeds? Why don't you comment on that?

Mr. Brake. I am not sure I know the exact answer to your question. I do -- so to be clear, the definition for the purposes of the broadband progress report is different from the definition for the purpose of Universal Service Funding. So this definition of Advanced Telecommunications Service is 25 megabits per second, I have criticized that decision under the former Chairman Wheeler, as being seemingly designed to paint a particular picture of competition using -- choosing the 25 megabits per second rather than, say, a 20 megabits per second standard, which would paint a much different picture.

Mr. Bilirakis. Thank you very much. Madam Chair, I am over. If anyone would like to respond in writing to that particular question, we would welcome that. Thank you very much. I yield back.

Mrs. Blackburn. The gentleman yields back. Mr. Welch for 5 minutes.

Mr. Welch. I thank the Madam Chair for having a hearing and Ranking Member Mr. Doyle. I want to -- and I thank the panel. I just want to make a few comments.

Everybody has agreed that this challenge of getting rural broadband is absolutely essential to tackle. Seventy of us wrote to President Trump, and we heard from Secretary Ross who said that broadband is an essential part of our nation's infrastructure and vital

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component of economic policy.

In February we met with Chairman Pai and we urged him to have a targeted goal of what successful broadband deployment would look like. Chairman Pai came to the rural telecom working group and said that this was going to be a priority.

There is a number of bills that have been introduced that would start to address the challenge, some of them bipartisan, and the frustration I am having, quite frankly, is we haven't had a markup. It is 6 months into this, there is a consensus on what the challenge is, because it affects all of our districts, and even folks from really urban districts have rural components that need this help.

In the broadband report of 2016 from FCC talked about what that divide is, 39 percent of rural Americans lack access to advanced broadband.

You know, in Vermont over a quarter of our population lacks access to advanced broadband, and it is a brutal problem for us. Rural America is getting left behind. So this is really a plea to our committee, Madam Chair, for all of us to start having markups and doing the tough work of having legislation that can actually concretely move us ahead.

You know, we have got to, one, define what broadband deployment success in rural America is. We are getting some information on that now.

Second, we are going to have to make some decisions about what

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is necessary to reach the goal. Does it mean public investment? That is a tough environment around here. But these broadband infrastructure deployments don't build themselves, they take money, and maybe it is a combination of direct investment in perhaps some loans. But that is a bottom line question, that unless we are willing to address, we are not going to be able to have a realistic plan to move ahead.

So this is just, from a representative who serves a rural district, a plea that we start having markups on some of the bills that are before us.

I will just ask a few questions because I have taken my time with this statement. But, Mr. Brake, if you were to recommend two things to start accelerating the deployment of broadband into rural areas, what would they be?

Mr. Brake. Well, I do think the FCC is taking a good start at evaluating potential legacy regulation developing model code that can help reduce the barriers to investment. So that is one area to start. But I do think that, at the end of the day, if we really want to see a real acceleration in deployment, a greater investment at the Federal level is required.

Mr. Welch. Ms. Matthey, do you have any comments?

Ms. Matthey. Yes, two things. You need money and you need more money. And you have to decide to spend it.

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Mr. Welch. If we have money and more money, how do we have confidence that it will be wisely deployed?

Ms. Mattey. Well, as I said in my opening remarks, I think it is very important if the committee decides to have money disbursed by an entity other than the FCC, that it be carefully coordinated with the FCC, to ensure that different Federal programs are working in harmony.

Mr. Welch. Dr. Wack.

Mr. Wack. Yes, sir.

Mr. Welch. Yes. Same thing. Same question.

Mr. Wack. I would say I am biased. I would say, give it to the municipalities with lots of strings attached. Require certain things, open access, certain project management oversight. But local problems are best solved locally.

Mr. Welch. What about rural areas?

Mr. Wack. Rural areas, I think there is some great models on the ground today. I would suggest you look at RS Fiber in Minnesota, it is a cooperative venture between a couple -- maybe even a couple dozen municipalities and cooperatives rural Minnesota that are solving their local access and broadband problems through a public private partnership.

Mr. Welch. Thank you. I yield back.

Mrs. Blackburn. All right. Mr. Johnson, you are recognized for

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5 minutes.

Mr. Johnson. Thank you, Madam Chairman. And, again, I thank the panelists for being here today, a very, very important topic.

Mr. Brake, you noted in your testimony that of the 6 percent of Americans that lack access to 10 megabits per second, close to a quarter of that number come from rural areas. And I can tell you, from personal experience, that that number is probably a lot higher in Appalachia, in eastern and southeastern Ohio along the Ohio River.

How is it that we keep missing large swats of our Nation in this otherwise well-intentioned effort to advance broadband access?

Mr. Brake. It is a very good question. I think it legitimately is a very hard challenge to get broadband into these very rural areas. When the homes are so widely dispersed, the revenue base is very wide and the cost per home is much higher. It is a real economic challenge.

If we do not define the goals very specifically in geography, I worry that sometimes money that is disbursed ends up inevitably pooling in the areas where the opportunity for revenue -- to see revenue return is greatest. I think this is more a concern when you are talking about broadband -- or loans rather than grants.

So, I mean, it is just a continuing challenge. But, as I said, the potential infrastructure package is a real opportunity to take another crack at it.

Mr. Johnson. Thank you. Ms. Matthey, do I have that right? Am

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I pronouncing that right?

Ms. Mattey. Yes.

Mr. Johnson. In your opinion, how has the accuracy of our broadband maps improved since the responsibility for mapping shifted from NTIA to the FCC?

Ms. Mattey. That is a complicated question. I think that the FCC has been working hard and has the advantage of requiring the information to be provided.

But I have to be perfectly candid, I am aware of inaccuracies in the information. I am aware that some entities have made mistakes. I have heard that there are concerns that some overreport. I think, and I actually agree with several of the panelists today that have talked about the importance of validation and even auditing the data to ensure that the data are accurate.

Right now we have a -- data collection companies are required to provide the information, but I will be candid and say, they don't necessarily have the strongest incentive to make sure that they are taking good care in submitting that information, and that is a problem.

Mr. Johnson. Okay. All right. We will continue with you, Ms. Mattey. In rural areas, how significant is it that a rural census block is considered served as long as part of the block is served. Isn't a census block based approach to broadband mapping very grandular?

Ms. Mattey. The issue, obviously, is if you require something

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more detailed than a census block, that imposes a greater burden on the parties that are submitting the information. Whether they are submitting it to the Government or an independent clearinghouse or a private sector entity that is collecting the information, either way, that is burdensome.

A different approach is to just shift the presumption rather than saying you are going to deem the block served. If there is one location you can say the block is unserved unless all locations are served. That is a simple fix.

Mr. Johnson. Yeah. That strikes me as problematic, though, because aren't there just a few homes in those census blocks? I mean, that is part and parcel to the question that I asked Mr. Brake earlier, when you are working on simply a census block, you miss folks.

Ms. Mattey. Well, that is the issue. It is just a question of which way. Do you want to presume something is served or unserved, and obviously, the issue is to make sure that you aren't declaring a block unserved, and then having a situation where you potentially are funding somebody to compete against another provider that serves a corner of the block.

I have seen that in rural areas where, in the course of the challenge process, folks submitted maps, and you could see that there was a cable plant that was crossing perhaps a corner of a census block, but not touching all of the homes within. That is the policy dilemma,

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which way do you push the lever.

Mr. Johnson. And I think you are highlighting the problem and making the case about why it is so important that these maps be accurate, because that is one of the reasons why we continue to miss swats of rural America is because of the way we are mapping it out and the detail we are going down to. Okay.

Madam Chair, I yield back.

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RPTR ZAMORA

EDTR SECKMAN

[11:59 a.m.]

Mrs. Blackburn. Ms. Matsui, for 5 minutes.

Ms. Matsui. Thank you very much, Madam Chair.

And I want to thank the panelists for being here today.

I think we all agree that good broadband data is essential to determining the public policies that we need to help facilitate broadband buildout.

Now, I represent the city of Sacramento, the State capital of California. But I also believe, because we are the hub of the region, that it is really important to relate to the rural areas. And as Mr. Johnson and Mr. Loeb sack and others, Mr. Welch will attest, I do attend the rural-urban kind of coalition because I believe we need to work together.

Now, I believe that, for a region to succeed, you really have to look at both the urban and rural areas being unserved and underserved. And there are areas outside of my district that I work with really well, and there are very successful farming operations that I believe will be going on the longest time.

There are other areas close to me that are farming now, but I can see the changeover to development and housing. And the region that

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I represent, the city and the suburbs, there are areas in Sacramento which were successful suburbs like in the 1960s and 1970s and no longer are that successful. And we see young people there not being able to have broadband to access their homework and all that.

So I am looking at this thinking that, for economic benefits, I look at looking at urban and rural together, because, quite frankly, what is happening now is we are having sort of a leapfrog type of situation where the developers are doing something in the rural areas, and then this area where we have some -- a suburban area that, you know, used to be successful no longer is.

And I am really wondering what we can do to tackle this. Is there different data we need to address that type of situation? We have a city area, which we are now getting, you know, a partnership with Verizon there for 5G. But then we have a suburban area, and then we also have the area that is developing from rural to suburban now.

I would think that there could be more harmonizing there. And I don't know whether the data even looks at something like that because you are looking, I think, Ms. Matthey said, we need to have more dynamic data. So I would like some comments on that, Ms. Matthey.

Ms. Matthey. Well, obviously, there are multiple ways one can try to improve the quality of the data. One of the questions is, whether the government does it or the private sector does it, who is going to pay? Whoever is doing the work.

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Ms. Matsui. It is always that, right.

Ms. Mattey. Yeah.

Ms. Matsui. Can I just say this: Our subcommittee has discussed legislative proposals to create an inventory of Federal infrastructure and property which could be used for broadband. Local and municipal governments would be permitted to add their existing facilities to the inventory so they might be better utilized by broadband providers.

And I am also looking at utilities and as we build transit, laying fiber and all that. And is there this type of coordination of data sharing now between the Federal, State, local governments? And have we also invited some of the utilities and transit people to be a part of this? Anyone?

Mr. Legg. Congresswoman Matsui, I think you are highlighting a very important issue that access to conduit, access to pole attachments, access to public rights-of-way, permitting through Federal lands, BLM, forestry, all of that, all of those are challenges to broadband deployment. Frankly, there is quite poor coordination on all of the things that I just mentioned, and there is much room for improvement.

Ms. Matsui. So that would mean that you would have another type of cooperation agreement, in a sense, other than we are talking about today?

Mr. Legg. That is right. I think so. I think the participation

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of State, Federal, and local entities in a common framework that would allow for the sharing of information on how to get access to those things is very, very important.

Ms. Matsui. Well, I would think that would benefit both rural and urban areas.

Mr. Darr. Yes, absolutely. One of the significant hurdles right now within the urban areas particularly has to do with the need to streamline zoning and permitting for small mobile and WiFi antennas. And this is going to impact the rural areas as well.

I was having a conversation with an operator last week who has a lot of coverage in rural Mississippi, and they are using small cells on a telephone pole that are the size of Coca-Cola cans. And as long as you can get fiber to that point, then you can provide very high-speed directed service to an area that is relatively nearby. You don't always have to have the 200-foot tower.

Ms. Matsui. Sure.

Mr. Darr. But it is also important to understand that that fiber has to be there. If you don't have the fiber there, it is extraordinarily difficult to provide a high-speed signal.

Ms. Matsui. Thank you.

I have been urged to wind up here. So thank you very much, and I will submit the rest of my questions.

[The information follows:]

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Mrs. Blackburn. The gentlelady yields back.

Ms. Matsui. I yield back.

Mrs. Blackburn. Ms. Walters, you are recognized for 5 minutes.

Mrs. Walters. Thank you.

I would like to thank the chair for holding this hearing this morning and for our witnesses for appearing.

Unfortunately, as we have been discussing, there are significant portions of this country that don't have access to broadband, which limits economic potential but, far more troubling, increases the digital divide. And in order to get there, it is clear that we need to find a way to properly and appropriately identify the areas that need coverage, and that starts with accurate and up-to-date data. That being said, as we look to improve this data, we must ensure that taxpayer dollars are spent wisely and efficiently.

Mr. Brake, you mentioned in your testimony that Federal support dollars should be given first to areas that are truly unserved. You state that priority should be given to these communities until the cost of connecting each additional premises becomes untenable. What cost should policymakers consider untenable?

Mr. Brake. I am not sure I can give you an exact number. I worry that that is, to some extent, a political question, what amount of money we are willing to spend to advance truly universal coverage. The real challenge is, as you approach the very last few percent, the cost of

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connecting each additional user really takes off like a hockey stick. And so I would assume that we have to draw the line at the last 2, last 1 percent. And at that point, it becomes reasonable to be looking at other technologies, such as satellite.

Mrs. Walters. So, if public investment does not reach these remote areas, that very last section you were talking about, will these communities ever be served?

Mr. Brake. They will be served -- I mean, they are served now by satellite, except for some extremely far north regions of Alaska, is my understanding, but -- so perhaps not with as robust a technology; perhaps the coverage would be less reliable or the latency higher. But the very final, you know, last percent, you know, satellite remains an option.

Mrs. Walters. Okay. Switching gears, Mr. Brake, I have got another question for you. In regard to smart infrastructure, can you touch upon the advancements we have seen in the networks themselves?

Mr. Brake. I can talk for a while about that. There are all sorts of ways in which the underlying technology that underpins these broadband networks is continually changing. I do worry, especially with the, you know, conversation about dark fiber, that there is a sense that these are simply dumb pipes, that if we put the infrastructure in the ground, then nothing has to change. That is simply not the case.

While a lot of the innovation, to be fair, is happening at higher

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layers of the stack, if you will, there are ways in which a lot of the routing and the real smarts of the network is being developed within software rather than hardware.

That is a very important transition that, while pretty obscure and technologically advanced, is an important transition, and so finding ways in which private sector can continue to drive those innovations. And I think the real balance is providing Federal funding to continue to see this, networks built out into rural areas, but leaving a lot of the actual innovation in the core of the network to the private sector is the answer.

Mrs. Walters. Okay. I yield back the balance of my time.

Mrs. Blackburn. Ms. Clarke, you are recognized for 5 minutes.

Ms. Clarke. Thank you very much, Madam Chair.

And I thank our panelists for their expert witness testimony this morning.

Dr. Wack, just following Ms. Matsui's line of questioning, rural and urban areas often experience similar socioeconomic dynamics. I represent an urban area. So, while we would not be defined as unserved, that doesn't mean that there aren't issues that also need to be addressed, such as maximum available speeds that aren't sufficient to support business needs or limited competitive and affordable options.

Can you speak to the conditions that preceded the city of Westminster's decision to explore building its own dark fiber network,

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and why are quality broadband speeds essential to businesses in your city?

Mr. Wack. Thank you, Congressman Clarke.

As I mentioned before, we went through an exhaustive planning process looking at our current levels of service, what the satisfaction with those levels of service were in our business community and in a residential population. And the resounding answer was that they were unsatisfied.

And I did not mention before, there was also a parallel effort working with our incumbent providers to get them to upgrade their infrastructure and their service levels, which took the better part of a decade, that conversation unfolded, and it was all for naught. There was no movement. Lots of promises, lots of talk, but no action. So we finally took matters into our own hands and started pursuing this project.

Ms. Clarke. I am also very concerned about redlining and the digital divide that seems to continue to grow. While many urban areas are defined as served, using the most recent definition of broadband from the FCC, I am concerned that there could be pockets within these areas that are still ignored by service providers. What can be done to address these concerning issues to ensure that everyone can have the opportunity to have access to broadband services? Dr. Wack.

Mr. Wack. Thank you. So this is a very important question, and

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I am glad you asked it. One of the things that we hear a lot today is an unfortunate conflation of service levels with the existence of the infrastructure. And we are debating a lot about service levels and the prevalence of service levels, but that sort of is making the service tail wag the infrastructure dog. And you can't have service at all until you have infrastructure.

And what we have pledged in the city of Westminster is that the city is going to extend just the infrastructure but make it available to every single person in our community regardless of the neighborhood, their economic situation, et cetera, so that everybody has access to the infrastructure, which then allows service providers to provide whatever level of service they think they can make a dollar off of, because we believe in the power of the free market to solve these problems.

But just like -- it is kind of a waste of time debating what features you are going to have on a car when you don't have any roads. We want to build the road first, and then we can have that conversation about big car, small car, red car, blue car, air-conditioning, CD. That is later. First, we need to build the roads, just as we first need to build the infrastructure and make sure that every citizen in our community has access to it.

Ms. Clarke. So, Dr. Wack, I wholeheartedly agree with your statement in your testimony that high-capacity data services and the

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infrastructure to provide them are essential in 21st century. I also agree that there is a duty for government to ensure that the infrastructure is in place.

What can the Federal Government do to help local municipalities like the city of Westminster to achieve wide deployment of quality high-capacity data service? I think you kind of went into that a bit in your last answer, but if you could just drill down a little bit deeper.

Mr. Wack. Sure. So the city of Westminster ship has sailed. We have already committed \$21 million to that project, and we are going to see it through to the end.

The barriers for other municipalities to do this really boil down to three things: One is their finances. Some municipalities unfortunately have a lot of debt, and that is a problem. So, to the extent that the Federal Government can help them with that, that would lower the barrier for them to do these kinds of projects.

The second thing is they have competing infrastructure projects: bad roads, bridges, water systems, et cetera. So, again, to the extent that the Federal Government can help relieve those problems, it would help.

The third is political will. They just have to be able to feel like they can see this project through, because as I said before, these are hard projects. They are taking many years. They are expensive.

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But our model shows that the infrastructure can end up paying for itself so that it doesn't unduly burden the rest of the municipal finances and still provide open-access infrastructure to allow the market to develop services and pricing levels that are suitable for that opportunity.

Ms. Clarke. Very well. Just in time.

I yield back, Madam Chair.

Mrs. Blackburn. You always do a good job, Ms. Clarke, and we appreciate that.

Mrs. Brooks, you are recognized.

Mrs. Brooks. Thank you, Madam Chairman.

Just a couple months ago, the State of Indiana passed legislation that empowered the employment of -- deployment of small cell devices to bring 5G technology, similar to what my colleague from Sacramento was talking about, to Indianapolis. And our city is currently a test site for 5G evolution buildout.

And while these are incredibly important, much of my district is also rural and may not necessarily be experiencing the same high-speed broadband access, and, in fact, one out of six Hoosiers live in an area of the State without any broadband access at all. And so I very much appreciate these discussions, particularly for those of us who are in both urban, suburban, rural, small-town districts.

One of the things that I would like to delve into a little bit

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more, and I haven't heard about it talked about enough probably, but, Dr. Wack, you talked about importance of public/private partnerships, and I don't think we have really talked much about that. And you just talked about barriers in response to my colleague from New York's question.

What would you say are the keys to success, or is it overcoming these barriers that you just talked about with respect to public/private partnership in this space? Can you expand on what you -- and I might ask some of the others for what they think keys to success could be to have successful public/private partnerships in this space?

Mr. Wack. Thank you, Congressman -- Congresswoman. I am sorry.

The public/private partnerships are all about allocating risk appropriately between the partners and making sure that the incentives for pursuing the partnership are aligned so that both parties get something out of it.

That is hard to do between the public sector and the private sector for a variety of reasons, but it is not impossible. And there are many examples of successful public/private partnerships in a variety of industries. There is no one-size-fits-all. Every community is unique. The private partners that come to the table are going to have unique skills and assets.

But I guess the key factors for success are appropriate risk

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sharing, that it is not one party is taking all the risk, not one party is footing all the bills, not one party is accruing all the benefits. Both sides have to have skin in the game. Both sides have to be able to gain something from it.

But what they need from it are very, very different from the public sector and the private sector. The public sector doesn't need to make money. They just need to solve problems for their community. The private sector needs to make money. And there is nothing wrong with that.

And those are some of the challenges that need to be overcome sort of culturally between the two partners, getting both sides to understand that solving a policy problem really doesn't have anything to do necessarily with the bottom line, but the private partner has got a bottom line, and the public partner has to be cognizant of that.

Mrs. Brooks. And thank you for that.

I am curious if any other panelists have any other ideas with respect -- because I think we need to think very creatively here in trying to bring broadband to everyone in the country. Anyone else like to add as to what you would like to see if we were to promote concepts of public/private partnerships? Yes.

Mr. Brake. So one thing I agree with Dr. Wack on is there is no sort of one size -- you know, one model of public/private partnerships. So there are different ways in which private industry and local

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governments can work together to try to find ways to accelerate deployment.

I would say, as a general rule, advancing a public/private partnership of this sort of type where the local government actually owns -- publicly owns the infrastructure itself should be off the table when there are already two existing providers in a particular area.

Part of my concern is that, especially when these are dynamic markets and two existing providers can be competing on other terms other than broadband access itself, if we come in with a simple fiber model and you are not competing on video or potential wireless play, it can become financially difficult for the public offering.

And I worry that then you see the public fiber model looking to pick off the highest revenue entities, such as the local government or businesses, and ultimately sees it more difficult to serve the overall area outside of where the municipal network itself is provided.

Mrs. Brooks. And very briefly, Ms. Matthey, do you have any comments or any thoughts, briefly?

Ms. Matthey. I think it is very important at the State and local level to find providers that actually want to serve the area. If it is a provider that doesn't want to serve the area, you are not going to get anywhere. And so it is really important at the grassroots level, you know, whether it is through something that we have heard about today or other methods trying to find folks in the community, providers in

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the community, folks that are actually committed to actually making this happen.

Mrs. Brooks. Thank you.

I yield back.

Mrs. Blackburn. The gentlelady yields back.

Mr. Olson, you are recognized for 5 minutes.

Mr. Olson. I thank the chair.

And welcome to our five witnesses. You are 5 minutes away from lunchtime.

Mr. Brake, my first question is for you, sir. You talked about the need to have reasonable broadband goals and the policy implications of defining broadband as 25 megabits per second versus 10 megabits per second. When I talk about broadband speed, I get my guidance from my sweet daughter Kate. She is 20 years old, a sophomore in college.

My question is, what type of a service can a consumer, like my Kate, expect with a 10/1 connection?

Mr. Brake. So it is a very good question. So part of the context of putting out those sorts of questions is ultimately there are tradeoffs involved, right. What kind of service you can achieve for 10? You can do a lot of things that are economically productive. You might not be able to stream the highest definition resolution of video, right.

And so, when you are looking at providing funds to build broadband

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out to the entire country, I would say we should look at providing that sort of level of service, where you can participate in the economy, you can do, you know, productive activities online, but you might not have access to the highest bandwidth applications. We should get those out to as many people as possible before then turning to the higher bandwidth possibilities.

Mr. Olson. My daughter Kate wants to stream video at the highest speed. So it sounds like that is a challenge for Kate.

How about, does the average consumer -- and I doubt this is my Kate -- use more than 10/1 on a regular basis?

Mr. Brake. I am sorry. Can you repeat the question?

Mr. Olson. Does the average consumer -- this is probably my Kate. I am sorry -- use more than 10/1 on a regular basis? Is it normal? Higher than that? Lower?

Mr. Brake. I would say lower. I mean, it depends on what you are trying to use it for. If you are doing like a large file transfer or something like that, over time, you could, you know, use up as much bandwidth as you have available.

But for most purposes, no, it would be much less than that. You can stream 4k video or at least encode 4k video at 15 megabits per second. So it is like, we are talking, you can easily do, you know, probably 720p -- like you can still do high-definition video but not the very highest.

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Mr. Olson. Thank you.

Ms. Matthey, ma'am, I realize I would be maybe playing with you by making you the judge, the jury, the executioner. But what suggestion do you have as the Federal Government looks to exploit broadband deployment when we have multiple programs at the Federal level doing the same jobs? So basically, where will you terminate? Cut? What will you restructure? What is your vision if you could make the government do what you want us to do? Judge, jury, executioner.

Ms. Matthey. I can't answer that question in 2 minutes.

Mr. Olson. How about the number one?

Ms. Matthey. As I said earlier, if Congress chooses to appropriate funds and direct those funds to a Federal agency, I presume it will be separate from the FCC because those are appropriated funds. And I would mandate -- I would absolutely mandate that there be coordination with the FCC so as to ensure that the Universal Service Fund funding is not working at cross purposes with the additional infrastructure funding that Congress mandates.

And I will also say one thing: I too have a sweet Kate, and it takes more than 10 when you have got three kids in the house.

Mr. Olson. Oh, boy, probably way more than 10.

I asked you that question about the judge, jury, executioner. What would you do? Mr. Brake, I see a smile on your face.

Mr. Brake. I would agree. I think that one of the most important

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things is coordination with the Universal Service Fund, Connect America. But, yeah, I think there is widespread agreement that money needs to be spent to see additional buildout in rural areas. I think getting over that hump is challenging enough.

Mr. Olson. Mr. Wack, you have a chance to file your last statement. Wack. Anything you want to take out from the Federal Government? I know it is not quite your bailiwick, but being a local operator, are you concerned about what D.C. is doing to the State of Maryland, your business there?

Mr. Wack. That is also too much for 28 seconds. I would just say build a lot of fiber, open it up, refer it to as many users as possible and make a commitment to reach every citizen of the United States regardless of where they live.

Mr. Olson. Mr. Darr, Mr. Legg, 15 seconds. Any comments or too short of time?

Mr. Legg. I would say, Congressman, that the need for speed is only going to increase. What is available or should be considered a minimum standard today will not be the minimum standard in a very short period of time: Applications, video, things we do over the internet constantly evolving, and we want that to be the case. So shoot for as much infrastructure, as much fiber as possible, especially with the advent of 5G on the horizon.

Mr. Olson. As a naval aviator, the need for speed is very dear

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to my heart. So thank you.

I yield back.

Mrs. Blackburn. The gentleman yields back.

And we will UC Mr. Tonko and Mr. Griffith to the committee to ask questions.

Mr. Tonko, you are recognized for 5 minutes.

Mr. Tonko. Thank you, Madam Chair. Thank you for the hearing.

And thank you to our witnesses.

In the digital age of the 21st century, broadband is essential to how we communicate and exchange information, conduct business, and engage in the democratic process. From young children working on school assignments to college students studying for exams to adults working from home or running a small business, easy and affordable internet access has become an integral part of our daily lives.

I hear from my constituents all the time about the lack of access to broadband internet throughout the region I represent. Some of these areas are rural and mostly unserved or underserved, and other areas are underserved with a few houses having access while many others are left without affordable options in sight.

I have heard from doctors who depend on the internet to read X-rays when they are on call, from librarians who see students sitting in the parking lot after hours so they can finish homework, from workers who are forced to leave their home to find high enough speeds so that they

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can upload or download large files. They all ask, when will we have access to broadband?

As a committee, we owe all of these people an answer. I appreciate that we are holding this hearing today, but we must take action. A lack of access to broadband internet in the capital region is one of many reasons why I made it a priority to join this very committee.

Let's work together to invest where we need to so that we can give these communities the service they deserve. These communities have been asking for help for a very long time, and as we heard, it is only going to become exacerbated from this point forward.

I am especially proud that New York State is helping to lead the way on expanding broadband, especially in upstate New York. This year, the New York congressional delegation helped to secure more than \$170 million in funding to expand high-speed internet access in upstate New York.

This will be added to \$500 million that has already been set aside by the State. The program has raised the goals for internet access speeds with an aim of 100 megabits per second across New York and 25 in the most remote and rural areas.

I hope that, by partnering with States like New York that are dedicating their own funds to broadband deployment, we will create a positive incentive, encourage other States to create their own

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broadband funding programs.

I am concerned that some of the census block data that are relied upon to determine if communities are served might show a misleading picture, especially in communities that may be partially served.

With all that being said, you know, earlier, Dr. Wack, you had discussed how Westminster was underserved despite meeting criteria for adequate broadband coverage. I would like to drill down a little deeper on that. Just how did this affect the people and businesses of your great community?

Mr. Wack. In short, it just slows them down. So the anecdote I related, that company almost lost that contract because they couldn't deliver their product on time, which relied on their internet connection. And as I related, they ended up mailing it. And, again, this was just a few years ago. This is the 21st century. That is not acceptable.

And that is the constraint on future growth. So, sure, some of these businesses may be able to get by today, but if we are talking about growth, we are talking about growing the economy, creating jobs, and creating opportunities for our constituents, we have to plan for future capacity. And existing capacity is already inadequate.

Mr. Tonko. What would this mean for home values or funding for schools and for students?

Mr. Wack. For home values, there is data that is out there that

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says that just having a dark fiber connection to the house increases the value of the home 3 to 5 percent. We are going to test that proposition in Westminster, and we were already seeing increased interest in some of the residential communities that are already lit. The realty community is excited about this. They are starting to market it. And they are seeing people coming saying: I want to go to a neighborhood that has the fiber service.

Our schools were already connected because of a Middle Mile Project that actually enabled our project. So we have already seen the benefit there. But I would imagine that, as the whole community gets connected and those kids are able to connect back to the school, there will be all sorts of opportunities for distance learning enabled by that as well.

Mr. Tonko. Why don't I just ask the entire team here, what progress would you suggest has been made at expanding broadband access? What would you cite as the progress for broadband, Mr. Legg?

Mr. Legg. Congressman Tonko, thank you for the question. I think that we have seen a rapid expansion of gigabit service in urban and suburban areas across the country just in the last few years.

I think that highlights the fact that there is actually a growing digital divide in the country where urban and suburban areas have gigabit service and rural areas are still struggling on dialup or low-grade DSL services. So I think the divide is actually increasing.

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It is great for urban and suburban areas. I think that there is a need for that speed. Our concern as a nonprofit organization is what is happening in some suburban and rural areas where they are simply not able to keep up.

Mr. Tonko. And that is of a great concern.

Anyone else?

Mr. Darr. I would like to add that, capturing a picture of how the networks are behaving today, we need to keep in mind that even though we have accomplished bringing a specific level of service to a given point at a given time, that doesn't mean that that will be maintained.

If you take a look at a two-lane, a four-lane freeway and it was designed for perhaps 40,000 cars, this is the same concept. If you put 70,000 cars on that highway, everything slows down. As you attract more people to the network and they learn they can do new things, then it is going to create further congestion on the network.

And so, if you are able to provide service to an area at 10/1 or 25/3, whatever that is defined by, then that can degrade over time if you continue to put more and more people and more and more load and stress on that network.

Mr. Tonko. Okay.

Madam Chair, you have been most kind and generous. I have exceeded my time, and I yield back.

Mrs. Blackburn. The gentleman did exceed his time, but that is

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perfectly okay.

Mr. Griffith, you are recognized for 5 minutes.

Mr. Griffith. Thank you very much, Madam Chair, and appreciate all the members of the committee being here.

We have been monitoring it, the testimony that you all have been giving, and so a lot of the things that I am going to ask or talk about, you all have already touched upon. But I did mention to the chair lady how much I appreciated her holding this hearing.

We have got to have accurate maps, as you all have all said. My district, for those of you who aren't familiar with it, is the rural corner of Virginia that stretches from Kentucky and Tennessee and North Carolina and West Virginia up to, I call it the cornucopia of the State, up to the edge of Roanoke.

In it, we have Virginia Tech, a highly wired community. And, yet, I have professors outside of Virginia Tech who do not have any service at all. It is not a matter of speed; they don't have anything. If they want something, HughesNet is their only option. Also, in Montgomery County, a few more miles, that is about 5 or 6 miles outside of Blacksburg, that we have that. Now, part of that has to do with the fact that the district does have a lot of mountains and a lot of nooks and crannies. But still, in Montgomery County, I have an area where the laid wire gets to within about 2 miles of the edge of the county, and the people out there have nothing.

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I have got huge sections geographically, maybe not huge population, but huge sections geographically that the FCC thinks they are serving, and it appears they might. They aren't. It is not there. I have looked at their maps, and there are lots of areas I know are white with no service that they don't seem to understand there is no service.

Public-private partnerships that you all touched on, I think, are very important. We are not going to lay wire to every one of those nooks and crannies, but we have got to get them some service. And while it may not be as fast as they can get it in downtown Blacksburg, it ought to be at least serviceable for kids doing their homework.

And I think all of you agree with that. The question is how we do it. And I don't know how we can craft it at the Federal level. So, if you all sleep on this and come up with an idea, let me know.

But I happened to stop by a couple weeks ago to see some folks in Bland County in their administrative offices. They started talking to me, and they had a fellow there from GigaBeam, which is a local startup that started in 1994, just a computer service company. And they saw that nobody was providing internet service so they started doing it where they could. It is expensive.

Bland County has been bartering with all kinds of folks. So when they needed to get a tower put up in one location, they were telling me they happened to know that a power company needed a little easement

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from them. So they said: We will give you the easement if you help us put the tower up. They already had all the equipment there.

Now, I don't know how you put that into a piece of legislation, Madam Chairman, because that is just good commonsense. The equipment was all sitting there. They said: All right, we need your help. We will give you the easement you need; you get your guys to put the tower up.

And, you know, there they made a deal.

That is the kind of stuff we need if we are going to get it out into a lot of the rural areas like mine where it is not easy. Bland has got two tunnels so the interstate can get through the county. So it is not an easy terrain, but there are a lot of good folks there, and they need their kids to be educated, and they need the ability maybe to bring in some jobs to the areas that aren't flat enough to build buildings on.

So you all have all touched on that. I want to work with you, as I know the chair lady does and the rest of us do, to try to solve these problems. And I think the first step is to get the mapping done, because if you don't know you have got a problem and you are building up the speeds in certain areas of the country because you think that is the problem and I have got people that don't have -- and a fair number; I hear this complaint regularly -- a fair number have no service at all, that is something that we need to be looking at to fix.

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So I am happy to give whatever time I have remaining to if anybody wants to respond or make any comments. But, frankly, you all have done a great job of getting the information out there already. And I am aware of that. So thank you.

Anybody want to respond?

Mr. Wack. Congressman Griffith, thank you.

Mr. Legg. Congressman Griffith, thank you for your comments. I grew up just across the Kentucky-Virginia line. I understand some of the areas that you are dealing with there.

I think one of the things that Congress can do is look at ways of incentivizing ease of pole attachment, ease of locating facilities and easements on public right-of-way within other easements that are granted to railroads and to power companies.

I think there is a lot that can be done. We talked a little bit earlier. I think it was Congressman Matsui that raised the comment that conduit easements, pole attachments, those are all things that actually either inhibit or promote the growth of broadband service, and that is certainly something that Congress could help with.

Mrs. Blackburn. The gentleman yields back.

And seeing no further members wishing to ask questions of this panel -- and you all have done a wonderful job, and we thank you, that you have been here today.

Before we conclude, I do ask unanimous consent that we can submit

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a letter from the Satellite Industry Association.

[The information follows:]

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Mrs. Blackburn. And then I know that the minority has three articles or two articles here -- two articles to submit regarding the exchange between Mr. Brake and Ms. Eshoo, and one relates to chairman -- they are both from Free Press and one relates to Chairman Pai and his investment numbers and the other two AT&T CEO regarding "Net Neutrality Rules Haven't Harmed Investment."

And I have one article from The Verge that cites statements from the CEOs and the deputy counsel from Verizon, the CEO from Charter, the CEO from Comcast, and AT&T discussing how it did inhibit or slow investment.

[The information follows:]

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Mr. Tonko. If I could just clarify, the minority is asking simply for the one Free Press article.

Mrs. Blackburn. The one, okay.

Mr. Tonko. -- be introduced into the record.

Mrs. Blackburn. Amended. So ordered. Without objection.

[The information follows:]

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Mr. Tonko. Thank you.

Mrs. Blackburn. Pursuant to committee rules, I remind members that they have 10 business days to submit additional questions for the record.

And I ask that each of you, upon receiving those questions, answer within 10 business days.

Seeing no further business to come before the subcommittee today, we are adjourned.

[Whereupon, at 12:38 p.m., the subcommittee was adjourned.]