

THE IMPACT OF BROADBAND INVESTMENTS IN RURAL AMERICA

HEARING

BEFORE THE

SUBCOMMITTEE ON COMMUNICATIONS,
TECHNOLOGY, INNOVATION AND THE INTERNET
OF THE

COMMITTEE ON COMMERCE,
SCIENCE, AND TRANSPORTATION
UNITED STATES SENATE

ONE HUNDRED SIXTEENTH CONGRESS

FIRST SESSION

MARCH 12, 2019

Printed for the use of the Committee on Commerce, Science, and Transportation



Available online: <http://www.govinfo.gov>

U.S. GOVERNMENT PUBLISHING OFFICE

WASHINGTON : 2025

60-881 PDF

SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED SIXTEENTH CONGRESS

FIRST SESSION

ROGER WICKER, Mississippi, *Chairman*

JOHN THUNE, South Dakota	MARIA CANTWELL, Washington, <i>Ranking</i>
ROY BLUNT, Missouri	AMY KLOBUCHAR, Minnesota
TED CRUZ, Texas	RICHARD BLUMENTHAL, Connecticut
DEB FISCHER, Nebraska	BRIAN SCHATZ, Hawaii
JERRY MORAN, Kansas	EDWARD MARKEY, Massachusetts
DAN SULLIVAN, Alaska	TOM UDALL, New Mexico
CORY GARDNER, Colorado	GARY PETERS, Michigan
MARSHA BLACKBURN, Tennessee	TAMMY BALDWIN, Wisconsin
SHELLEY MOORE CAPITO, West Virginia	TAMMY DUCKWORTH, Illinois
MIKE LEE, Utah	JON TESTER, Montana
RON JOHNSON, Wisconsin	KYRSTEN SINEMA, Arizona
TODD YOUNG, Indiana	JACKY ROSEN, Nevada
RICK SCOTT, Florida	

JOHN KEAST, *Staff Director*

CRYSTAL TULLY, *Deputy Staff Director*

STEVEN WALL, *General Counsel*

KIM LIPSKY, *Democratic Staff Director*

CHRIS DAY, *Democratic Deputy Staff Director*

RENAE BLACK, *Senior Counsel*

SUBCOMMITTEE ON COMMUNICATIONS, TECHNOLOGY, INNOVATION
AND THE INTERNET

JOHN THUNE, South Dakota, <i>Chairman</i>	
ROY BLUNT, Missouri	BRIAN SCHATZ, Hawaii, <i>Ranking</i>
TED CRUZ, Texas	AMY KLOBUCHAR, Minnesota
DEB FISCHER, Nebraska	RICHARD BLUMENTHAL, Connecticut
JERRY MORAN, Kansas	EDWARD MARKEY, Massachusetts
DAN SULLIVAN, Alaska	TOM UDALL, New Mexico
CORY GARDNER, Colorado	GARY PETERS, Michigan
MARSHA BLACKBURN, Tennessee	TAMMY BALDWIN, Wisconsin
SHELLEY MOORE CAPITO, West Virginia	TAMMY DUCKWORTH, Illinois
MIKE LEE, Utah	JON TESTER, Montana
RON JOHNSON, Wisconsin	KYRSTEN SINEMA, Arizona
TODD YOUNG, Indiana	JACKY ROSEN, Nevada
RICK SCOTT, Florida	

CONTENTS

Hearing held on March 12, 2019	Page 1
Statement of Senator Thune	1
Prepared statement of Hon. Roy Blunt, U.S. Senator from Missouri	52
Statement of Senator Schatz	3
Statement of Senator Fischer	39
Statement of Senator Klobuchar	40
Statement of Senator Moran	42
Statement of Senator Tester	44
Statement of Senator Scott	45
Statement of Senator Sinema	47
Statement of Senator Udall	50

WITNESSES

Denny Law, General Manager and Chief Executive Officer, Golden West Communications	4
Prepared statement	6
Justin Forde, Senior Director of Government Relations, Midcontinent Commu- nications	12
Prepared statement	14
Mark A. Jamison, Ph.D., Visiting Scholar, American Enterprise Institute	21
Prepared statement	23
Carol Matthey, Principal, Matthey Consulting, LLC	27
Prepared statement	29

APPENDIX

Hon. Shelley Moore Capito, U.S. Senator from West Virginia, prepared state- ment	53
Response to written questions submitted by Hon. Jacky Rosen to:	
Denny Law	53
Justin Forde	55
Mark Jamison	56
Carol Matthey	58

THE IMPACT OF BROADBAND INVESTMENTS IN RURAL AMERICA

TUESDAY, MARCH 12, 2019

U.S. SENATE,
SUBCOMMITTEE ON COMMUNICATIONS, TECHNOLOGY,
INNOVATION AND THE INTERNET,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Subcommittee met, pursuant to notice, at 2:45 p.m. in room SH-216, Hart Senate Office Building, Hon. John Thune, Chairman of the Subcommittee, presiding.

Present: Senators Thune [presiding], Schatz, Fischer, Moran, Scott, Klobuchar, Tester, Sinema, and Udall.

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

Senator THUNE. Good afternoon. Welcome. I apologize for being a little bit tardy. We had a couple of votes going on. We're going to have to juggle that as we proceed with the hearing.

But I want to welcome everybody to today's hearing, examining the State of Rural Broadband Deployment.

Given the importance of rural broadband to the Committee last Congress and also to my home state of South Dakota, I'm excited to chair the first Communications Subcommittee hearing of the year on this topic.

High-speed broadband services are vital to America's communities. Broadband connectivity provides opportunities for advancements in health care, education, and economic development.

Unfortunately, access to these services is often determined by where you live, with rural areas trailing more populated areas in broadband access. One of the most critical programs to help build out rural broadband services is the high-cost program within the Federal Communications Commission's Universal Service Fund.

Just a little over 5 months ago, I led a hearing calling on the FCC to restore sufficiency and predictability to the high-cost program. Since that time, the FCC under the leadership of Chairman Pai unanimously took action to enable the continued deployment of broadband in rural communities in my home state of South Dakota and across the country.

The Commission fulfilled an important obligation to ensure universal service and met its obligations under the law. By ensuring predictable and sufficient support, there will be more broadband investments in rural and tribal communities across America. For that, I thank the Commission.

It is important to note that universal service cannot be achieved without pragmatic and bipartisan cooperation in Congress and without proper oversight of the FCC and other agencies tasked with advancing this goal, including the Rural Utilities Service at the U.S. Department of Agriculture.

Last year's spending bill directed the Rural Utilities Service to develop a pilot program to distribute \$600 million to advance broadband deployment in underserved areas of rural America. That same program received an additional \$550 million this year.

While both the FCC and the Rural Utilities Service share the goal of closing the digital divide, we have to be mindful of where these dollars are being directed. I have repeatedly said that coordination between these particular programs is essential if we're truly going to reach areas lacking sufficient access to broadband. Failure to do so will lead to the duplication of existing broadband services.

As this Committee has previously discussed, accurate broadband maps are also essential for these programs to effectively target unserved areas. I'm encouraged to see that the FCC's latest Broadband Deployment Report shows that the number of Americans lacking access to a fixed broadband connection has dropped by more than 25 percent, but it's clear that more work has to be done to close the digital divide once and for all.

One effort to do that is an auction for the Remote Areas Fund which would provide service to extremely high-cost areas, including both rate of return and price cap areas.

So I'm glad that Chairman Pai has indicated an auction for the Remote Areas Fund may take place this year. I'm interested in seeing a tech-neutral approach for future support from programs like the Remote Areas Fund, ensuring wireline service along with fixed and mobile wireless service have a part to play in connecting Americans to broadband service.

As I said earlier, I'm pleased to be convening this important hearing. I remain committed to building on the past successes of this committee, while also looking for new approaches to ensure that all Americans have access to next generation broadband services.

To help in that effort, we have a very distinguished panel before us. Today, we're joined by representatives from two South Dakota-based companies: Mr. Denny Law, who's the General Manager and CEO of Golden West Telecommunications, and Mr. Justin Forde, who's the Senior Director of Government Relations at Midcontinent Communications.

We're also joined by Dr. Mark Jamison, Visiting Scholar at the American Enterprise Institute, and Ms. Carol Matthey, Founder and Principal of Matthey Consulting.

Thank you all for being here today. I look forward to hearing from you and having the opportunity to discuss how we can continue to close the digital divide.

Before I recognize Ranking Member Schatz for his remarks, I'd just like to add that I'm looking forward to leading this subcommittee with him.

I mentioned the importance of pragmatic bipartisan cooperation when confronting issues like rural broadband. Senator Schatz and I have partnered on many bills over the last several years, from ef-

forts to streamline small cell siting and improved weather forecasting to bills focused on small business cybersecurity and reforming emergency alerts.

So I'm optimistic about our continued collaboration on matters within the Subcommittee's purview, and I now want to turn it over to Senator Schatz for any opening remarks he'd like to make.

**STATEMENT OF HON. BRIAN SCHATZ,
U.S. SENATOR FROM HAWAII**

Senator SCHATZ. Thank you, Mr. Chairman.

Likewise, I'm looking forward to continuing our good bipartisan work together.

I want to thank the testifiers for being here. We all need fast and affordable broadband, regardless of where we live, but the level of broadband Americans enjoy today did not happen without government policy. It's the result of smart planning and incentives, substantial public and private investment, and the ingenuity and muscle of American workers. It would not exist without the Federal Government, labor, and industry working together.

We've made pretty good progress in a short period of time. In early 2009, Congress directed the FCC to develop a national broadband plan so that every American would have access to affordable broadband.

As part of that plan, the FCC concluded that it needed to reform universal service and that's exactly what they've done. Beginning in 2011 and continuing through today, the FCC has fundamentally reformed the way the high-cost USF works.

The FCC shifted the program from a 20th Century voice-centric model to a 21st Century broadband-centric model. Instead of subsidizing old phone networks, universal service now supports building new broadband networks, but we still have work to do. Despite substantial progress, the FCC's 2011 reforms are not yet fully implemented. Broadband availability remains uneven, particularly in rural and insular areas.

As anyone who lives on the big island or in the Dakotas will tell you, deploying affordable broadband in many rural and insular areas is still not possible without subsidy.

Another important component of the FCC's 2011 reforms that remains unfinished is establishing a stable and sustainable USF contribution system. Several years ago, the FCC updated universal service funding to directly pay for broadband build-outs but it has not yet required broadband connections to contribute to universal service. That would be fair and that would be common sense. The FCC still needs to finish this task.

We also need granular and accurate maps to know how and where to best direct the support and to avoid overbuilding. We can and should have better maps than we have today.

One final observation: 5G holds great promise and I certainly support its deployment, but it does not appear that it will be a viable universal service solution in the near future.

We need to be realistic about the costs and technical challenges of deploying 5G in high-cost areas. Other fixed and mobile technologies likely will continue to be the answer.

I look forward to hearing insights from the witnesses and working with the members of the Subcommittee.

Thank you.

Senator THUNE. Thank you, Senator Schatz.

We'll proceed now to our panel and as I mentioned, we have a very distinguished panel. We have, starting out on my left and your right, Mr. Denny Law, Wahl, South Dakota, who, as I mentioned, is the General Manager and Chief Executive Officer of Golden West Telecommunications in Wahl, South Dakota, and we'll start there and then proceed accordingly across the panel, and we realize that we have a limited amount of time to get through this, and we would have to make sure that we get Mr. Law back to Wahl, South Dakota, because we're told he's going to have about two feet of snow to shovel when he gets home. So not something that the Senator from Hawaii probably has to think much about. [Laughter.]

Senator THUNE. But in any event, we are glad to have you all here and welcome you.

So, Mr. Law, please proceed.

STATEMENT OF DENNY LAW, GENERAL MANAGER AND CHIEF EXECUTIVE OFFICER, GOLDEN WEST TELECOMMUNICATIONS

Mr. LAW. Chairman Thune, Ranking Member Schatz, Members of the Subcommittee, thank you for this opportunity to testify on the importance of broadband in rural America.

I'm Denny Law, CEO of Golden West Telecommunications Cooperative, based in Wahl, South Dakota.

For over a century, Golden West Telecommunications has provided services to rural South Dakota. Today, we have over 30,000 accounts and 25,000 broadband Internet subscribers located across 24,500 square miles of South Dakota. That's an area larger than Maryland, New Jersey, Connecticut, and Delaware combined, and equates to 1.4 persons per square mile.

This coverage would have been impossible without support from the high-cost Universal Service Fund overseen by the Federal Communications Commission. Thankfully, Congress and the FCC recognizes the pivotal role that USF plays.

Due to support from hundreds of Members of Congress, including many on this committee, the FCC took landmark steps last December to eliminate USF budget shortfalls that had undermined the advancement of networks in rural areas. This Order is poised to put the USF Programs on more sound footing for years to come.

Just in our serving area, the FCC's Order will translate to direct benefits for rural South Dakotans. Prior to the December Order, Golden West had postponed nearly \$4 million in network upgrades for 2019 due to the ever-increasing cuts in USF support.

This year, however, we have renewed our efforts to improve or provide broadband to the communities of White River, Murdo, Hot Springs, Kadoka, Minnow, Interior, and Vivian, and with even more time now to adjust our year 2020 plans, Golden West expects to increase its capital budget for construction considerably and reach even more locations than those identified for 2019.

Golden West is not alone in this mission, however. According to the South Dakota Telecommunications Association, in less than 2

years, 93 percent of SDTA customers are expected to be served by fiber broadband. That's up from 65 percent in 2017.

With a right-sized budget in place, we must ensure these programs are driven by good data. This committee has shown much concern over whether the FCC Form 477 data accurately captures coverage in the mobile context, but these concerns are just as prevalent in the context of fixed broadband services.

In the absence of perfect data, agencies like the FCC and USDA, have previously used challenge processes. Mapping databases can be a baseline for determining where support should or should not go, but a challenge process confirms whether the maps are correct and adjust them when they are not. Unfortunately, the FCC has proposed to eliminate the existing challenge process to validate Form 477 data in the context of fixed USF support and instead to default to the carrier-reported data as gospel.

If the Mobility Fund experience provides any lesson, it's that a meaningful challenge process is a necessity in determining how to distribute funds and make policy decisions.

On a related note, a continued focus on coordination among Federal agencies is critical. It is essential to avoid the prospect for dueling Federal support programs and networks built in rural areas that cannot sustain either one without the assistance of Federal programs.

Speaking of data, the FCC has taken commendable steps forward to promote accountability. However, it's important to balance the burdens of accountability measures with the urgency to implement them.

To this end, new FCC performance requirements that USF recipients test their networks will take time to implement properly. To be clear, the rural telecommunications industry fully supports the implementation of broadband network performance testing.

However, with systems standards yet to be prescribed and vendors only beginning to create new testing equipment, key questions remain unanswered even though this rule is set to go in effect in a matter of months.

In addition, little attention has been paid to the practical concern about approaching customers and asking them to attach a government-mandated device to their Internet router in their home or business for testing purposes. For these reasons, time and care must be taken to work through questions and reach workable solutions.

Another item of concern is permitting delays, especially when crossing Federal lands or railroad rights-of-way. Our industry appreciates this committee's bipartisan efforts to reduce deployment barriers through the MOBILE NOW Act, which developed common form applications and deadlines for agency action.

With more to do to achieve a shared vision of sustained universal broadband access, Golden West and the hundreds of small broadband providers in NTCA's membership look forward to working with this committee to fulfill our shared vision and national mandate of universal service.

I thank you for this opportunity to testify and look forward to your questions.

[The prepared statement of Mr. Law follows:]

PREPARED STATEMENT OF DENNY LAW, CHIEF EXECUTIVE OFFICER, GOLDEN WEST
TELECOMMUNICATIONS COOPERATIVE, INC.

INTRODUCTION

Chairman Thune, Ranking Member Schatz and members of the Subcommittee, thank you for the opportunity to testify on the importance of rural broadband.

I am Denny Law, Chief Executive Officer of Golden West Telecommunications Cooperative, Inc in Wall, South Dakota. For over a century, Golden West Telecommunications and its subsidiaries have provided communications services to rural South Dakota, starting initially with the stringing of line along fence posts. Today, we have over 30,000 accounts, 25,000 broadband Internet subscribers, and 10,000 cable television customers. These customers are located across 24,500 square miles—an area larger than the states of Maryland, New Jersey, Connecticut and Delaware combined—equating to 1.42 customers per square mile. The largest community we serve has just over 3,500 residents. Yet with more than 14,000 network route miles in service, our network could stretch from Wall, South Dakota to Hong Kong and back again.

In addition to our demonstrated commitment to consumers and businesses across this wide swath of South Dakota, we serve numerous anchor institutions, including 72 K–12 schools, 62 health clinics/hospitals, 22 libraries, and five Veterans Administration facilities within our service territory. Golden West also provides telecommunications service on portions of five Native American tribal reservations in South Dakota.

Golden West was a 2018 recipient of a “Smart Rural Community” Showcase award for its efforts in connecting rural South Dakota with the rest of the Nation and the world. We were one of just over a dozen award recipients nationwide, and several dozen other smaller operators have received similar awards in prior years. Such awards highlight the importance of not only getting broadband to rural areas in the first instance, but the value of keeping it there and empowering consumers, businesses, and anchor institutions to make the most of it as part of “smart communities.”

While every rural area is unique, I think Golden West’s efforts and its community commitment is representative of the hundreds of small, community-based companies and cooperatives in the membership of NTCA–The Rural Broadband Association. Smaller operators like those in NTCA’s membership serve less than five percent of the U.S. population spread across over 35 percent of the U.S. landmass. In the vast majority of these wide-ranging rural areas, companies like Golden West offer the only full-service fixed networks available, and we provide many of the critical links for mobile services as well. Small broadband providers therefore are essential to connect rural America with the world—making every effort to deploy advanced networks that respond to demands for cutting-edge, innovative services that help rural communities overcome the challenges of distance and density.

THE IMPACT OF BROADBAND INVESTMENTS IN RURAL AMERICA

Investing in rural broadband has far-reaching effects for urban and rural America alike, creating critical connections and efficiencies in health care, education, agriculture, energy, and commerce, and enhancing the quality of life for citizens across the country. Indeed, while we are proud of the broadband speeds we deliver and the route miles of network we have built, the benefits of rural broadband go beyond sheer numbers—when looking to develop a “Smart Rural Community,” it is helpful and important to focus upon the productive uses of broadband and what they mean to those communities that get and stay connected. The last time I testified before this Committee, I shared stories about the benefits of rural broadband to rural South Dakotans, including a teacher able to offer Spanish classes to over 100 students in 14 rural high schools from her home office; a rancher able to simultaneously operate a small electronics business because of broadband; and a professional writer able to use her Internet access to self-publish a book.

In fact, the feedback that has perhaps resonated with me most about the importance of broadband in rural areas came from a Golden West customer in a very rural area near Hayes, South Dakota. She does software development for an international firm. After living and working in an urban area, she and her husband decided they wanted to move home to South Dakota. She was able to negotiate a telecommuting arrangement with her employer. As a result, she is now managing software teams across the world, all from her rural home near Hayes. Her statement to me that her broadband connection meant “being able to work where you want to live instead of having to live where you want to work” rings true every time we build fiber to a community or roll a truck to upgrade a customer’s broadband service.

These stories are not exceptions to the rule. Golden West recently completed a survey of our customers that posed the question “Does anyone in your household telecommute, or in other words, use an Internet connection to work from home?” Twenty-three percent of the respondents answered “Yes,” and of those, 40 percent indicated they telecommuted for their employment five days a week. Nor are these stories, I believe, unique to Golden West or South Dakota—instead, my sense is that they are repeated in rural areas across the country, especially in places where smaller rural operators have, like Golden West, led the charge in deploying robust, high-capacity, low-latency networks and in taking pride in the delivery of high-quality customer service for the communities in which we live.

As described in a recent CoBank report on rural economic challenges, “Rural America faces a unique set of economic challenges, but it has demonstrated resilience during the past eight years of recovery. The rural population, jobs and incomes are all trending in the right direction. And current efforts to improve rural broadband access offer the greatest opportunity to make a significant dent in the rural/urban economic divide. As broadband becomes more widely available in rural communities, enhanced access to education, healthcare and business opportunities can markedly improve the quality of life and the economic vitality in these communities. Rolling out broadband to rural communities will take several more years in some areas. But as access increases, so will rural America’s economic potential.”¹

What’s more, a report released in 2016 by the Hudson Institute in conjunction with the Foundation for Rural Service underscores the nationwide benefits that arise from rural broadband; this study found that investment by rural broadband companies contributed \$24.2 billion to the economies of the states in which they operated in 2015.² Of this amount, \$8.3 billion accrued to the benefit of rural areas, while nearly \$16 billion accrued to the benefit of urban areas. In addition, better broadband access in rural America is helping to drive growth in online transactions—a recent survey found, for example, that rural consumers account for more than 10.8 billion internet-driven transactions annually, representing approximately 15 percent of the national total.³

THE HURDLES TO REALIZING THE BENEFITS OF BROADBAND INVESTMENTS IN RURAL AMERICA

The Business Case for Rural Broadband is Driven by Both Investment and Operating Challenges

Building broadband networks is capital-intensive and time-consuming. This is hard enough in urban areas, but rural areas present unique considerations and complications. Indeed, the primary challenge of rural network deployment is simply in making the business case for deployment at all. This business case turns, of course, not only upon the one-time act of constructing networks across hundreds or thousands of miles where population is sparse and terrain is diverse, but it is also affected significantly by the ongoing costs of delivering quality services and maintaining and upgrading networks across such rural expanses.

Many factors can affect the costs and timing of construction—an important consideration particularly in areas like South Dakota where the “build seasons” can be quite short due to weather. For example, especially when crossing Federal lands or railroad rights-of-way in rural America, small hometown providers must address environmental and historical permitting concerns or contractual obligations that can delay projects and increase already high costs. Then, even once networks are built, those networks must be maintained over hundreds or thousands of miles—this requires technicians who regularly travel long distances to make service calls and customer service representatives trained to deal with questions about router and device configurations in ways that were unimaginable for “telephone companies.”

Moreover, even the best “last mile” networks in rural markets depend upon “middle mile” or long-haul connections to Internet gateways dozens or hundreds of miles away in large cities. As an example, Golden West’s operations are more than 300 air miles—not network route miles—from the closest Tier 1 Internet peering point. Reaching such distant locations is expensive, and as customer bandwidth demands increase—moving from Megabytes to Gigabytes to Terabytes of demand per month per customer—so too does the cost of ensuring sufficient capacity to handle customer demand.

¹*The Year Ahead: Forces that will shape the U.S. rural economy in 2018*, CoBank Knowledge Exchange Report.

²*The Economic Impact of Rural Broadband* (2016), The Hudson Institute, Washington, D.C.

³*A Cyber Economy: The Transactional Value of the Internet in Rural America*, White Paper, iGR (2018), at 1.

In fact, Golden West’s analysis found that our average broadband customer monthly data usage was 150GB as of February 2017. As of February 2019, the average broadband customer monthly data usage was 270GB. In less than two years, we estimate the average usage will exceed 500GB a month. By contrast, some networks that use less robust technologies may often impose caps on data usage and/or slow data when they exceed these levels; for example, even in the context of their “unlimited” plans, certain wireless operators will use thresholds far lower.

These figures indicate the wisdom, the necessity, and the efficiency of investing in robust future-proof “last mile” access networks that can handle demands for years to come *and* the importance of robust “long-haul” capacity to connect rural areas to the rest of the world.

The delivery of broadband in rural America is therefore an ongoing effort that requires, among other things: (1) a holistic and realistic look at the business case challenges; (2) a sustained commitment on the part of the providers who want to overcome them; (3) a sustainable partnership between committed private operators and Federal and state initiatives that seek to promote universal connectivity; and (4) the deployment of technology that will meet the test of time in the face of massive increases in user demand. We will miss the mark as a nation if we treat the broadband challenge as a one-time declaration of “success” just for the very preliminary act of connecting a certain number of locations with basic broadband. I am proud of Golden West’s nearly \$193 million in total capital investment in rural South Dakota over the past five years, and the rural broadband industry as a whole can tell a great story of success. But there is also much more work to do—and this is where public policy plays an important role in helping both to build *and* sustain broadband in rural America.

OVERCOMING THE CHALLENGES TO THE BUSINESS CASE FOR SUSTAINABLE RURAL BROADBAND INVESTMENT

The Importance of Universal Service as a National Policy—and the Importance of Sufficient and Predictable Support to Fulfillment of that Policy

Support from the High-Cost Universal Service Fund (USF) overseen by the Federal Communications Commission (FCC) is essential to make the business case for broadband in many rural areas. In fact, while other programs and initiatives focus on the upfront capital costs of building networks, the USF is the primary, if not the only, tool to help cover the costs of ongoing operations and ultimately to ensure—as mandated by the Communications Act—that consumers in rural areas like those served by Golden West can purchase services that are reasonably comparable to what urban Americans receive at rates reasonably comparable to what urban consumers pay.

In short, USF does not itself “pay for” upfront network construction. Instead, the USF program helps to justify the use of loans or private capital to build networks by supporting ongoing operations and ensuring that rural consumers can pay reasonable rates for their use of services atop networks. Put another way, without a reliable and sufficient USF program, the business case for expending capital and building networks in many rural markets simply does not “pencil out.” USF is thus perhaps the best, most successful example of a public-private partnership that exists in the broadband space, having helped to justify the business case for private network investments that can total tens of billions of dollars per year when measured as gross plant in service. Without USF support, it would have been impossible for Golden West to do all that it has done in seeking to continuously improve access to quality voice and broadband services across approximately one-third of rural South Dakota.

The Impact of USF Programs on South Dakota Communities

Thankfully, Congress and the FCC recognize the pivotal role that the USF plays in connecting—and then keeping connected—South Dakota specifically and rural America more broadly. In 2011, the FCC attempted to update the USF mechanisms for broadband, but those efforts focused primarily on larger operators (who frankly had not done as much to invest in rural America as smaller providers). An unfortunate collateral effect of this understandable focus upon the many unserved consumers in larger carriers’ territories was the creation of significant uncertainty in the USF programs that had allowed smaller operators like Golden West to lead the charge in rural broadband until then.

In the wake of the 2011 order, hundreds of members of Congress on both sides of the aisle wrote repeatedly to the FCC over several years, asking the agency to: (1) eliminate the persistent regulatory uncertainty; (2) reorient the USF programs that support smaller operators to enable delivery of both voice *and* broadband services; and (3) overcome shortfalls in the USF programs that flew in the face of the

Communications Act’s mandate for sufficiency and were deterring network investment. These bipartisan letters signed by hundreds of members of Congress were critical in highlighting these concerns, and the FCC responded in a series of orders over the past several years attempting to address each of these issues.

Most notably, the FCC took landmark steps in an order released last December to eliminate the USF budget shortfalls that had undermined advancement of networks in rural areas and had precluded operators from offering affordable broadband services to consumers. This watershed order is poised to put the USF programs on more sound footing for years to come, and smaller operators like Golden West are eager for the chance to get back to focusing on the business of building and delivering broadband in rural America.

Indeed, just for Golden West, I can report that the FCC’s order will translate to direct benefits for rural South Dakotans. Prior to the December order, as I reported to this Committee last year, Golden West had postponed nearly \$4 million in network upgrades for 2019 due to the ever-increasing cuts in USF support. The course has now reversed in the wake of the FCC’s December order, and I have been making trips to communities throughout our service area in recent weeks to announce that Golden West will be deploying fiber and delivering high-speed broadband. Because we are a hometown provider, Golden West did everything we could even in the face of insufficient and uncertain support in 2018 to upgrade networks in Pine Ridge, Martin, Custer, Marion, Midland, and Bonesteel. This year, however, thanks in no small part to the FCC’s December 2018 order, we have renewed our efforts to improve or provide broadband to the communities of Murdo, White River, Hot Springs, Kadoka, Menno, Interior, and Vivian. And, with even more time now to adjust our 2020 plans, Golden West expects to increase its capital budget for network construction considerably and reach even more locations than all of those identified for 2019.

Golden West is not alone in this mission, however. According to the South Dakota Telecommunications Association (SDTA), in less than two years, 93 percent of SDTA customers are expected to be served by fiber broadband as opposed to 65 percent at the end of 2017. Likewise, by the end of 2021, South Dakota small carriers plan to invest an additional \$306 million in fiber broadband, resulting in an additional 7,900 miles of buried fiber. In short, smaller telecommunications providers like Golden West are committed to making sure the USF resources provided as a result of the FCC’s order—resources that can be attributed ultimately to the interest of leading policymakers like so many of those on this committee—will go “back into the ground” for the benefit of rural American consumers and businesses. We are therefore deeply grateful to the FCC for its unanimous vote on the December order, and for this Committee and other elected officials for their strong support over the years for our national universal service mission.

The Need for Good Data to Make Good Policy Decisions

There is no question that good decisions about infrastructure policy generally and universal service policy more specifically must be driven by good data. “False positives”—claims of voice and broadband services where none actually exist—could leave rural consumers and businesses stranded without access in defiance of the national mandate for universal service. Meanwhile, “false negatives”—areas that are perceived as unserved but actually have voice and broadband services available—run the risk of wasting scarce resources from important governmental programs on redundant networks.

At this point, nearly every governmental communications program has some mechanism intended to ensure that funds are directed toward where they are needed most to build and sustain advanced networks. Problems arise, however, when the data driving these programs are incomplete or incorrect—and, unfortunately, it’s not easy to discern when that is the case on the face of existing databases and maps.

The FCC, for example, gathers data on voice and broadband service availability through its Form 477. There has certainly been a lot of concern—especially from among members of this Committee—about whether the Form 477 data accurately capture coverage in the mobile context. This is an understandable focus given the efforts to implement the Mobility Fund and the visceral feeling of having no cell phone coverage in an area where provider maps say one should.

But what is often lost is that these concerns are just as prevalent in the context of *fixed* voice and broadband services, too. On Form 477, a census block is reported as served simply because one location in that block *could* be served by a provider at an *advertised* speed within 10 business days. In other words, there may be no service *actually* installed in a census block, or the speeds *actually* delivered in that block may not be equal to what is advertised—and, yet, that area can show as served. Even more troubling in rural census blocks that can stretch large distances, the theoretical delivery of service to *one* customer in a census block could result in

the denial of funding for voice and broadband to another customer located miles away, yet still in the same census block, who literally has no choices for such services.

At this point, the reaction is often to say that we need to get more granular in the data—and this is probably correct as a partial response. But getting more granular alone is not going to solve the problem or potential for “false positives” specifically. In particular, no one is vetting in advance whether data submitted on Form 477 are accurate. Providers submit the data based upon what they advertise. Thus, whether by accident or on purpose, Form 477 data can contain errors that in turn lead to support being denied in areas where it is in fact very much needed.

Fortunately, there is a way to care for the fact that broadband coverage maps are always at risk of being inaccurate even if they get more granular. For years, agencies like the FCC and the Rural Utilities Service (RUS) under the U.S. Department of Agriculture have developed and used “challenge processes” that treat service coverage information like Form 477 data as *informative* but not *dispositive*. Mapping databases are used as a “baseline” for determining where support should or should not go, but a “challenge process” is then used to confirm whether the maps are correct and to adjust them when they are not.

Certainly, the recent experiences with the Mobility Fund show the value and wisdom of a challenge process. Without such a process, the concerns that have been raised about overstated mobile coverage would never have been identified. At the same time then, it was disappointing and somewhat shocking to see the FCC now considering moving away from challenge processes in the fixed voice and broadband context. Specifically, the FCC has proposed to eliminate the prior existing challenge process to validate Form 477 data in the context of fixed USF support, and instead to default to the Form 477 data effectively as gospel.

If the Mobility Fund experience provides any lessons, however, it is that a meaningful challenge process is a necessity in determining where funding should go or be denied. We therefore are hopeful that the FCC will reverse course on its suggestion to eliminate a challenge process in the context of distributing USF to support fixed networks, and that it will return to a data-driven process that ensure rural consumers are not left on the wrong side of a digital divide due to inaccurate information. This is more work, to be sure, for all involved—but the stakes of getting it wrong are too great to leave to chance.

Balancing Accountability and Burdens in Ensuring that Consumers Receive the Services Expected

The FCC has taken numerous commendable steps to promote accountability in the use of USF support in recent years. While Golden West has always focused on putting such resources “into the ground” for the benefit of our cooperative members and their communities, we understand that it is important to have measures in place to ensure this happens systematically and to be able to show what the American public has realized through USF and other infrastructure programs.

At the same time, it is important to balance the burdens of such accountability measures—especially on smaller operators who need to have their employees focus first and foremost on delivering top-notch services to consumers and businesses. One area in which this tension arises right now is a new FCC requirement that USF recipients test their networks. The basic concept is important, and one we agree with—in particular, we certainly do not want to see providers “overpromise” what their networks can do, but then “underdeliver” when it comes to using technologies and architectures that are not capable of realizing what was expected. Testing is going to be very important as part of that accountability, and so we support it.

But the process by which the testing is being implemented is a problem. Certain standards—such as how systems may need to be modified to select and then report upon testing at random locations—have yet to be prescribed. Moreover, nearly every association representing nearly every kind of potential USF recipient has filed some sort of petition or application asking the FCC to modify or reconsider certain aspects of the testing standards that present challenges or even just are unworkable in current form. Those petitions were filed last September, and the FCC has yet to act on those—but they are critical even just to *starting* to design the solutions by which testing will be accomplished. Key questions that are still open include how many locations need to be tested and the extent of the networks to be tested.

While vendors are starting to market potential solutions and some providers are trying to develop their own, this task is difficult, if not impossible, when the rules governing testing are not yet finalized. In addition, there appears to be little attention to the practical concerns about approaching rural customers and ask them to

allow a company to attach a device to the Internet router located in their home or business in order to test pursuant to a government mandate.

All of these considerations make it such that a reasonable, right-sized delay should be provided to work through these questions and reach a workable set of solutions. Again, we support implementation of testing, but it should be done right from the start—and with the questions still to be resolved, rushing to do that this year is neither realistic nor practical. Instead, the FCC should work through the pending petitions and applications and finalize all of the standards that will govern testing. After that, time should be given for vendors and service providers to design, manufacture, and/or select from solutions that conform to those standards; this will almost certainly take many months rather than several weeks.

Finally, more time should be provided after that to allow USF recipients to install the solutions and “test the testing”—to ensure that the testing solution is integrated properly into the network and is accurately capturing the performance of the network in question. It is essential to do this right to strike a proper balance between accountability on the one hand and the potential for burdens, confusion, and uncertainty on the other.

Coordination Among Agencies is Critical to Achieve a Shared Vision of Sustained Universal Access

One very successful formula for the deployment and ongoing operation of communications networks in rural America comes in the combination of: (1) RUS loans that finance upfront network construction (with payback) in rural areas where there are often few financing options; and (2) the USF programs that help, as noted above, to support ongoing operations and ensure the affordability of rates on networks once built.

RUS has long played an important role in financing rural broadband construction. Throughout Golden West’s history, we have obtained financing from RUS or its predecessor agency under the U.S. Department of Agriculture. RUS telecommunications lending has helped enable and unleash billions of dollars in private capital investment in rural communications infrastructure. It is important that the complementary roles of RUS upfront financing and USF ongoing support continue. In particular, we can make smart and effective use of Federal resources by reaffirming and codifying the complementary nature of coordinated RUS and FCC programs, rather than allowing these programs and the resulting networks to be pitted against one another in a manner that undermines the sustainability of the networks and the integrity of the programs themselves.

Indeed, with the 2018 Farm Bill and the newly minted ReConnect Program, RUS will take on a larger financing role for rural broadband deployment through grants and loan/grant combination packages. These new and updated programs are much-welcomed and important tools in the Federal government’s toolkit to eliminate the digital divide. But it will be critical to promote the efficient and effective use of limited Federal resources by ensuring that a new network built by one provider leveraging Federal programs will not compete with and undermine the sustainability of an existing network operated by another provider that leveraged other Federal resources and is already meeting Federal broadband standards. Both the FCC and the RUS should therefore coordinate closely in administering their programs, and it is essential to avoid the prospect for two dueling federally-supported networks built in a rural area that cannot sustain either one without the assistance of Federal programs.

Improving the Business Case for Rural Broadband Through Streamlined Permitting and Removal of Other Barriers to Deployment

Given the deeply rural, sparsely populated nature of the area we serve, Golden West operates across large swaths of Federal land, including land owned or managed by the Bureau of Indian Affairs, Bureau of Land Management, USDA’s National Forests, Department of Interior’s National Parks, and Army Corps of Engineers. Barriers to broadband deployment such as disparate applications, fees, and reviews across Federal and state landowning agencies can slow down or stymie deployment of networks within and across such areas, and such barriers must be addressed as part of any holistic plan to promote and sustain infrastructure investment.

Efforts to standardize Federal permitting processes and implement “shot clocks” for securing prompt approvals are important tools in promoting broadband investment—while they may not make the business case in and of themselves, efforts to eliminate regulatory barriers and streamline permitting can help to improve the business case and expedite the construction of networks, which is an important consideration in particular in places like South Dakota where the “build season” is rel-

actively short due to environmental factors, namely winter. Streamlining permitting and other steps to remove barriers to deployment will also be critical in making sure USF dollars go further—that such resources are spent on building and operating networks rather than paying outrageous fees for mere feet of railroad crossings or spending hours and days to secure permits from a government agency.

Our industry appreciates this Committee’s bipartisan efforts to reduce barriers to deployment of communications networks. Important measures like the MOBILE NOW Act have laid out a roadmap for important steps forward like the development of common form applications (which are particularly useful for small businesses like Golden West that work with multiple landowning agencies) and deadlines for agency action. Building upon such provisions through additional efforts here in Congress and recommendations and model provisions such as those developed by the FCC’s Broadband Deployment Advisory Committee can help in realizing the benefits of broadband in rural areas.

CONCLUSION

Recent measures such as the FCC’s December 2018 USF order will help in achieving our shared mission of universal service, and we are grateful to the FCC and of course to the many members of Congress who wrote repeatedly to the FCC on a bipartisan basis calling for such action. The continuing work of the RUS in providing financing for the construction of networks in the first instance is also a critical piece of the puzzle. Because of such efforts and initiatives, companies like Golden West can once again focus more closely on the business of deploying networks and delivering quality and affordable voice and broadband services.

There is certainly much more to do to overcome a digital divide between rural and urban America. But we must make such efforts and build upon existing initiatives if we want to promote the sustainability and vitality of rural communities, and to ensure American competitiveness in a global economy. Golden West and the hundreds of small companies and cooperatives like it look forward to working with this Committee, other policymakers, the FCC, and the RUS to fulfill our shared vision and national mandate of universal service.

Senator THUNE. Thank you, Mr. Law.
Mr. Forde.

STATEMENT OF JUSTIN FORDE, SENIOR DIRECTOR OF GOVERNMENT RELATIONS, MIDCONTINENT COMMUNICATIONS

Mr. FORDE. Chairman Thune, Ranking Member Schatz, Members of the Subcommittee, thank you for inviting me here today to discuss ways to expand broadband in rural America.

My name is Justin Forde, and I’m the Senior Director of Government Relations for Midco.

We are proud to offer internet, cable, and other services to over 400,000 residential and business customers in the Upper Midwest. Our communities range in size from Sioux Falls with a population of over 180,000 to most small rural communities with less than 500 residents.

We have developed innovative approaches to get high-speed reliable broadband to all of our customers, friends, and neighbors. We are proud to be recognized as a national leader on rural broadband and we have nearly closed the digital divide in the Red River Valley, one of the most productive farming regions in the world.

We are bridging the digital divide today. We know the role the Federal funding programs can play in continuing to close the digital divide and I am excited to share our thoughts on such programs.

We have made it our mission to ensure that most rural communities are at the leading edge of technology. In Less than 2 years of launching the Midco GIG Initiative, more than 90 percent of our customers have access to gig speeds. It’s important to note that we

are bringing this service to every address in both our large and small communities and not just certain parts of certain cities.

We also leverage our extensive fiber backbone and connectivity to reach the most rural and most remote areas of our footprint using our Midco Edge-Out Strategy. We edge out of our high-speed Internet from our fiber backbone from urban areas into very rural areas using fixed wireless technology.

Using fixed wireless, we can reach areas that are up to 50 miles away from our fiber network and we can implement the solution relatively quickly, even in the winter months, without the effort or the expense of constructing fiber networks.

I myself have been a fixed wireless customer for almost 10 years and Midco recently updated my service to our LTE 4.5G platform. I get my Internet from the top of a tower in Brandon, North Dakota, to my small farmstead six miles west of Hartsville. On a normal day, my three kids are streaming video or other content while my wife is using the Internet to run a small business. This has been a great asset for my family.

My neighbors are also fixed wireless customers. One of my neighbors, Carl Wilson, runs a cattle ranch. He uses our fixed wireless to sell his animals by auction where speed and capacity matter. He is running a vital and thriving ranching business in rural North Dakota.

We recently committed to serving most rural areas of our footprint using our next generation fixed wireless network through participation in the FCC's Connect America Fund Phase II Auction.

The FCC provisionally awarded us \$38.9 million to bring high-speed broadband to approximately 9,300 unserved homes in South Dakota, North Dakota, and Minnesota. In building out to these locations, we will pass approximately 200,000 homes with high-speed low-latency broadband.

Having participated in the CAP Auction, we believe there are ways to better coordinate and refine Federal broadband programs. We have a few recommendations to ensure that future funding is used efficiently and effectively.

First, with several Federal agencies and a growing number of states dedicating funding to broadband deployment, all relevant agencies must coordinate with each other to avoid overbuilding. They must continue this coordination throughout the life cycles of these programs to ensure that subsequent rounds of funding are not inadvertently used to overbuild hard-earned progress.

Second, programs should operate in a technology-neutral manner. As long as providers are able to meet the specified broadband service requirements, it should not matter what technology they are using to provide the service.

Third, programs should prioritize projects that will offer higher speeds and lower latency to ensure that communities receive the benefits of these investments for years to come.

It's more prudent for funding programs to make a cost-effective investment in advanced networks than to make repeated investments in a series of upgrades just to keep pace with the broadband minimum.

Fourth, agencies should focus on grants or partial grants rather than loans. Grant programs that require a company to expend

some private capital in addition to government funds create better investments and accountability.

There have been too many recent examples of providers who receive significant loan money only to default on their obligations without being able to meet their broadband build-out requirements.

Finally, it's critical to foster a regulatory environment that encourages ongoing private investment, including in rural America. We can serve the unserved in rural America if we continue to have access to valuable spectrum, especially mid-band spectrum. That is why Midco strongly believes that any portion of the C-band that can be cleared after protecting incumbents should be reallocated for terrestrial uses, including fixed wireless, and done through an FCC auction.

We also strongly support efforts by the FCC to make more effective use of the 2.5 gigahertz band which is currently only licensed to educational institutions who then may lease the spectrum to others.

I commend the Subcommittee for its focus on ensuring that all Americans, including those in rural America, receive the full potential of America's broadband networks.

Thank you again for inviting me here today, and I look forward to working with you on these important issues.

[The prepared statement of Mr. Forde follows:]

PREPARED STATEMENT OF JUSTIN FORDE, SENIOR DIRECTOR, GOVERNMENT
RELATIONS, MIDCONTINENT COMMUNICATIONS

Chairman Thune and Members of the Subcommittee, thank you for inviting me here to discuss Midco's views on ways to improve Federal broadband funding programs and other opportunities to expand broadband in rural America. The U.S. cable industry now offers 1 gigabit service to 80 percent of American households, and importantly this gigabit service is available in both urban and rural communities, including many that Midco serves in the Upper Midwest. Midco has developed innovative approaches to help get high speed and reliable broadband to all of our customers, and I'm excited to share our ideas with you today.

My name is Justin Forde, and I am the Senior Director of Government Relations for Midcontinent Communications ("Midco"). Midco is the leading provider of Internet and connectivity, cable TV, phone, data center, home security and advertising services in the Upper Midwest. We also operate a regional sports network, Midco Sports Network, which broadcasts live, local high school and regional college sports.

Over 400,000 residential and business customers count on Midco services in 342 communities in South Dakota, North Dakota, Minnesota, Kansas, and Wisconsin. Midco community populations range from less than 100 in places like Dodge, North Dakota, to our largest community, Sioux Falls, South Dakota, which has a population of more than 180,000. The majority of the 342 communities we serve, however, are very rural—nearly all have less than 50,000 people, with most having a population closer to 500 than to 5,000.

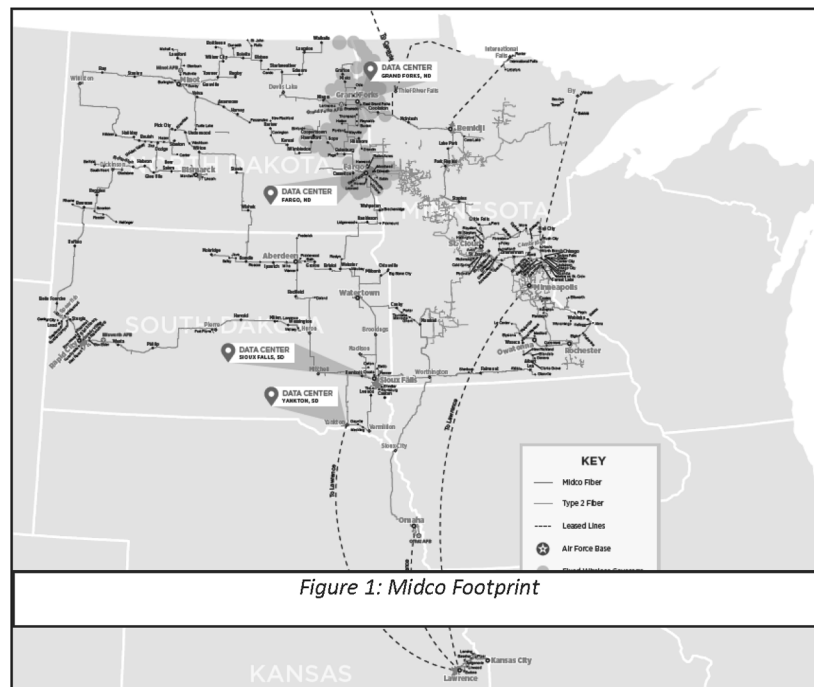
At the end of the day, we are a Midwestern company that is deeply committed to giving back to the communities we serve through service, financial grants, and broadband funding programs. For example, to date, the Midco Foundation has given or matched more than \$4.2 million in grants to further the work of non-profits, local governments, and schools. We also promote the Midco Lifeline Program, administered by the Universal Service Administrative Company. More than 3,700 qualifying low-income households benefited from reduced monthly interest or home phone rates through the Midco Lifeline Program.

Midco's History of Innovation

Innovation and foresight have shaped Midco's course for more than 85 years. In particular, we have made it our mission to ensure that our most rural communities are at the leading edge of technology. Our goal throughout our footprint is always to continue to find ways not only to meet, but to exceed, the communications needs of our customers.

Founded in 1931, Midco began by operating movie theatres, and then entered the radio business. In 1954, we became the owners of the first television station in South Dakota. We continued to innovate with the introduction of cable television and phone service, and on April 15, 1996, in Aberdeen, South Dakota, launched our broadband Internet service.

Our commitment to innovation continues to motivate our business initiatives. We own and operate four data centers in North Dakota and South Dakota to give local businesses a cost-effective way to secure critical data and their IT infrastructure. We provide solutions for regional and national banking, healthcare, energy, and government customers, among many other industries. We combine our data center services with powerful network solutions through our wholly-owned, operated and engineered Midco fiber network. Our data centers are directly connected to our fiber backbone, giving businesses access to some of the fastest Internet speeds in the country.



Midco's innovation and continuing capital investment stems from our desire to serve the communities where we live and raise our families. In 2017, we launched the Midco Gig Initiative—a commitment to bring Gigabit Internet speeds to our entire service area—from the region's smallest towns to its largest cities. Midco Gig is now available to more than 90 percent of our customers, while the rest of our customers have a choice to receive speeds of anywhere from 50 Mbps to 250 Mbps. And we continue to make upgrades to our network and services. In 2018 alone, we made a \$91.3 million investment in capital projects throughout our footprint.

But Midco and our industry aren't stopping at 1 Gig. We also recently announced our involvement in the 10G initiative where we will invest \$500 million over 10 years on a global cable industry standard that will provide ultra-fast symmetrical speeds of 10 gigabits per second, combined with low latency, unmatched reliability, and rock-solid security for a broad range of customers. This initiative is being built upon our existing fiber-rich infrastructure, and the industry through our R&D consortium CableLabs, is currently undergoing lab trials—and field trials will begin in 2020. This is the future of broadband and companies like Midco will be bringing it to America's heartland in the coming years.

We also leverage our extensive fiber backbone and connectivity to reach the most rural and remote areas of our footprint through our Midco Edge OutSM strategy.

We “edge out” our high-speed Internet from our fiber backbone in urban areas to rural areas using fixed wireless technology. We use the initial fixed wireless expansion from our wired plant to meet consumers’ immediate needs, and then leverage that expansion to justify a wired network buildout in the future. While some rural areas may support that wired build, other, more remote rural areas will continue to be served with a fixed wireless solution.

I can personally speak to the benefits of the fixed wireless approach, as I am a Midco fixed wireless customer. I have been a fixed wireless customer for almost 10 years, and Midco recently updated my service to our LTE, 4.5G platform. I get my Internet from the top of a commercial tower in Grandin, North Dakota to my small farmstead six miles west of Argusville, North Dakota. On a normal day, my three kids are streaming video or other content, while my wife is using the Internet to run a small business, so this service has been a great asset for our family.

My neighbors are also Midco fixed wireless customers. One of my neighbors, for example, runs a cattle ranch. He uses our fixed wireless to sell his animals by auction where speed and capacity matter, and where many individuals are participating in the auction at the same time. He is a happy Midco fixed wireless customer running a vital and thriving ranching business in rural North Dakota.

Midco’s Innovative Use of Fixed Wireless to Reach More Communities with Broadband

We recently made a large commitment to serving the most rural areas of our footprint using our next generation fixed wireless network through our participation in the Connect America Fund (CAF) Phase II Auction. The Federal Communications Commission provisionally awarded us about \$38.9 million to bring our high-speed broadband to approximately 9,300 unserved homes in South Dakota, North Dakota, and Minnesota. In building out to serve these CAF locations, we will pass approximately 200,000 homes with high-speed, low latency broadband.

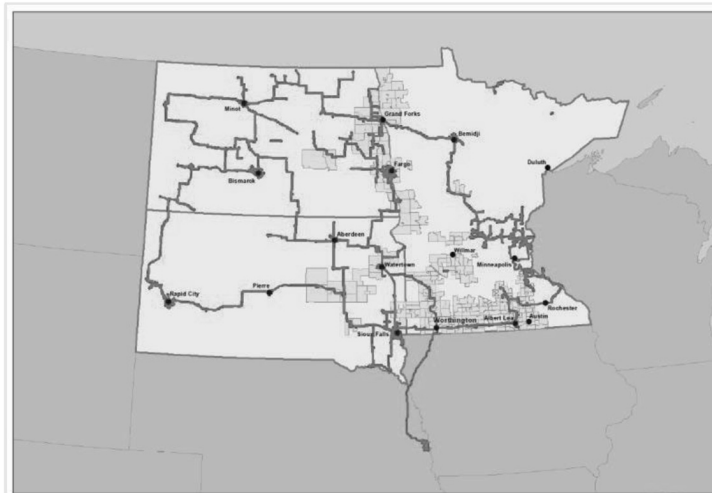
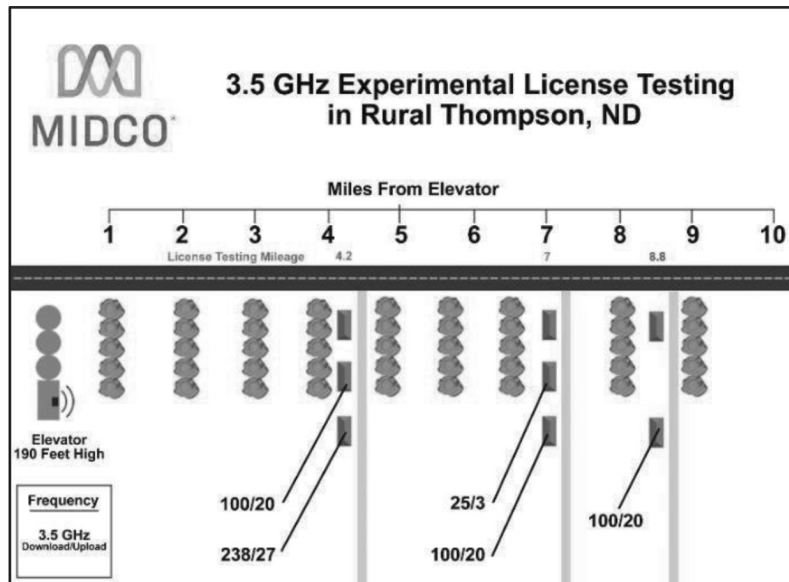


Figure 2: CAF Census Block Groups Provisionally Awarded to Midco

The combination of CAF and our Midco Edge OutSM strategy allows us to deploy a carrier-grade, LTE network, currently capable of “4.5G.” Assuming that we continue to have access to spectrum, we know that we can help close the Digital Divide. Using the Citizens Broadband Radio Service band on our experimental license, for example, we can currently offer speeds of 100/20 Mbps at a distance of 8.8 miles away from the Thompson, North Dakota grain elevator. Full access of this spectrum would allow us to expand the 100/20 Mbps service more broadly in our footprint.



We know that fixed wireless technology is a real solution for rural America. We know that we can reach remote, rural areas that are up to 50 miles away from our fiber network. We can also implement this solution relatively quickly and without the effort or expense of constructing fiber networks. Fixed wireless technology can also be deployed during the winter months, when harsh weather makes fiber construction impossible.

Opportunities to Improve Federal Broadband Programs to Better Serve Rural America

Midco appreciates the opportunity to discuss ways to better coordinate and refine Federal broadband programs to ensure that they deliver the benefits of broadband to as many unserved Americans as possible. We recognize that government help may be needed to bring broadband to areas that are beyond the reach of private risk capital. In areas where it is not financially viable to build—because they are too difficult to reach, geographically remote, or are otherwise very hard to serve—broadband deployment grants can alter the financial calculation, making serving an area possible. It is critical, however, that such help and government resources used for this purpose are directed to bring service to areas that are truly unserved.

We participated in the FCC's CAF auction last year. This was a competitive, reverse auction, and we believe a fair and economical method to fund those last mile technologies. Based on this experience, we would like to offer a few recommendations to ensure that future funding is used efficiently and effectively to expand the reach of broadband networks in rural America.

Improving Coordination Among Federal Agencies

With several Federal agencies and a growing number of states dedicating funding to broadband deployment, it is increasingly important to ensure that all relevant agencies are coordinating with each other to avoid overbuilding other government-funded projects and areas served by those who have invested their own private risk capital to deploy broadband networks. The FCC's universal service high-cost programs, including Connect America Fund Phase II and funding for rate-of-return and mobile providers, spend about \$4.5 billion per year, while USDA programs spend about \$1.4 billion per year. Together, these programs, at these funding levels, should be able to make significant progress in closing the Digital Divide, provided that the agencies coordinate with each other to ensure that their efforts and subsidies complement each other. We have three suggestions on how agencies can better work together.

First, it is critical that all agencies work off the same map. Typically, the FCC and RUS use FCC Form 477 data on fixed broadband service and the associated map as a starting point to determine which areas are unserved. While there is widespread agreement that the map needs to be improved—and the FCC has an open proceeding to reform the data collection for the map—using a central reference point is essential to avoid confusion and broadband funding overlaps. As other agencies, such as NTIA, begin their own efforts to improve mapping, they should coordinate with the FCC and the RUS to harmonize the information and avoid conflicting maps that could deepen confusion and potentially lead to precious government dollars going to areas that already have broadband, furthering the Digital Divide.

Second, Federal agencies should coordinate their eligibility requirements to maximize participation and keep the programs rowing in the same direction. There is a learning curve for companies to familiarize themselves with government programs, eligibility requirements, service expectations, and accountability requirements—and that comes at a cost, particularly for smaller providers who have not traditionally received government subsidies. At a minimum, standardizing eligibility requirements based on best practices learned across agency programs would encourage a broader range of providers to invest the time to learn about and apply to participate in these programs. For instance, partnerships were eligible for the FCC's CAF Phase II auction, but apparently are not eligible for RUS's ReConnect program, even if they have decades of operational experience. Midco has operated as a partnership for almost 20 years, and our predecessor companies operated as partnerships for decades prior. We have invested well over \$800 million in capital projects as a partnership, and remain committed to servicing our customers. We are a sound investment for the Federal Government, and our legal status as a partnership should not preclude eligibility in funding programs. These types of needless inconsistencies deter participation by qualified companies who could be part of the solution to reach unserved communities.

Third, this inter-agency coordination should continue throughout the entire life cycles of these programs. As providers receive funding, meet project milestones, and complete their required buildouts, information on interim and final deployments should feed back into the coordination process and broadband map to ensure that subsequent rounds of funding are not inadvertently used to overbuild this hard-earned progress. Indeed, with billions of dollars being spent each year to extend the reach of broadband in rural America, agencies and funding recipients must be accountable to show not only where the subsidies are awarded but also where and how these dollars are being used.

Making Programs More Effective

In addition to improving coordination among agencies, there are four steps that agencies can take to make their own programs more effective in serving rural America.

First, programs should operate in a technology-neutral manner. As long as providers are able to meet the specified broadband service requirements, it should not matter what technology they use to provide the service. For example, we have demonstrated that fixed wireless can be an effective tool to edge out our fiber backbone and connectivity, particularly in lower density rural areas where it can be very costly to deploy last-mile fiber.

Second, programs should prioritize projects that will offer higher speeds to ensure that communities receive the benefits of these investments for years to come. In the CAF Phase II auction, the FCC used a weighting system that favored companies willing to invest in networks capable of offering higher speeds of service. For example, our next generation, LTE fixed wireless network is currently "4.5G" capable—and will be 5G capable once the ecosystem has developed. We can offer speeds of 100/20 Mbps currently (without data caps) and our speeds will keep increasing with more available spectrum and continuing innovation. Areas that are only upgraded to 10/1 Mbps will soon become the new "unserved" areas as demand for bandwidth increases. Simply put, it is a better financial investment than one made to build a network limited to 10/1 Mbps. Therefore, it is prudent for funding programs to make a cost-effective investment in networks offering higher speeds than to make repeated investments in a series of upgrades just to keep pace with the bare minimum of what is considered broadband.

Third, broadband programs should target funding to truly unserved areas. In the past, some government broadband programs have allowed funding to be used in places that already have broadband service. Midco has been overbuilt with our own tax dollars in places like Mitchell and Yankton, South Dakota, as have others in our region. In Yankton, South Dakota, for example, government dollars were used by a fiber company to overbuild two existing providers; and the new provider used

those government funds to “cherry pick” a few business customers. We believe that scarce government resources should be targeted to those who will build out areas that do not yet have access to all the benefits broadband provides.

Fortunately, both the FCC and RUS have taken steps to direct new broadband funding where it is truly needed. The FCC requires areas receiving new funding to be unserved and, in the ReConnect pilot program, RUS requires that areas be at least 90 percent unserved. Additionally, both the FCC and the RUS allow stakeholders to supplement the initial eligibility maps with information about recent broadband deployment to ensure that funding is directed to areas that are truly unserved. This guards against using government subsidies to overbuild private investment or broadband deployment funded through other Federal or state government programs, ensuring that any such programs will make meaningful headway in closing the Digital Divide.

Fourth, agencies should focus on grants or partial grants rather than loans. We’ve found that grant programs that will require a company to expend some private capital, in addition to government funds, create better investments and accountability. There have been too many recent examples of providers who received significant loan money defaulting on their obligations and being otherwise unable to meet their buildout requirements. Moreover, at least in the past, the RUS broadband loan program resulted in overbuilding of served areas rather than reaching unserved areas.

Additional Opportunities to Increase Broadband Availability in Rural America

Finally, it is critical to continue to foster a regulatory environment that encourages ongoing private investment, including in rural America.

Removing Barriers to Entry and Deployment

It is appropriate to examine the regulatory landscape at the federal, state, and local levels to ensure that obligations and costs placed on providers—whether they offer wireless or wireline service—are reasonable, lawful, competitively neutral, and not unduly burdensome.

As an example, some franchising authorities around the country have begun seeking additional “in kind” contributions beyond what is required by law, and even duplicative franchise fees, in order to grant or renew franchises. Given our deep connections to the communities we serve, we have generally been able to work effectively and collaboratively with our local franchising authority partners. But, we support the FCC’s “Section 621 proceeding” to clarify that these extra fees and requirements are not allowed because every dollar paid in excessive fees and taxes is a dollar that cannot be invested in broadband, making the rollout and upgrading of rural broadband slower and less ubiquitous.

Ensuring Equal Access to Spectrum for Rural America

Additionally, as Congress and the FCC work to free up additional spectrum, it is vital that companies like Midco, that provide high-speed and reliable broadband to the most rural areas of our country, have equal access to spectrum. It would be detrimental to rural America if valuable and limited spectrum was allocated only to 5G, especially as 5G requires a high concentration of small cells to operate.

Current 5G technology measures the distance from the small cell to the customer in *feet*. Rural solutions, however, must be measured in *miles*. In our area, for example, we may have one or two farmsteads every mile. These remote rural areas lack the heavy infrastructure needed to support a 5G small cell deployment, and such infrastructure is unrealistic to build to serve a few homes with mobile 5G when we can offer high-speed and proven broadband solutions. Therefore, 5G small cell, mobile technology is not currently a realistic solution to close the Digital Divide in rural areas. Fixed wireless, however, is a realistic solution—we are closing the Digital Divide now with our high-speed, low latency fixed wireless.

We can continue to serve the unserved in rural America if we continue having access to valuable spectrum, especially mid-band spectrum. Mid-band spectrum is especially valuable to fixed wireless operators like Midco because, as shown in Figure 3, it balances speed and propagation.

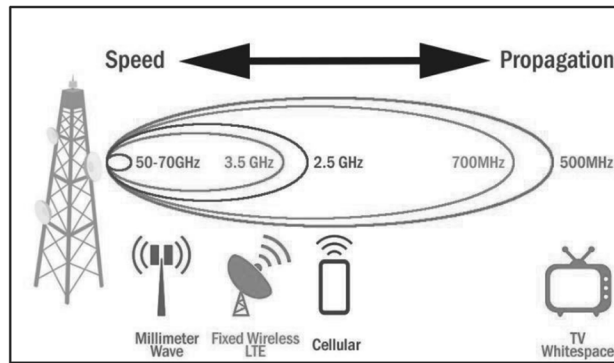


Figure 3: Simple Propagation Diagram

Midco strongly believes that any portion of the C-Band that can be cleared after protecting incumbents should be reallocated for terrestrial uses, including rural fixed wireless. We are concerned that proposals in the record about a private sale of this valuable spectrum would neglect rural America and exclude operators like Midco. We hope the FCC will balance the needs of incumbent operators, urban 5G deployments, and next generation fixed wireless's potential to close the Digital Divide. Additionally, any auction must be conducted by the FCC, because the Commission has the Congressional direction to auction spectrum, and the expertise to do so in an efficient and equitable manner. A Commission-led auction is especially needed when, as with the C-Band, there are multiple applicants with various technologies interested in the spectrum.

Moreover, when I testified last fall, I noted that the FCC should make more effective use of the 2.5 GHz band. The band is attractive because its propagation characteristics and high power allowance allows the broadband signal to penetrate through multiple shelter belts and forests to provide broadband and an Internet solution for our most rural customers. Currently, however, the 2.5 GHz band can only be licensed to educational institutions, who may then lease the spectrum to others. But, the FCC estimates that current licensees only cover about half of the geographic area of the United States today, with significant amounts of spectrum going unused in rural areas. Figure 4 shows the current 2.5 GHz "Educational Broadband Service" licenses in the three-state area—only 38 percent of this area has even a single license.

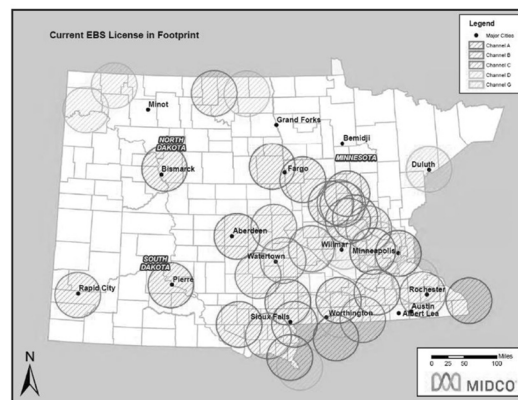


Figure 4: Current EBS Licenses from the 2.5 GHz Band in Midco's Footprint

Opening the 2.5 GHz band for licensing by other, non-educational entities would allow Midco to provide fixed wireless service to even more rural residents. For example, as shown in Figure 5, the 2.5 GHz band would allow us to serve residents

18 miles away from the elevator. A single sector deployment at 200 feet on the Thompson elevator, for example, would cover 443.04 square miles and a population of 3,863. As technology continues to improve, we expect to be able to serve even more residents with high-speed fixed wireless.

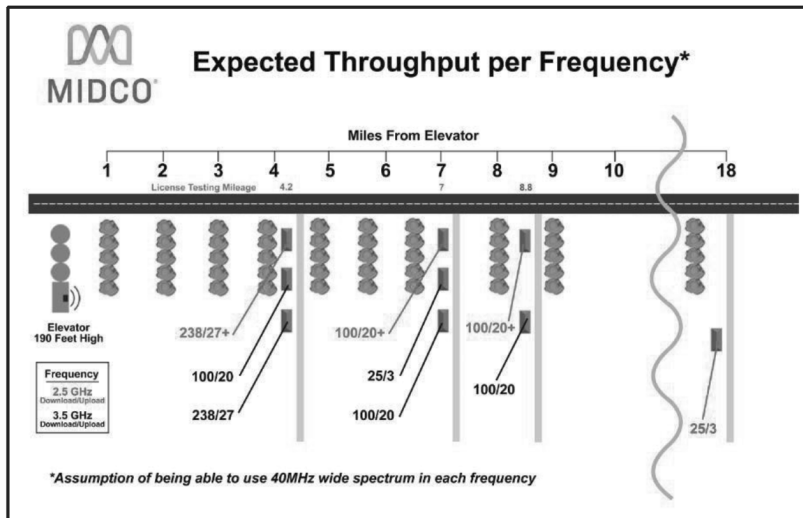


Figure 5: Service Ability with the 2.5 GHz

* * *

I commend the Subcommittee for its focus on ensuring that all Americans—including those in rural America—receive the full potential of America's broadband networks. Thank you again for inviting me here today, and we look forward to working with you on these important issues.

Senator THUNE. Thank you, Mr. Forde.
Dr. Jamison.

**STATEMENT OF MARK A. JAMISON, PH.D., VISITING SCHOLAR,
AMERICAN ENTERPRISE INSTITUTE**

Dr. JAMISON. Chairman Thune, Ranking Member Schatz, and Members of the Subcommittee, thank you for the opportunity to appear before you at today's hearing on the Impact of Broadband Investments in Rural America.

I can summarize my testimony in four sentences. First, promoting universal access to modern telecommunications services and the Internet is an appropriate and pragmatic objective.

Second, the FCC's recent improvements in its Rural Broadband Programs are based on sound economic thinking and empirical evidence.

Third, the FCC's parallel deregulatory efforts to allow Internet service providers to increase the value of their service offerings may be just as important as the agency's subsidy programs.

Last, it is crucial that overlap between Federal universal service programs be diminished and that coordination be improved.

Let me summarize my thoughts on each. It's well known that broadband infrastructure is an essential feature of a modern econ-

omy. People use broadband for their social relationships, interacting with governments, shopping, entertainment, and employment, just to name a few.

Businesses use it for marketing and sales, management, planning, and seeking employees. A 2016 Hudson Institute study found that rural broadband industry supported over 69,000 jobs and \$10 billion in e-commerce in 2015.

The FCC's committed considerable resources to promoting universal service. Its programs spent over \$42 billion from 2012 through 2016 with slightly more than half of that going to rural telecommunications.

Ensuring that these programs are beneficial and run efficiently is important because if the households that funded the \$42 billion had spent that money themselves, they might have purchased an additional \$16 billion in housing, \$4 billion in health care, \$672 million in education, and many other important items.

Fortunately, the FCC has been improving its rural subsidy programs, so that they are up to the task. It has done this by improving targeting, using competition where it can, and using incentive regulation where competition is impractical.

The FCC based its service benchmark, 25 megabits per second down and three megabits per second up, on actual customer demand. This was appropriate because regulations should avoid promoting services that customers may not want. Customers should lead.

The FCC uses competitive reverse auctions to ensure that subsidies are as small as possible. This was done in 2018 with great success. The auction process resulted in a 70 percent savings or \$3.51 billion over 10 years. This savings will allow Americans to purchase more—excuse me—an additional \$1.2 billion in housing, \$326 million more in health care, \$38.6 million more in education, and other essential items over the next 10 years.

Where auctions are impractical, the FCC adopted a form of incentive regulation to encourage efficiency and minimize subsidize amounts. The incentive regulation is in the form of subsidy caps and cost limits. The subsidy caps allow the FCC to challenge carriers to improve their efficiency in exchange for them being allowed to keep more of whatever profits they earn by lowering costs.

The cost limits are used in situations where the FCC subsidy caps appear inappropriate, because the computer modelers are unable to emulate in the computer the unique circumstances of some rural regions.

The FCC has been careful to avoid subsidizing overbuilds of areas where broadband is provided. Overbuilds have been problems in other rural broadband programs. Economists Janice Hauge and James Prieger examined the effects of the U.S. Department of Commerce Broadband Technology Opportunities Program, for example, that was funded by the ARRA Program, by the ARRA legislation.

Their study could find no clear correlation between the funds spent in that program and increased broadband penetration, pointing to the importance of following through and making sure our programs are effective.

In the past, rural subsidies focused exclusively on the cost side, ignoring opportunities that providers might have to gain new revenues. This one-dimensional approach was no longer appropriate. Today's broadband service providers offer a myriad of value propositions, including different speeds, payment methods, quality commitments, and offer those to consumers and content providers alike.

Exploiting this opportunity to gain value from multiple services and sources is how companies, such as Google and Facebook, have been able to build Internet access in poor areas.

Be glad to answer any questions you might have. Thank you.
[The prepared statement of Dr. Jamison follows:]

PREPARED STATEMENT OF MARK A. JAMISON, PH.D., VISITING SCHOLAR,
AMERICAN ENTERPRISE INSTITUTE

Chairman Thune, Ranking Member Schatz, and members of the subcommittee, thank you for the opportunity to appear before you at today's hearing on "The Impact of Broadband Investments in Rural America."

I have had the opportunity to study communications, media, and Internet policy issues over many years and in several capacities, including in my current positions as a visiting scholar at the American Enterprise Institute and as the director and Gunter Professor of the Public Utility Research Center at the University of Florida, where I am also the director of the newly launching Digital Markets Initiative. While I am proud to be affiliated with these organizations, I am appearing today solely on my own behalf, and the views and opinions I express should not be attributed to any of the organizations with which I am or have been affiliated. Earlier in my career I served on the staffs of two state utility regulatory agencies: The Kansas Corporation Commission and the Iowa Utilities Board. One of my duties while working for the state of Iowa was to serve the staff of the Federal-State Joint Board that dealt with an issue called separations, which was the system that provided rural telecommunications subsidies for many years.

I can summarize my testimony in four sentences. First, promoting universal access to modern communication services and the Internet is an appropriate and pragmatic objective. Second, the Federal Communications Commission's (FCC) recent policies to improve the effectiveness of its rural broadband programs are based on sound economic thinking and empirical evidence. Third, the FCC's parallel deregulatory efforts to allow Internet service providers to increase the value of their service offerings may be just as important as the agency's subsidy programs. Lastly, it is crucial that overlap across Federal and state universal service programs be diminished and that coordination be improved.

Let me address each in turn.

Importance of Rural Broadband

First, it is well-known that broadband infrastructure is an essential feature of a modern economy. As my AEI colleague Jeffrey Eisenach said testifying before the Committee on Commerce, Science and Transportation of the United States Senate on September 6, 2017:¹

There is a broad and deep literature on overall economic effects [of broadband communications services] which has consistently demonstrated a positive relationship between broadband and economic growth, employment and productivity.² Research is also increasingly demonstrating the socioeconomic benefits of broadband for disadvantaged populations. For example, new research published in the *Journal of Medical Internet Research* shows that when people from low socioeconomic positions begin using the Internet they use it for a variety of capital enhancing activities, including education, job seeking and obtaining

¹Jeffrey Eisenach, "Testimony of Jeffrey A. Eisenach, Ph.D.," statement before the Committee on Commerce, Science and Transportation on Addressing the Risk of Waste, Fraud and Abuse of the Federal Communications Commission's Lifeline Program, U.S. Senate, September 6, 2017, <http://www.aei.org/wp-content/uploads/2017/09/090617-Eisenach-Senate-Commerce-Testimony-on-Lifeline.pdf>.

²See, for example, I. Bertschek *et al.*, "The Economic Impacts of Broadband Internet: A Survey," *Review of Network Economics* 14, no. 4 (2015): 201–27 at 222. "In sum, we find strong evidence for positive impacts of broadband Internet on economic outcomes."

health information.³ Recent research from the Pew Internet Center also shows that broadband plays an important role in facilitating job search activity.⁴ There is also substantial research demonstrating the benefits of broadband expansion in rural areas. For example, Atasoy found that gaining access to broadband in a county increased the employment rate by approximately 1.8 percentage points, with larger effects in rural areas.⁵ A 2016 Hudson Institute study found that the rural broadband industry supported over 69,000 jobs and \$100 billion in e-commerce in 2015.⁶ (Brackets added. Endnotes in original.)

The FCC has committed considerable resources to promoting universal service. According to the agency's 2017 report⁷ on universal service programs, the programs spent over \$42 billion from 2012 through 2016 on high cost, Lifeline, schools and libraries, and rural health care programs. The high-cost program, which covers the rural subsidies that are the subject of this hearing, made up slightly more than half of this \$42 billion.

While this \$42 billion subsidy clearly benefited the service providers and some customers, it came at a cost. If, for example, the households that funded the \$42 billion had spent that money themselves, they might have spent an additional \$16 billion on housing, \$4 billion on health care, and \$672 million on education among other important items (assuming their additional spending was in proportion to how they spent their household incomes in 2015).⁸

Given the importance of rural broadband infrastructure, the magnitude of resources committed to its expansion, and the sacrifices that Americans make to provide the subsidies, it is vital that universal service programs be efficient. By this I mean that they be well targeted and provide Americans with great value for their dollars.

Improved Efficiency and Effectiveness of the FCC's Rural Broadband Programs

This takes me to my second point, which is that the FCC's recent policy changes to improve the effectiveness of its rural broadband programs are based on sound economic thinking and empirical evidence. To be efficient, a rural broadband program should target the right services and should support them at minimal cost.

Targeting. The FCC, regarding its rural target, is using as its benchmark Internet services that customers are demonstrating they want and are willing to pay for. The FCC's target speed is 25/3 megabits per second (Mbps), which means that customers are to receive 25 Mbps downstream and 3 Mbps upstream. The agency found in its 2018 broadband report that 59 percent of residential fixed connections equaled or exceeded that speed,⁹ indicating that 25/3 Mbps is now normal service. That it is a norm makes 25/3 Mbps an appropriate standard for universal service obligations. However, that 59 percent of these customers are buying 25/3 Mbps does not mean that all customers should have this service: Different customers have different preferences, which should be respected. So it is also appropriate that the FCC's standards allow for differing speeds.

My understanding from reviewing FCC documents is that the agency will revise its targets as customer preferences evolve. This is appropriate, and it is important

³See R. McCloud *et al.*, "Entertainment or Health? Exploring the Internet Usage Patterns of the Urban Poor: A Secondary Analysis of a Randomized Controlled Trial," *Journal of Medical Internet Research* 18, no. 3 (2016), <http://www.jmir.org/2016/3/e46/>. The study also finds that "familiarity and skills in using the Internet enhance the capacity to use it for diverse purposes, including health and to increase capital."

⁴See Aaron Smith, "Lack of Broadband Can Be a Key Obstacle, Especially for Job Seekers," Pew Research Center, October 28, 2015, <http://www.pewresearch.org/fact-tank/2015/12/28/lack-of-broadband-can-be-a-keyobstacle-especially-for-job-seekers/>; and Council of Economic Advisers, "The Digital Divide and Economic Benefits of Broadband Access," March 2016.

⁵See Hilal Atasoy, "The Effects of Broadband Internet Expansion on Labor Market Outcomes," *ILRRReview* 66, no. 32 (April 2013): 315–45.

⁶See Hanns Kuttner, *The Economic Impact of Rural Broadband*, Hudson Institute, 2016, <https://s3.amazonaws.com/media.hudson.org/files/publications/20160419KuttnerTheEconomicImpactofRuralBroadband.pdf>.

⁷Federal Communications Commission, *Universal Service Monitoring Report*, 2017, https://www.fcc.gov/sites/default/files/2017_universal_service_monitoring_report.pdf.

⁸Calculations are derived from the Bureau of Labor Statistics, "Consumer Expenditure Survey," 2015, <https://www.bls.gov/cex/2015/combined/income.pdf>.

⁹Federal Communications Commission, "Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion," February 2018, <https://www.fcc.gov/document/fcc-releases-2018-broadband-deployment-report>.

that the FCC made this explicit in its December 13, 2018,¹⁰ decision regarding rural broadband. By being explicit the FCC effectively told carriers that they need to ensure that their systems can economically scale as the FCC's consumer-based requirements change. I would like for the FCC to further hone its targeting to allow for differences between urban and rural customer preferences, but that is simply a refinement of the FCC's already appropriate regulatory direction.

Using Competitive Auctions to Minimize Cost. Regarding ensuring that the chosen target for rural broadband is supported at minimal cost, the FCC has taken important steps to use competition where it can and to use regulatory incentives where competition is impractical. The FCC introduced competition by adopting a reverse auction process for determining which carrier would receive a universal service subsidy. This was done in 2018 with great success. As economist Joseph Gillan observed, the auction process resulted in a 70 percent savings—or \$3.51 billion over 10 years—over the amount of subsidy the agency projected that it would need to provide.¹¹ This savings will allow Americans to purchase about \$1.2 billion more in housing, \$326 million more in health care, and \$38.6 million more in education, as well as other additional household essentials, over the next 10 years.¹²

Using Regulatory Incentives to Minimize Cost. For instances in which the FCC has determined that a competitive reverse auction is impractical, the agency has taken other steps to encourage carriers to control their costs. In the past the FCC largely used rate of return regulation—the traditional U.S. system for regulating utility and telephone company prices—to estimate amounts for universal service subsidies. It is well-known that rate of return regulation provides poor incentives for companies to operate efficiently and that alternative forms of regulation, such as price cap regulation, provide better results.¹³ The problem with rate of return regulation has been that it allows service providers to flow through to customers whatever investments, operating expenses, taxes, and other costs that the providers incur unless the regulator can find and demonstrate that a provider has made wasteful, inappropriate management decisions. Research has found that regulators have not caught many of the companies' management inefficiencies and that incentive schemes, such as price cap regulation, have improved efficiency. Properly performed, these incentive schemes reward providers for improving efficiency by allowing them to keep some portion of the profits that occur with improved efficiency.

The FCC has appropriately reflected these economic lessons in its rural broadband programs. One method the FCC adopted has been using cost models for estimating subsidy needs and using these estimates as a form of subsidy cap. Rather than allow companies to recover from the subsidy system the costs the companies report to the FCC, the cost model system estimates what costs should be and then the FCC caps subsidies at those levels. To the extent companies accept these subsidy estimates, the system results in savings for those who fund the subsidies.

This modelling approach for determining costs has been used extensively around the world for determining prices for telecommunications and other types of regulated companies. One of the lessons is that it is hard for a computer model to provide realistic cost estimates. That is one of the reasons why the FCC auction provided the 70 percent savings previously mentioned. This problem of missing the mark is especially true when services are to be provided in areas that are fairly unique. The reason for this is that a computer model needs large amounts of relevant data to accurately project costs, and unique or rare circumstances that provide too little data. Another reason is that the model builders need to understand the geographic areas for which they are making estimates. That is hard for the model builders to do when there are many diverse features and areas. What regulators do in such circumstances is use other tools, such as earnings sharing, limits on particular costs or cost changes, and benchmarking to provide incentives for effi-

¹⁰Federal Communications Commission, "In the Matter of Connect America Fund, ETC Annual Reports and Certification, Establishing Just and Reasonable Rates for Local Exchange Carriers, and Developing a Unified Inter-carrier Compensation Regime," December 13, 2018.

¹¹Joseph Gillan, "Lessons from the CAF II Auction and the Implications for Rural Broadband Deployment and the IP Transition," National Regulatory Research Institute, forthcoming.

¹²Calculations are derived from the Bureau of Labor Statistics, "Consumer Expenditure Survey."

¹³See, for example, D. Kridel, D. Sappington, and D. Weisman, "The Effects of Incentive Regulation in the Telecommunications Industry: A Survey," *Journal of Regulatory Economics* 9, no. 3 (May 1996): 269–306; C. Ai and D. Sappington, "The Impact of State Incentive Regulation on the U.S. Telecommunications Industry," *Journal of Regulatory Economics* 22, no. 2 (September 2002): 133–59; and D. Sappington, "The Effects of Incentive Regulation on Retail Telephone Service Quality in the United States," *Review of Network Economics* 2, no. 4 (December 2003): 355–75.

ciency. The specific tool or tools chosen depend on the regulator's and providers' circumstances.

The FCC has chosen a combination of tools—including the cost-model based caps and limits on certain types of cost recovery—to create incentives for efficiency while anchoring the subsidy amounts in the real world. This is an appropriate approach. I am not in a position to assess whether the FCC has made optimal decisions with respect to its chosen combination of tools, but I am confident that the agency's new emphasis on economic analysis will inform the commission as it adjusts and fine-tunes its program.

Eliminating Overbuilds. It is normal in competitive markets for rivals to duplicate each other's infrastructure. This duplication is important for rivals to be able to compete for customers and for companies to test alternative services for the future. This duplication of infrastructure can be wasteful at best, and perhaps even destructive, when the government is subsidizing one of the providers.

This is why it is important that subsidies be provided only in places where there is no service and where service would not be commercially viable absent the subsidy. The FCC has taken steps to avoid subsidizing overbuilds—that is, situations where broadband service is already in place and the subsidy is provided to another competitor. Broadband mapping is central to this effort.

Other Federal subsidy systems in the past have not been as focused on eliminating subsidies for overbuilds. For example, Jeffrey Eisenach and Kevin Caves examined the effectiveness of the \$2.5 billion provided in the American Recovery and Reinvestment Act (ARRA) to the Rural Utilities Service (RUS) for the ARRA-created Broadband Initiatives Program (BIP).¹⁴ Focusing on three case studies, Eisenach and Caves found that “more than 85 percent of households in the three project areas are already passed by existing cable broadband, DSL, and/or fixed wireless broadband providers. In one of the project areas, more than 98 percent of households are already passed by at least one of these modalities.” This was a waste of taxpayer dollars, so much so that the study estimated the cost of providing service to a home that had no service before was “\$30,104 if existing coverage by mobile broadband providers is ignored, and \$349,234 if mobile broadband coverage is taken into account.”

Such problems were not unique to the BIP program. Economists Janice Hauge and James Prieger examined the effects of the U.S. Department of Commerce's Broadband Technology Opportunities Program (BTOP), which was also funded by ARRA. Their study could find no clear correlation between funds spent and increased broadband penetration.¹⁵ Some BTOP projects were also overbuilds.

Importance of Deregulatory Efforts

Customers choose what they purchase based on their perspectives on the value the various services offer and the prices charged. Historically, residential telecommunications services were all the same, so universal service programs focused only on the cost side, presuming that subsidizing telecommunications companies would result in affordable prices. The value side of the consumer equation was ignored.

This one-dimensional approach is no longer appropriate. Today's broadband service providers offer a myriad of value propositions, including different speeds, payment methods, and quality commitments, and offer them to both consumers and content providers. Exploiting this opportunity to gain value from multiple services and sources is how companies such as Google and Facebook have been able to build Internet access networks in poor areas: They leverage revenues from advertising to help make the infrastructure commercially viable.

The FCC's recent deregulatory path—the highlight of which is its decision to restore Internet freedom—allows Internet service providers the opportunity to enhance their revenue by offering greater varieties of services to more types of customers. This may not be feasible for all service providers, but at least some will be able to enhance the commercial viability of their broadband offerings.

For example, it might cost a broadband provider \$100 million to provide service in a rural area. The consumers in the area may be able to pay only \$90 million for the service, implying that the provider needs \$10 million in subsidy to make the service commercially viable. But if the carrier can offer fast lanes or other enhanced services and receive say \$15 million from customers who are willing to pay for these

¹⁴J. Eisenach and K. Caves, *Examining the Cost-Effectiveness of RUS Broadband Subsidies: Three Case Studies*, Navigant Economics, April 13, 2011, <https://prodnet.www.neca.org/publicationsdocs/wwpdf/41311rus.pdf>.

¹⁵J. Hauge and J. Prieger, “Evaluating the Impact of the American Recovery and Reinvestment Act's BTOP on Broadband Adoption,” *Applied Economics* 47, no. 60 (2015): 6553–79.

services, then the need for the subsidy is eliminated because the total revenue—\$105 million—exceeds the \$100 million cost.

Diminishing Program Overlap

In the portion of my testimony addressing the efficiency of the FCC's programs, I mentioned historic problems with BIP and BTOP, two Federal programs that have also subsidized rural broadband. Rural broadband customers and the citizens that subsidize rural broadband would benefit from diminishing or eliminating this overlap.

One reason that overlap is counterproductive is that it allows companies to receive duplicative subsidies. For example, it is my understanding that a company receiving an FCC subsidy could still qualify for a low interest loan from RUS. It would be useful for the FCC staff and the RUS staff to coordinate to ensure that companies are not effectively receiving two subsidies for the same thing. I do not know of situations in which the new programs are duplicating subsidies, but it did happen under the old system.

Perhaps even better than staff coordination would be a consolidation of the Federal broadband programs so that there is a single system that is focused, provides a single point for reporting and enforcement, and applies a coherent incentive system. Optimally, this would be conducted by an independent regulatory agency to restrict political interference. The FCC is now well positioned to do this, but a future system could be managed by state utility regulators that apply the FCC's approach, or cooperatively managed by Federal and state regulators.

* * *

Chairman Thune, Ranking Member Schatz, and members of the subcommittee, this completes my written testimony. I look forward to answering any questions you may have.

Senator THUNE. Thank you, Dr. Jamison.
Ms. Mattey.

STATEMENT OF CAROL MATTEY, PRINCIPAL, MATTEY CONSULTING, LLC

Ms. MATTEY. Chairman Thune, Ranking Member Schatz, and Members of the Subcommittee, I'm honored to appear before you today to share my personal views on efforts to expand broadband access in rural America.

I bring the perspective of a former government official with 22 years of experience at the FCC and NTIA with the last decade focused on the FCC's Connect America Fund.

As a result of the FCC's reforms, USF recipients now have enforceable requirements to meet broadband performance obligations in exchange for support. With a known cash flow for a defined period, companies will be more willing to make investments in rural America.

I view the recent Phase II Auction as a success. A diverse group of providers using a variety of technologies bid for support. They are promising to provide better service for less support than otherwise might have been the case.

The FCC has adopted a regime with improved accountability and consequences for noncompliance. There may be more work to be done around the margins but, big picture, we now have verification of performance and an ability to track progress in closing the digital divide. This is a massive multi-year project and the Nation is moving in the right direction.

In my remaining time, I want to highlight five points for future action.

First, it may make sense to discard the notion of a separate remote areas fund and roll the areas that did not get bids in the re-

cent Phase II Auction into the FCC's upcoming auction for the geographic areas now receiving Phase II support which I'll refer to as the Phase III Auction.

Effectively, the Phase II Auction implemented the original vision for the Remote Areas Fund because it included the areas that were expected to be the most expensive to serve with varying performance standards.

Ultimately, it was the market through competitive bidding that determined which areas of the country would be served by what types of service, not government regulators. There could be further efficiencies in conducting the RAF and the Phase III Auctions on a consolidated basis.

Second, the FCC needs to recalibrate its vision for what is the minimum requirement in any future auction. 10.1 megabits is yesterday technology. Raising the minimum performance standard logically would expand the geographic areas that would be eligible for funding in a Phase III Auction.

Third, efforts to develop a better understanding of fixed broadband service availability should not prevent the FCC from moving to the Phase III Auction in a timely manner.

Everyone wants a comprehensive national database of broadband availability that could be used by all agencies, Federal and state, to make informed funding decisions, but we should not let the perfect become the enemy of the good. Rural consumers have waited long enough. It has been more than 7 years since the FCC laid out its original vision. There must be some areas of the country where it's clear there's no broadband provider offering service that meets the FCC's requirements.

The FCC potentially could auction those areas first, using a portion of the budget, and then hold a second nationwide auction later when there's an improved dataset of service availability.

Fourth, the Federal Government needs to share information in near real time, both across Federal agencies and with state and local officials engaged in similar efforts, regarding the specific geographic areas where parties have applied for funding or where funding has been authorized, even if construction has not yet occurred.

Ideally, there would be a shared standard at least among Federal agencies for what constitutes an unsubsidized competitor. In my view, all states should provide some level of funding to supplement Federal funding. Achieving universal broadband should not be the job of the Federal Government alone.

Fifth and finally, the current USF contribution system needs an overhaul. Parsing revenues into accessible and non-accessible buckets is like counting how many angels are dancing on the head of a pin. With modes of communications changing and business models evolving, it's time to have a thoughtful conversation about new ways to ensure that the Universal Service Fund remains on a solid footing.

I believe that it is appropriate for the FCC to exercise the permissive authority granted to it by Congress in Section 254(d) to assess retail broadband Internet access. In my opinion, it makes sense for broadband to contribute to a fund that is intended to ad-

vance the deployment of broadband infrastructure in rural America.

Thank you for the opportunity to appear before you today. I will be happy to answer any questions.

[The prepared statement of Ms. Matthey follows:]

PREPARED STATEMENT OF CAROL MATTHEY, PRINCIPAL, MATTHEY CONSULTING LLC

Thank you very much, Chairman Thune and members of the Subcommittee. I am deeply honored to appear before you today to share my perspective on efforts to expand broadband access in rural America.

While I'm a consultant with both private sector and governmental clients, I appear before you today to share my personal views on issues I have wrestled with for many years. I bring the perspective of a former government official and regulator, with 22 years of experience at the Federal Communications Commission (FCC) and the National Telecommunications & Information Administration.

In 2009–2010, I developed the universal service recommendations in the FCC's National Broadband Plan. Then, as Deputy Chief at the FCC, I implemented those recommendations over the next seven years, transforming the FCC's Universal Service Fund (USF) voice-focused high-cost program into a modern, data-driven program that supports broadband networks only in those areas of our Nation where there is no private sector business case. I am mindful that government resources must be carefully targeted and invested wisely. I bring to you firsthand experience with designing and implementing one Federal government program to address the lack of broadband in rural areas and personal knowledge of the practical and political impediments to completing the task.

In this testimony, I review the progress the FCC has made and then offer some observations on next steps for the FCC now that it has largely completed its initial implementation of the Connect America Fund reforms adopted in 2011. I address the need to coordinate among broadband funding programs and then conclude with my thoughts on reforming the system for raising the funds that finance the Federal USF, also known as contributions reform. Throughout, my intent is to highlight the key issues that public policymakers must resolve so that our Nation can complete the job of ensuring that all Americans in rural areas have full access to opportunities for jobs, education, healthcare, economic development, and more through broadband connectivity.

Taking Stock of Where We Are

When the FCC reformed the existing high-cost program in 2011, it observed that there was a digital divide within rural America. Some rural communities had state-of-the-art communications connectivity, and other communities had nothing. The system in place at the time had numerous shortcomings and was never going to close that gap.

To get broadband service to challenging areas requires money and a willing provider. The reason why certain areas aren't served is that they are viewed by the existing incumbent telecommunications carrier as non-profitable. The costs to serve are too high compared to the anticipated revenues from the customers. That's it—plain and simple. It does not make economic sense for a private sector firm to invest more capital in low-return rural areas if it has opportunities to earn a higher return elsewhere. Without viable and willing providers, and access to capital, there will be no solution to the broadband availability gap that exists today.

As a result of the FCC's reform efforts, universal access to broadband now is an explicit goal of the FCC's universal service program.

The FCC has moved from a program that handed out money with no specific requirements to upgrade network infrastructure to a new program with defined obligations for recipients to deploy broadband by a date certain in exchange for support.

The FCC has adopted a regime with improved accountability and consequences for non-compliance. There may be more work to be done on the margins, in terms of how specific details are administered, but big picture—we now have verification of performance and an ability to track progress in closing the digital divide.

The FCC has moved from a system in which support was available throughout an incumbent's service territory, and subsidies could be used to upgrade infrastructure to compete against unsubsidized competitors in areas that aren't even that costly to serve, to one in which support is more narrowly targeted to high-cost areas lacking an unsubsidized competitor.

The FCC has created a pathway to allow non-incumbents into the universal service program, recognizing that the incumbent telecommunications carrier is not nec-

essarily interested in serving rural markets, and others may be better situated to serve consumers.

The FCC has adopted a technology-neutrality approach, concluding that it would set performance standards and not dictate what type of provider or technology would be allowed to receive funding so long as the recipient meets the standards.

And the FCC has begun to use auctions to award support, which ensures that subsidies are subject to market discipline.

More than seven years later, we now have a situation where a variety of providers have access to a stable amount of Connect America Fund support for a defined term of years with requirements to meet certain broadband performance obligations. Essentially, the FCC committed a revenue stream for a period of years in order to stimulate additional investment in rural America. The private sector will be more willing to make those investments, and banks will be more willing to finance those upfront costs to build infrastructure, because there is an assurance of a known cash flow for a defined period. And people, your constituents, are benefitting from these changes. More people in rural America will be able to access the Internet and all the benefits that come with broadband connectivity.

There have been a few bumps, and course corrections, along the way. That's to be expected.

In 2011, the FCC defined fixed broadband for purposes of the Connect America Fund as 4 megabits per second (Mbps) upstream/1 Mbps downstream and decided that high-cost recipients with fixed broadband public interest obligations should provide a minimum of 4/1 Mbps service. At that time, the FCC rightly recognized the definition of broadband should evolve over time, and it committed to initiating a proceeding no later than 2014 to review the minimum performance characteristics to ensure that the Connect America Fund would continue to support broadband service that is reasonably comparable to broadband service in urban areas.

In late 2014, the FCC adjusted the minimum performance standard for fixed broadband for Connect America Fund recipients upward to 10/1 Mbps. More recently, in the December 2018 *Rate-of-Return Reform Order*, the FCC adopted 25/3 Mbps as the new minimum speed requirement for rate-of-return carriers. It has not yet addressed what the minimum should be for the rest of the country.

It is notable that each time the FCC has set a minimum standard, that standard has become outmoded before funding recipients complete their required deployments. If past experience is any indication of the future, the 25/3 Mbps standard will become out-of-date as well.

It has taken a long time to implement the initial vision for reform. It's been nine years since the release of the National Broadband Plan, and more than seven years since the release of the 2011 *USF Transformation Order*. There are a lot of reasons why it took so long, but it's a cautionary tale for anyone urging dramatic changes to the system now in place.

Rural consumers are impatient. Once they hear that government funding is bringing broadband to their area, they expect it to appear overnight. It took decades to bring electricity and telephony to all corners of America. Hopefully, this time, it won't take so long. But there's no question, this is a massive, multi-year project.

Next Steps for the FCC

With that as the backdrop, I'd like to turn now to next steps for the FCC.

I want to personally congratulate the FCC for conducting the Phase II auction last summer, and its recent announcement that it is ready to authorize the first group of Phase II winning bidders. I authored the chapter in the National Broadband Plan that recommended, among other things, that "the FCC should identify ways to drive funding to efficient levels, including market-based mechanisms where appropriate, to determine the firms that will receive CAF support and the amount of support they receive." I believed it then, and I still support that recommendation today. Thoughtfully designed auctions are an important component of the FCC's toolkit.

I view the FCC's Phase II auction as a success. The auction demonstrated unequivocally that alternative providers using a variety of technologies are willing to compete for support—and that is a positive development. There were winning bids for about three-quarters of the locations up for bid. More than half of the locations with winning bids are slated to get 100 Mbps or better service. Providers planning to use fixed wireless technology, in some cases in conjunction with fiber, won about 65 percent of the dollars, to serve about 53 percent of the locations up for auction. Electric providers won about 18 percent of the dollars to serve about 13 percent of the locations. Satellite won 8 percent of the dollars, to serve 27 percent of the locations.

The larger incumbents (the price cap companies) won less than 2 percent of the dollars, to serve only 1 percent of the locations. But there's an important caveat—several of them did not even bid in the auction. Those price cap carriers that did bid only bid on a very small number of locations. In my view, the bidding activity of price cap carriers as a group in this auction is not necessarily indicative of how those companies might act in the context of future auctions.

I am heartened to see a variety of providers willing to provide better service, for less support, than otherwise might have been the case. That enables the FCC to stretch those dollars farther to serve more consumers.

There are several pieces of unfinished business remaining from the 2011 *USF Transformation Order*: implementing the Mobility Fund Phase II auction and the Remote Areas Fund (RAF). In addition, the FCC has promised to hold an auction before the end of the Phase II term for the larger carriers to award support in those areas on a competitive basis, often referred to as Phase III of the Connect America Fund.

I'll focus my attention today on efforts to expand access to fixed broadband, while recognizing that there is much yet to do to reach the FCC's goal of universal access to mobile broadband.

With the benefit of hindsight, I question the FCC's decision back in 2011 to adopt a separate fund called the Remote Areas Fund. The theory was well intentioned, but the structure was wrong. I've come to appreciate that segregating one set of communities into a separate fund tends to make those folks feel like they are second class citizens.

The theory was that some areas of the country are just too expensive to serve with fiber; consumers in those areas instead would be served by alternative technologies, like fixed wireless and satellite. There'd be a separate pot of money available to providers willing to serve those areas, possibly with lowered service standards.

So, what happened? For one thing, we came to realize that RAF areas are sprinkled around and within other high-cost areas, a proverbial checkerboard on a map that does not necessarily reflect how companies build networks. Some commenters said, "Don't implement the Remote Areas Fund in my backyard." The service providers using alternative technologies that the FCC originally intended for the Remote Areas Fund said, "Don't relegate me to the Remote Areas Fund. I shouldn't be limited to the most expensive, least profitable locations in the country. I want the opportunity to compete for funding on a technology-neutral basis everywhere."

Eventually, the FCC decided to put those extremely high-cost areas located within the territories of the price cap companies into the Phase II auction, along with the high-cost areas in the states where the price cap carrier turned down the offer of Phase II support. The FCC figured out a way to conduct an auction in which providers using different technologies, and proposing to offer different levels of service, could compete head to head.

Effectively, the Phase II auction implemented the original vision for the Remote Areas Fund because it included the areas expected to be the most expensive to serve.

Ultimately, it was the market that determined which areas of the country would be served by alternative technologies, offering whatever level of service, not government regulators based on estimates of cost to serve from a hypothetical cost model. That's a good thing, in my opinion.

To be sure, some areas lacked winning bidders in the Phase II auction. Those areas logically would be the ones up for bid in a RAF auction, if the FCC still intends to go forward with that. It's worth considering whether the better course would be to discard the notion of the Remote Areas Fund as a standalone fund and roll those geographic areas into the upcoming Phase III auction.

The Phase II term of support for the larger price cap companies ends on December 31, 2020. In the big scheme of things, that's not that far away.

Back in 2014, the FCC decided that it would provide a six-year term of support to the companies that accepted the offer of Phase II support, with the option to receive an additional year of support through the end of 2021.

Given the usual timeline for FCC auctions, the FCC needs to get started on the Phase III auction as soon as possible. Start to finish, it generally takes 9–12 months to implement an auction after adopting the substantive rules for what is going to be auctioned, and that doesn't even include the time to solicit comment on those rules. After the bidding is over, it typically takes a minimum of six months before funding is authorized to some winning bidders and even longer to authorize all of the winning bidders.

Here are just a few of the key decisions that the FCC will need to make regarding the Phase III auction:

- What is the minimum performance standard for the Phase III auction?

In the recent Phase II auction, the FCC allowed bidders to bid on one of four performance tiers, with 10/1 Mbps service as the minimum tier. A mere quarter of 1 percent of the winning bids were in the 10/1 Mbps tier. The market has spoken: 10/1 Mbps is yesterday's technology. The FCC needs to recalibrate its vision for what is the minimum requirement in any future auction.

- Which geographic areas will be eligible?

A logical corollary of increasing the minimum performance standard is that the FCC would readjust the standard for determining whether there's an unsubsidized competitor that makes an area ineligible for Connect America Fund support. That would expand the geographic areas eligible for the Phase III auction, compared to the areas now receiving model-based support or slated to receive support from the Phase II auction.

- What data sources should the FCC use to decide what areas are eligible in the Phase III auction?

Many are dissatisfied with the FCC's current Form 477 data collection. The problem is that a data collection originally adopted for another purpose many years ago now is forming the foundation for funding decisions that have enormous implications for the American public.

I am personally acquainted from my tenure at the FCC with the difficulties of conducting a challenge process to determine the specific geographic areas eligible for Connect America Fund support. There must be a better way to do this.

The FCC is considering modifications to its Form 477 data collection. We all want a comprehensive national database of broadband service availability that could be used by all agencies, both Federal and state, to make informed funding decisions.

If I were still at the FCC, while fully supporting the need for better datasets to make funding decisions, I'd be worried if efforts to develop a more comprehensive database of service availability were to prevent the FCC from moving to the Phase III auction in a timely manner. We should not let the perfect become the enemy of the good: there are ways to move forward so that we can achieve the shared goal of getting more broadband out to consumers sooner rather than later.

There are no silver bullet solutions that will quickly update the national broadband availability maps to a state of perfection. Any significant changes to existing data collections are going to require time and money. Any new data collection will require Paperwork Reduction Act approval from the Office of Management and Budget, and it will take time to collect and clean up the data. The first filing in a new data collection often surfaces inconsistencies amongst filers and questions that need to be ironed out. New mapping requirements will impose burdens on small businesses as well as larger companies.

Any process to gather input from folks on the ground requires local government officials and consumers to speak up if they want Washington, DC to know they aren't served.

At a minimum, there must be some areas of the country where it's clear there's no broadband provider offering service that meets the FCC's requirements: the incumbent isn't offering the requisite level of service, and there are no unsubsidized competitors. One potential solution would be to proceed immediately to auction those areas, and hold a second nationwide auction later, after there's an improved dataset of service availability.

- What should the budget for the Phase III auction be?

I do not ascribe to the view that the budgets adopted in 2011 for various components of the Connect America Fund should be carved in stone. Just because \$1.5 billion was accepted by the price cap carriers back in 2015, based on a decision made in 2011, that does not mean that's the right number for Phase III of the Connect America Fund.

- Is there a way to auction partially served census blocks?

One of the problems with the current approach is that it ignores the plight of people who live in partially served census blocks. Thus far, the FCC has treated any census block that is partially served as if it were fully served, and therefore ineligible for funding. As a consequence, the FCC's December 2018 estimate that nearly

12 million rural Americans lack 25/3 Mbps fixed broadband undoubtedly is too low.¹ If the FCC at some future date has more granular information about actual service availability at the sub-census block level, the next step would be to figure out how to include the unserved portions of high-cost census blocks in any auction.

This is just the tip of the iceberg. There are many more decisions to make. It's time to get started.

Coordination Among Government Programs

It is critically important to coordinate and harmonize various programs administered by different Federal and state agencies, so that the government as a whole is efficiently tackling the problem and not potentially working at cross purposes. It's a concern if one government agency is providing funding to overbuild a service provider that currently is receiving funding from another government agency.

Some state and local governments are not satisfied with the extent of private sector broadband investment in their communities and are actively taking steps to provide funding above and beyond what is available from the Federal government. This is a welcome development. In my view, all states should provide some level of funding to supplement Federal funding. Achieving universal broadband should not be the job of the Federal government alone.

Coordination requires more than periodic touchpoints between agencies to talk generally about their respective programs and new initiatives. The Federal government needs to share information in near real time—both within the Federal government, and with state and local officials engaged in similar efforts—regarding the specific geographic areas where parties have applied for funding, or where funding has been authorized, even if construction has not yet occurred. The information needs to be sufficiently detailed that other agencies can map the location of planned deployments when making their own funding decisions and evaluate whether there is an overlap. Ideally, there would be a shared standard, at least among Federal agencies, for what constitutes an unsubsidized competitor so that everyone's working on the same page.

Coordination should not be a one-way street. The Federal government needs to share information with state and local officials, but state and local officials also have a responsibility to share their deep local knowledge about service availability with the Federal government.

I presided over several challenge processes while at the FCC. We invited the states to weigh in on those challenges. My recollection is there was little to no participation from state or local officials. I sincerely hope that all states and localities will play a more visible and proactive role in whatever processes the FCC uses in the future to decide which areas are eligible for the Phase III auction. They ought to; it is their citizens who will be directly impacted.

Contributions Reform

I oversaw the FCC's contributions reform docket when it started back in 2001. I worked on this docket for much of my FCC career, including the two Further Notices of Proposed Rulemaking in 2002, the more recent Notice of Proposed Rulemaking in 2012, and the referral to the Federal-State Universal Service Joint Board in 2014. I also have assisted numerous clients while consulting in the private sector, including competitive providers, mobile providers, and interconnected Voice over Internet Protocol (VoIP) providers, on complying with their USF contributions obligations. I've seen the many problems with the current system from both sides of the fence.

Under today's system, there are several thousand contributors to the Federal USF. Contributions are based on interstate and international retail revenues. Notably, the top five contributors (alphabetically, AT&T, CenturyLink, Sprint, T-Mobile, and Verizon) collectively fund about two-thirds of the entire USF.² A couple of the major cable operators probably are among the top 10 contributors. Think about that, basically a handful of the large communications firms collectively contribute most of the money that goes into the USF (and pass through those amounts to their end user customers), and thousands of smaller contributors (and their customers) pick up the balance.

The current system is built on regulatory constructs from decades ago. Only revenues from interstate and international telecommunications services and certain

¹*Communications Marketplace Report et al.*, GN Docket No. 18–231, FCC 18–181, para. 248 (rel. Dec. 26, 2018) (finding that 24 percent of rural Americans lack 25/3 Mbps fixed terrestrial broadband).

²FCC, *Universal Service Monitoring Report*, CC Docket No. 96–45 *et al.*, Tables 1.7 (2017), available at https://www.fcc.gov/sites/default/files/2017_universal_service_monitoring_report.pdf.

other telecommunications are subject to assessment. The form used to collect information from potential contributors uses terminology and categories that do not reflect today's marketplace. Companies are making judgments as to whether certain data services are telecommunications services (assessable) or information services (non-assessable). Dividing revenues into mythical buckets of intrastate and interstate jurisdiction is like counting how many angels are dancing on the head of a pin. The compliance burden, particularly for the thousands of smaller contributors that are not familiar with arcane regulatory details, is non-trivial. The major wireless and cable providers—who principally contribute today based on their voice revenues—probably could cause the system to collapse on a moment's notice if they decided to provide voice for free when bundled with broadband. The system we have today needs an overhaul.

The trend lines are not good. According to the FCC, while non-telecommunications revenues (which are not assessed) have more than tripled between 2006 and 2016, there has been a steady decline in assessable revenues over the last decade, by more than 20 percent.³

The FCC has sought comment on alternative contributions methodologies multiple times, from connections to numbers to hybrids. It also has sought comment multiple times on whether to assess broadband Internet access under its permissive authority granted by Congress in section 254(d).

Meanwhile, several states are looking at alternative contribution methodologies for their own state universal service funds. For instance, Nebraska will shortly implement a new hybrid contributions system—assessing a flat fee on all voice connections, with business services continuing to contribute based on revenues.

At the outset, it's important to step back and ask: what are we trying to accomplish with contributions reform?

People often say the current Federal contributions system is “unsustainable” and rail about the fact that the contribution factor is hovering around 20 percent. In my opinion, focusing on the contribution factor is a red herring. It's not 20 percent of your total bill; it's 20 percent of a small fraction of your communications bill.

Many argue that “We should expand the contribution base,” which implies that contributions reform would assess firms that are not subject to assessment today.

Some apparently believe that expanding the contribution base would bring more money into the USF. That's not the case. The budgets for the disbursement programs are set independently of any decision regarding how the money is collected.

When people say, “We need to expand the contributions base,” they often look to broadband. And then the conversation morphs into a “Don't tax the internet” debate. This is unfortunate, because it may prevent us from having a thoughtful conversation about new ways to ensure that universal service remains on a solid footing.

Because most firms pass these assessments through to their end users, I would suggest that it's useful to look at the impact on end users, rather than focusing exclusively on which industry sector has the obligation to report and contribute in the first instance.

Assessing retail broadband Internet access would not likely bring in new contributors, at least on the residential side. Do you know any person who has a broadband connection, but no voice connection, either landline or mobile? In today's world, people with broadband also have some form of voice connection, whether it's a traditional landline connection, a VoIP connection or a cell phone. That's why changing the contributions methodology to assess broadband effectively would just shift the universal service line item from one bill to another or, in the case of a bundled voice/broadband offering, be a wash. One amount goes down, while another amount goes up. Either way, that residential customer still is paying for it.

Nonetheless, I believe as a matter of logic and fairness it's appropriate to assess retail broadband Internet access. We all agree that universal broadband is a public policy goal, and that broadband is essential to our lives in the 21st century. To me, it makes sense to assess broadband to contribute to a fund that is intended to advance the deployment of broadband infrastructure.

Some fear that assessing broadband would suppress adoption. Broadband is not some fragile nascent service. With consumers cutting the cord on traditional voice service, it's broadband and the cell phones that are the necessities; if anything, landline voice is the service that people increasingly are willing to do without.

The more difficult question is what to do on the business side.

For many years, the FCC has estimated that contributions based on services typically sold to residential users represent roughly half of overall contributions.⁴ Stated

³ *Universal Service Monitoring Report*, Tables 1.2, 1.5.

⁴ *Universal Service Monitoring Report*, Tables 1.12.

another way, residential households bear roughly half of the contribution burden, with the balance falling on businesses. It's worth asking whether residential consumers will increasingly be contributing a greater percentage of the total USF, based on assessments imposed on voice service (whether it's traditional landline service, mobile voice, or VoIP), as businesses shift away from services that historically have been subject to assessment into new service offerings that fall within the definition of information services. The concern is that as the marketplace shifts to new services and new technologies, businesses will increasingly be able to escape any responsibility for financing USF under the current system.

Is that we want?

Conclusion

To conclude, the need for coordinated action to fulfill the promise of access to broadband in rural America is compelling. It will take a careful and a concerted effort involving federal, state and local governments, private sector investment, and American ingenuity to connect all of rural America.

I appreciate the opportunity to appear before you today. I will be happy to answer any questions you might have.

Senator THUNE. Thank you, Ms. Matthey.

Let me just start out by asking, Mr. Law. Your testimony highlighted some of the positive steps the FCC has taken to put Federal universe service programs on a more solid foundation for the future.

Could you describe how the recent Order will help Golden West and other companies like yours better deploy broadband and perhaps what this will mean for rural consumers and businesses?

Mr. LAW. Thank you, Mr. Chairman.

I think it really focuses on two aspects from the December Order from the FCC. First would be prescribing an adequate budget for the Universal Service High-Cost Fund, which had been lacking in several years.

Demand had exceeded supply and also the way the system works, the ability to recover costs for funds already expended had diminished. So I applaud the Commission for increasing the budget to be a workable budget for the foreseeable future, which brings me to the second item.

They set a budget which is between a five and a 10 year budget for those elements. In order for network operators to have the confidence to make multi-million dollar decisions in terms of investments, you have to have some level of confidence that those mechanisms that will provide portions of the funding will remain for a period of time. Five to 10 years is a reasonable window to make those investments. So Golden West is proceeding with accelerating our capital deployment plans.

Senator THUNE. Thank you.

Mr. Forde, the FCC's Connect America Fund Phase II Auction consisted of over a hundred bidders who are going to be awarded \$1.5 billion in support over the next 10 years. Of that \$1.5 billion, Midco was provisionally awarded \$38.9 million.

Could you speak to how that funding will help you expand your services in rural areas throughout South Dakota and other parts of the country?

Mr. FORDE. Yes, we are able to use those funds to edge out from our fiber network to some of the remote areas. That allows us to serve—when we go up on those towers and fix wireless, that allows us to bring that high-speed 100 megabit down connection that we're going to provide through that Connect America Funds to

every acre in that area and that's so important for our rural states, for precision ag, and it's not just every address that we're providing. It's for grain dryers and it's for water pumps and other equipment out there.

So that high-speed connection becomes so important for all of the enterprises in our rural areas.

Senator THUNE. As a follow-up, what are some of the lessons learned from that auction that should be applied in future rounds of funding or to other Federal programs?

Mr. FORDE. We are very happy with the way that the auction process worked out. Not only was our bidding able to keep those costs down for us at the level we provide service, but there was several other areas where we did not receive the CAF funding that we were able to save the taxpayer dollars by bidding down other folks in those areas.

Senator THUNE. Let me just direct this to all the panelists. With both the FCC and USDA providing broadband funding as well as a number of states, it's easy to see how funding from one program could be inadvertently used to overbuild projects funded through another program.

It's also important to note that a company can get support for deployment over a period of years. So simply examining what is currently deployed is not going to be enough to prevent overbuilding.

How can we all do a better job of making sure that these various programs work together and complement each other, and should we require Federal agencies to coordinate with each other to avoid the risk of wasteful overbuilding?

Ms. Matthey.

Ms. MATTHEY. I think it's important that Federal agencies and state agencies, as well, share information and specifically they need to share real information. They need to share maps, maps and geo files that folks can then lay and see where there is an expectation that new construction will occur in the future, so that additional government funds don't go to those areas just because today they're not served.

Senator THUNE. Mr. Law and Mr. Forde, when you're applying for broadband funding from Federal agencies in the past, were you required as an applicant to disclose support from other Federal, state, or local government sources?

Mr. FORDE. No, we were not in our FCC Connect America funds, and we have many examples throughout the Midwest where we have been overbuilt with Federal dollars.

In fact, there was a recent example where we had provided gig service in an area and a competitor was able to get a USDA loan, Universal Service Funds and Connect America funds, to overbuild us in that area where we already provided gigabit Internet service.

Senator THUNE. So do you think that a requirement like that would prevent overbuilding or help prevent it?

Mr. FORDE. Absolutely. We have to have that coordination to prevent it. Otherwise, we're going to still have areas that are not going to be able to get broadband service.

Senator THUNE. OK.

Mr. LAW. Mr. Chairman, I do feel that it is reasonable to expect that there should be coordination as well as some level of non-du-

plicity amongst programs. You know, you kind of at times have two thoughts that go with it.

There should be no duplicity period. At the same time, there are funds that are expended for deployment of networks. There are funds that are expended for sustainability of networks, so kind of two different items. However, at a base, I absolutely agree there should be some level of coordination so that duplicate funds are not used to overbuild existing broadband networks.

Senator THUNE. OK. So in your testimony, you mentioned barriers to deployment on Federal lands and across railroad rights-of-way.

Could you describe in more detail how these issues affect broadband deployment in rural areas?

Mr. LAW. Thank you, Mr. Chairman.

I think there are two aspects of that. From the Federal lands perspective, Golden West serves a large portion of Federal lands from the Department of Interior, National Parks, National Forest, Bureau of Land Management, BIA. I'm probably missing a few other Federal agencies there.

The timeframes involved in making the applications as well as the approvals range at the low side months, and I'm being generous with months. I would probably more characterize it in terms of years. Those are opportunities that are either lost or delayed and also when you are dealing with the Upper Midwest and roughly a 5-month construction window in order to build things, you miss that window or you get a permit back from a Federal agency in October means it's next year's or the following year's project.

As it relates to railroad rights-of-way, given the vast expanses that companies in rural areas cover and the railroads do, as well, oftentimes two things, both the delay in terms of permits in a timely fashion on railroad rights-of-way and then the inordinate amount of fees that railroads feel free to charge providers for the privilege of directional boring a line underneath their tracks.

I do not believe that railroads should be able to treat that as a profit center. I understand they have reasonable expense. I don't feel it should be a profit center.

Senator THUNE. Thank you.

Senator Schatz.

Senator SCHATZ. Thank you, Mr. Chairman.

Ms. Matthey, thank you. Thank you to all of you for being here.

Ms. Matthey, in 2010, the FCC concluded in its National Broadband Plan that it would need to "broaden the USF contribution base to ensure USF remains sustainable over time."

Has the need for contribution reform increased, decreased, or stayed the same since then?

Ms. MATTEY. First of all, I wrote that paragraph and I still believe it.

[Laughter.]

Ms. MATTEY. I think contributions reform still is something that needs to be done. Thank you.

Senator SCHATZ. So the FCC has the legal authority to do everything that it needs to, correct?

Ms. MATTEY. In my opinion, it does. Congress gave its permissive authority to assess telecommunications back in the 1996 Act.

Senator SCHATZ. OK. I want to talk a little bit about mapping and then maybe get a little bit more into USF reform.

It's without dispute that the FCC's broadband map is a mess, that it doesn't reflect what's really happening for Hawaii. For instance, the FCC's maps overstate speeds and the number of competitors in many places, and, of course, if we don't know where the funding is needed, we can't spend it in the right places and sometimes we spend it three times in one place and not at all in others.

What is holding the FCC back from collecting this granular data and producing accurate maps?

Ms. MATTEY. The FCC has had a pending proceeding for a number of years to modify the Form 477 data collection. I know that various parties have been trying to develop new ideas about how to get better information.

At the end of the day, though, one of the things that you need to understand is that it takes time and any new data collection will also impose burdens, burdens on industry, burdens on others, and last but not least, there's a need for more funding.

Congress needs to appropriate funding, more funding to help whatever is being done to develop these better maps.

Senator SCHATZ. For the development of maps.

Ms. MATTEY. Yes.

Senator SCHATZ. So it seems to me it's a couple of problems.

Ms. MATTEY. Yes.

Senator SCHATZ. One is, I don't feel there is—I think the staff are very motivated, but I think there is a desire among some to declare victory and to say we've got coverage, we're making great progress, when I think I'm looking at all the members of this committee. You go to a place and you say, well, that's—I don't know who did this map but they don't know because I talked to folks right there and there is no coverage.

And so I think there's this sort of political instinct at the FCC level, at the leadership level to declare victory prematurely here, but it seems to me there's also an organizational capacity question.

In other words, even if they really wanted to do this, this stuff is hard. Is that about right?

Ms. MATTEY. Well, one of the things you have to understand is different efforts—ultimately, the information comes from service providers and so it's not all in one place just waiting to be found. It actually requires effort to collect the information and if you want to have a third party in any capacity to be part of that process or to validate information, then there needs to be funding for that, as well.

Senator SCHATZ. Right. It just seems to me to be a pretty reasonable investment, to the extent that we're collecting all this revenue and pushing it all out, that it's not unreasonable for us to spend a few dollars to make sure that we know where it ought to go.

Let me ask you about where we are in the process of implementing the 2011 USF Reform Order. What remains to be done?

Ms. MATTEY. Well, the big thing obviously is the Mobility Fund Phase II Auction. The second thing is the Remote Areas Fund, which I talked about in my testimony, and there my thoughts have evolved over time.

I've come to realize that you can't designate specific areas as the Remote Areas Fund. That leads people to feel like they are second-class citizens and that it is better to allow those areas to be served in conjunction with what I call the main Connect America Fund because of how networks are actually built in the real world and so that is why I am suggesting that it may make sense to take the money that was originally dedicated for the Remote Areas Fund and combine it with what will be the budget for the next auction, the Phase III Auction.

Senator SCHATZ. One last question about 5G. How do we ensure as we move forward with 5G where density is the name of the game, where I think urban areas, even cities within rural communities where the math adds up, but what do we do about rural areas and the sort of practical aspect of this is that we're not going to get 5G in places where we don't even have regular broadband?

And so what technologies ought to fill the void as we push forward with 5G where we can, what technologies work best and are practicable in rural communities?

Ms. MATTEY. Well, honestly, I think it's a variety of technologies and as some of the folks on this panel have indicated, you know, in some areas, it makes sense to do fixed wireless. In other areas, it may make sense to do fiber and there's no single solution.

Senator SCHATZ. Thank you.

**STATEMENT OF HON. DEB FISCHER,
U.S. SENATOR FROM NEBRASKA**

Senator FISCHER. Thank you, Senator Schatz.

Mr. Law, in Nebraska, we have carriers that are receiving model-based and cost-based Universal Service Port and I was glad that the FCC's High-Cost Order from December significantly addressed the needs of both of those.

According to the Order, I understand that the FCC is likely to open the ACAM Program up for rural carriers who opted not to participate in the first round of that program.

For carriers that are eligible for ACAM, what advantages can consumers expect if their service provider chooses to opt into that ACAM Program? What's going to help people?

Mr. LAW. Thank you, Senator Fischer.

I think the primary thing that would help consumers in that case is again from the investment perspective for a provider the stability or ability to accurately, in the case of the ACAM model for 10 years, know exactly what it is you will receive, what your obligations are at a minimum and hopefully then some to provide broadband.

And so what I believe consumers should expect to receive from companies that do elect to follow on the ACAM model, Senator, is significant buildout as well as the ability to invest because of the stability provided by that long of a term in that election.

Senator FISCHER. You're from Wahl, South Dakota, is that correct?

Mr. LAW. Yes, ma'am.

Senator FISCHER. I know where that is. I'm just south of you in Nebraska, by Valentine, and when we look at the needs of consumers and the needs to have correct mapping, how would you re-

spond as a carrier if you're questioned on the mapping that you provide?

Because I travel the state of Nebraska a lot and I can tell you a lot of places, as Senator Schatz said, where you can look at your phone and you have no connectivity. How do you respond to that?

Mr. LAW. Thank you, Senator, and with your roots in Valentine and Golden West service of the mission area as part of our service area, so we're just located just north of you.

A couple of things as it relates to mapping and coverage and certainly there is mobile coverage and there's fixed coverage. As Ms. Matthey alluded to in her testimony, coverage data, I believe, or provider data will always be a key component, like it or not, of developing service maps, where is service available, whether it be fixed or whether it be mobile.

The key for that will be, and I think we've seen it in the last Mobility Fund round, is the key for that is an additional step in confirmation to determine, all right, and whether it is a company like Golden West or a mobile provider or someone else, what are the validation or verification methods used to determine that I as a provider said accurately depicts the services I am able to provide, and I think that perhaps has been missing.

Senator FISCHER. Thank you.

In your testimony, you also remarked on the FCC's effort to improve accountability and implement performance testing requirements that are related to universal service support.

What's the status of implementing those requirements and do you have any concerns with that process?

Mr. LAW. Thank you, Senator.

The status is the clock is ticking very loudly in providers' heads because the deadline as set by the FCC, I believe, is third quarter of this year, so merely months away for performance testing of networks that are recipient of Universal Service Fund dollars.

As I indicated in my oral statement, I strongly support there should be performance testing. The issues that I have with how the FCC has set this up is that I believe it is challenging, if not impossible, for a rural carrier to meet the requirements of the testing procedures as well as it requires us—in Golden West's case, it will require us to go to over 200 of our customers' homes and install a device in their home to monitor the performance of their network.

Senator FISCHER. Is that just a problem for rural carriers because of distance? Wouldn't it also be a problem in urban areas just to cover that many residences or businesses?

Mr. LAW. I believe most of the associations involved in the telecommunications industry have asked the FCC to reconsider and I hope that they will take heed of that reconsideration.

Senator FISCHER. Thank you very much.

Next, Senator Klobuchar.

**STATEMENT OF HON. AMY KLOBUCHAR,
U.S. SENATOR FROM MINNESOTA**

Senator KLOBUCHAR. Thank you very much.

And I thought I'd start with the mapping issue, something I'm working on right now. Earlier this month, Minnesota was actually selected as one of seven states to partner with National Telecom

and Info Administration to improve the accuracy of broadband mapping, and I'm glad we're doing that, but I think we need to change this nationally.

Mr. Forde, do you believe allowing consumers and state and local entities to report data could help create more accurate maps?

And, Dr. Jamison, why are these maps important in eliminating overbuilding?

Mr. FORDE. Thank you, Senator.

We absolutely love it when customers and folks in the region let us know where areas they don't have service. We love hearing from them and for us providing that data allows us to know if we've got an unserved area and unserved farms, we love to know that data so we can go and try reaching them.

In fact, we've been in conversations in Minnesota with the broadband folks there, you know, helping us identify areas that are unserved or underserved. So it has been very fun to work with them to find those pockets and try to provide service.

Senator KLOBUCHAR. OK. Dr. Jamison.

Dr. JAMISON. Yes. Thank you for the opportunity to be here.

The issue of mapping and the overbuilding is critical because none of us spending our own budgets would pay two people to do exactly the same thing for us. The fact is this doesn't make economic sense for the people paying the bills.

The use of the maps, as people have talked about and as you indicated, partnering with the Federal Government on that, that type of state and local participation is also important.

Part of my work at the University of Florida is conducting courses for telecommunications regulators around the world and as I talk with them about their systems, they're always feet on the ground trying to figure out where service is and service is not and that's not something the Federal Government can do by itself.

Senator KLOBUCHAR. OK. Very good. Chairman Wicker and I introduced the Precision Agricultural Connectivity Act. It was signed into law in the Farm Bill, the last Farm Bill, and the bill directs the FCC to establish a task force to look at gaps in rural broadband service and I actually figure this is one way to get at the kind of information we're going to need to get the money to actually get it out there and I like your ideas, Ms. Matthey. It's something we've been looking at quite a bit, as well.

How has broadband supported precision agriculture, Mr. Forde?

Mr. FORDE. I think it has been great to take a look at the area. Red River Valley in your state, one of the best farming areas in the entire world, to be able to use the mix of technology we have and to use that fixed wireless technology, serving off of elevators in your service territory out to the deep piling stations, out to a grain dryer.

We had a farmer that recently hooked up four of his grain dryers on various parts of his farm and instead of sitting at those all day long monitoring them for fire, he was able to monitor that from his home using fixed wireless connections, you know, in the winter months. Just has been an unbelievable tool to reach all those farming assets that people are now having on those farms with a mix of technologies and it's really going to help us move things forward.

Senator KLOBUCHAR. Right. Following up on Senator Schatz's questions on funding and Senator Thune was actually getting at the coordination, we know there are a lot of different funding sources designed to support broadband build-outs in rural areas, FCC, USDA, and while these programs all help reduce the digital divide, it's crucial they're working effectively together.

Last month, Senator Cramer and I introduced the Office of Rural Broadband Act to establish someone or an office that's coordinating between all these so we're not giving the same money. I've seen this happen in my own state.

Do you think—I guess this is to the whole panel. Do you think that this would be helpful, more coordination, instead of just having the doubling? I know, Dr. Jamison, you already answered that on the maps, but anyone else want to chime in?

Mr. LAW. I would absolutely concur that whether it is an Office of Rural Broadband or other agency that more coordination is crucial as we go forward and as more dollars are allocated for rural broadband. So I would be supportive.

Senator KLOBUCHAR. OK. Very good. That's it. Thank you.

Senator FISCHER. Thank you, Senator Klobuchar.

Senator Moran.

**STATEMENT OF HON. JERRY MORAN,
U.S. SENATOR FROM KANSAS**

Senator MORAN. Senator Fischer, thank you.

Mr. Law, I'm going to direct this question to you. Welcome to the entire panel. Thank you for your presence today.

In 2011, the FCC adopted a rate floor policy that denies USF support to carriers to the extent that they charge rural customers less than the rate for local voice service for the average urban customer.

The FCC froze the rate floor in 2017, pending a rulemaking to reconsider whether it was still necessary and, if so, how it should be calculated. This freeze is scheduled to expire July 1 of this year, and in the absence of FCC action, the rate floor is expected to nearly double to meet the average urban rate of 2019. That has significant consequences, I would think, in South Dakota. It does in Kansas.

The Kansas statute, in fact, requires the carriers to authorize rate increases 45 days in advance with the Kansas Corporation Commission essentially shortening that deadline July 1 to something less than that. Otherwise, we've got significant harm to our Kansas consumers.

The FCC has indicated an intent to address this issue but nothing has occurred to date, and I would ask for your description of this issue, what harm would result if this freeze is not extended, and the importance of its timeliness of that extension?

Mr. LAW. Thank you, Senator Moran, for your question.

Yes, the clock is also ticking rapidly on the increase to the local service rate benchmark. To work the calendar backwards for you, you're right. It's by July 1 for carriers who receive USF, such as Golden West. We have to have it in place by June 1 and in South Dakota, we need to provide a minimum of 30 days' notice. So that would be May 1, as you mentioned in Kansas, a 45-day notice, and

so the clock is ticking rapidly whether the rate goes from \$18 to, I believe, \$27 and that does not include all of the other fees.

I am hopeful that the Commission understands the urgency for rural consumers in what I would believe to be somewhat of a messed-up scenario for local service rates that shouldn't overcharge rural consumers who still choose to keep a local landline phone. Charging them \$27, plus the fees that go with it, I think is absurd.

Senator MORAN. Thank you for your comments. I'm hoping that I can use this, your testimony, and I'm hoping that the FCC will pay attention and act quickly.

It also has a self-defeating apparatus, which is another reason not to have a landline, which is the source for the Universal Service Fund revenue to begin with. So we're in a circle that could be very damaging.

Let me ask Dr. Jamison and Mr. Forde a question about over what I call overbuilding.

Last year, I worked with my colleagues in the Senate Agriculture Committee to support a Broadband Overbuilding Protection. It survived the conference committee and is included in the Farm Bill.

While coordination, as you just talked about, is important in preventing overbuilding, how else can we make certain that the money goes where it is most necessary? What are guidelines? What are regulations?

Law now requires that 95 percent of that money must be spent where there is no service provided, and we've seen instances in the past in which it is easier for carriers to build over and generate the revenue from those circumstances with the hope that then that revenue is used to subsidize even more rural, more less-served areas.

How can you help me address this issue? How can you help me make certain the money goes where it's most needed?

Mr. LAW. There are two things that I would consider. One is to be very supportive of the people who are working on that program in the USDA. I have some friends that are working there. They're being very diligent to make sure they don't fund overbuilding but providing strategic support for that.

But then also enforcement, as well. I recall talking with people who received grants from the Department of Commerce, BTOP Program many years ago. They were very proud of the fact that they were overbuilding and they were doing it because that's where the customers were. That was their attitude and that should not have been allowed. They should not have been able to have kept that money.

Senator MORAN. Mr. Forde.

Mr. FORDE. Thank you very much, Senator.

We appreciate all your work on the Farm Bill and on overbuilding. As a company that's been overbuilt several times throughout our footprint with our private capital overbuilt, we greatly appreciate that, and as I mentioned before, there have been some areas where we've even been triple-dipped on from companies where they've used universal service fees, Connect America funds, and USDA loans to overbuild areas where we already provided gig service, and if we're really going to reach the last mile, we can't have that type of stuff happening.

Senator MORAN. Thank you both.

Senator FISCHER. Thank you, Senator Moran.
Senator Tester.

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

Senator TESTER. I'm just going to kind of keep going where Senator Moran left off.

So you got to educate me, folks. How big of an issue is the overbuilding issue as it applies to using Federal dollars? And if there's no broadband that's laid out without using Federal dollars, let me know that, too. OK? So how big of an issue are we talking about here?

Dr. JAMISON. I could tell you that I don't know the quantity of it. I know from the anecdotal evidence, a study I cited in my testimony, and then just the people I've talked with, that a lot of the specific grants went to overbuilding.

Senator TESTER. OK.

Dr. JAMISON. But I don't know how big that is in general.

Senator TESTER. When these people apply for their grants, are they applying with the idea that they're going to overbuild or are they selling it that this is going into an area that has no service?

Dr. JAMISON. My recollection from the people I've talked with is they were not advertising the fact that they were going to overbuild and maybe before they got the grant that was their intent, but once they understood the economics of the business, they went in where the services already were.

Senator TESTER. Which it goes back to what I think Senator Moran was saying and you guys were saying, that if we use money for overbuild, the money's hard to come by to begin with.

So and I've heard three programs talked about today, Connect America, USDA, USF. Are there any other Federal programs out there used to lay broadband down or, as one of you said, sustained broadband?

Mr. LAW. Senator, I'll say there are some parts of each of those programs, little fingers.

Senator TESTER. Those are the three primary and they don't talk to one another?

Mr. LAW. I don't know that it's fair to characterize it as don't talk to each other. I would more characterize it perhaps they don't talk enough.

Senator TESTER. Let me ask it this way. Because you guys are familiar with applications to all three, correct? So when you fill out an application, Mr. Law, to any of those, do they ask you about the other programs?

Mr. LAW. The specific application perspective from our side would be as it relates to RUS and RUS loan funds, and in terms of asking us about other Federal funds, not specifically. However, they do very clearly ask about, I'll say, what broadband is available there today and we have to answer that as part of our application.

Senator TESTER. OK. So if we're going to solve this problem, is coordination between the programs the key? In other words, have them talk to one another, or what is the key? As a committee, this committee, what can it do to stop the overbuild because it's ridiculous? Go ahead. Just tell me, tell me what we should be doing.

Mr. LAW. I would formalize the coordination. It's good for the staffs to talk with each other, but there's no formal coordination. Then there will be gaps or there will be overlaps.

Senator TESTER. OK. Anybody else? Go ahead.

Dr. JAMISON. I would concur with that.

Senator TESTER. OK. So let me go on in a completely different direction.

Generally speaking, it's the smaller providers in my home state of Montana, which is where I'm from, it's the smaller providers that really provide. They have a stronger obligation and interest. That's nothing against the big guys, but the fact is we're talking Frontier America here. OK.

There are some of these rural exchanges, I don't think it's a bunch, but there are some, maybe more than I think, that are currently owned by large price-capped carriers that, quite frankly, don't have the same commitment to service as some of the smaller carriers. We'll be kind.

Is there something we can do to encourage them to do a better job or is there something we could do to encourage them to sell those exchanges to somebody who really gives a damn about them? Talk to me.

Mr. LAW. I'll start, Senator. As a resident of Wahl, South Dakota, population 700, those towns——

Senator TESTER. And the home of Wahl Drug.

Mr. LAW. Thank you very much, Senator Tester. I know Senator Moran has also commented on his fondness for Wahl Drug. So I appreciate that.

As a resident of a small community who works for a company that serves a lot of those small communities, they are also very near and dear I'll say not only to my individual heart but our organization's heart, and yes, there are instances of, I'll say, adjacent exchanges where service is not at a level that would be acceptable in our environment.

Senator TESTER. Right.

Mr. LAW. In terms of tools that I believe Congress has to effectively do that, quite honestly, Senator, I think the best one you have available is the bully pulpit and I'm not sure what else there would be.

Senator TESTER. OK. All right. Well, just one other question for you, Mr. Law, and you don't have to tell me. You can say no, I'm not going to answer this question.

But what is the average price a railroad charges you per mile of the landline?

Mr. LAW. That is all over the board, but we have seen application permit fees and other fees that go in excess of \$10,000 per crossing.

Senator TESTER. Per crossing?

Mr. LAW. Yes.

Senator TESTER. Thank you. Thank you, Mr. Chairman.

Senator THUNE. Thank you, Senator Tester.

Next up, Senator Scott.

**STATEMENT OF HON. RICK SCOTT,
U.S. SENATOR FROM FLORIDA**

Senator SCOTT. Thank you all for being here.

Dr. Jamison, as you brag about, the University of Florida being the eighth best public university in the country.

Dr. JAMISON. Well, I do on a regular basis but I have not here. Senator SCOTT. So these satellite carriers, are they going to be able—like Gear Bus One Web, which is, you know, expanding and is going to put up all these satellites out at the Space Coast. Is that going to have an impact on broadband for rural areas?

Dr. JAMISON. I would think it probably would but that's beyond my expertise.

Senator SCOTT. OK. Does anybody else—

Mr. LAW. I would say impact perhaps but it depends on what applications you're looking to do and what services do you wish to provide. At the end of the day with the satellite, you have some physics issues. While I am not a physicist, you have whether it's 300 miles or 22,000 miles in the sky and some latency going back and forth.

So would I say they won't be able to provide service? Absolutely not. However, I think the quality of service will depend on what applications you are trying to run, Senator.

Senator SCOTT. OK. And I didn't check where they were today, but my understanding is they say they're going to be able to compete with the same speed as Comcast and all the others have, but you haven't seen anything like that, that you believe they'll be able to do that?

Mr. LAW. I have not seen that and I have no evidence to say they can or cannot. What I can address to that, Senator, is that as someone who has provided network and network capabilities for in my company's history of over a hundred years, I focus more on what I know technologies can do today, not what I predict they may be able to do tomorrow.

Senator SCOTT. Right. So we have counties that have spent the money to put in, you know, fiber lines. When they do that, why is it difficult to get providers to come in if a county's taken the financial risk to—isn't your biggest expense the lines?

Mr. LAW. Certainly that's a large portion of the expense in terms of the miles of line and the labor that goes to putting that fiber in. Certainly the line is a component of that.

There are really kind of a couple of things. There are both engineering specifications and not that the counties couldn't engineer it properly, but what are the rights to use on those fibers? Do they stop where I need them to stop to serve a particular business versus Mr. Forde's company or another company down the road and so those are often challenging questions for a provider that is used to, I'll say, either engineering or architecting networks in a particular manner to now have someone else put in a network and say, well, just go ahead and use mine.

It sounds simple on the face value but the reality is in terms of provisioning of that service, it may not be.

Senator SCOTT. Right. But for you all, you don't believe that the satellite carriers are going to be much of a competition for the foreseeable future?

Mr. LAW. I can't say whether they will be the competition for the foreseeable future, but when you're talking about, you know, Cisco does what they call Visual Networking Index, VNI, the Cisco VNI,

and when Cisco VNI predicts the busy hour traffic in the next 4 years will increase 4.8 times compared to where it is today, the demands of what something can technologically do today versus technologically accomplish tomorrow is a high bar. It's a high hurdle for those who build networks.

Our average customer, Golden West customers uses roughly 270 gigabytes of data a month. Two years ago, it was a 150. Two years from now, it'll be north of 500. Can satellite take that possibility? I'll believe it when I see it, but I have no evidence to say that they can't.

Senator SCOTT. Thank you.

Senator THUNE. Thank you, Senator Scott.

Senator Sinema.

**STATEMENT OF HON. KYRSTEN SINEMA,
U.S. SENATOR FROM ARIZONA**

Senator SINEMA. Thank you, Chairman and Ranking Member, for holding this important hearing.

You know, I share the concerns that have been expressed by many of my colleagues about the funding and deployment of rural broadband. Rural broadband access in rural communities is of great concern for Senators on both sides of the aisle.

The recent Broadband Deployment Report from the FCC indicates that over 520,000 Arizonans, that's a full 66 percent of rural Arizona, still lack access to reasonable minimum standard of broadband connectivity.

I've also heard stories from Arizonans who lack reliable Internet services in places that aren't particularly rural or very far-flung and so the resulting digital divide between urban and rural communities makes it more difficult for rural Arizona to attract new companies, deliver high-quality health care, and offer world-class education for its kids.

Recently, I met with representatives from the Black Mesa Community School. It's a pre-K to eighth grade school located in the Navajo Nation in North Arizona. For students at Black Mesa, most of their days start with a 3-hour-long bus ride to school down a dirt road that's about a 120 miles long, but often that bus gets stuck in the mud because it turns those 3 hours into five or 6 hours because of the weather, however long it takes a tow team to come and pull the bus out of the mud.

And while we certainly have identified a need for improved transportation infrastructure in parts of Arizona, one way to address this issue is through increased broadband infrastructure to ensure that these students have access to educational resources if they are at home whenever rain or snow or flooding makes it impossible to get to school.

Beyond education, broadband services can help get access to health care, job training, and economic growth, and for our rural counties that are well-connected to broadband, we find that they have higher incomes and lower unemployment rates than the counties in our state with less connectivity.

So we know that serving rural America, including tribal lands, is challenging for broadband providers.

So my first question today for any of our witnesses is to note that each of you in your testimonies talked about the importance of coordinating deployment efforts from private capital and government subsidies to prevent overlaps in funding.

Obviously we don't want to waste funding on areas that are already served when places like Arizona have nearly a million people who live with no terrestrial broadband.

So could you talk about programs that do not work in concert and then explain the impact of how we can better promote coordination in places like rural Arizona to help communities like the Navajo Nation?

Ms. MATTEY. One thing that we haven't talked about specifically is the need for better coordination among the different programs that are part of the Universal Service Fund.

We've spent most of our time talking today about the Connect America Fund, which is under the USF umbrella, but there also is a program called E-Rate and another program called the Rural Health Care Program, and for many years, I have thought that there needs to be better coordination among those three programs because each in its own way may be funding infrastructure and those programs today are administered in separate silos.

Senator SINEMA. What would it take to get those three programs to begin coordinating with each other so that we can get rid of those silos and actually fill these gaps?

Ms. MATTEY. I mean, in the first instance, it's fully within the FCC's existing authority to make that happen. The programs exist in different silos for historical reasons and so it just is a question of making a decision to better require coordination within the existing framework.

Senator SINEMA. OK. Thank you. Anyone else want to address this?

Dr. JAMISON. There's one more thing I would add and this has to do with the overbuilding issue.

One thing I've seen done in other countries is that the subsidies aren't provided until the service is provided and that is an easy way to detect was there overbuild and you find out, OK, you're starting off service but it was already there, then the funding is never provided. So you're not in a position of having funded it or you're trying to get the money back.

Senator SINEMA. That's helpful. A follow-up question for Mr. Law.

In your testimony, you speak about the FCC's willingness to address the USF budget shortfalls, and I just wanted to ask how the recent Order could help your company and companies like yours better deploy broadband and what this body, if anything, can do to be helpful there?

Mr. LAW. Thank you, Senator.

The first part in terms of the December Order was, I'll say, the adequate budget for the foreseeable future as well as the time-frame contained within that budget and so when you're making the types of investments that companies like Golden West make in rural South Dakota, having that level of understanding what type of funding may be available for the next five or, depending on the program, the next 10 years allows operators, such as myself, to in-

vest with more confidence as opposed to less confidence, which, you know, none of these investments are ones that are ones that, I'll say, bet the farm-type investments. So that would be the largest thing from the December Order, Senator.

Senator SINEMA. Thank you.

Senator THUNE. Thank you, Senator Sinema.

We have a couple of members that are trying to make their way back here to ask questions and so we'll give them just a minute. I know this question has been addressed at some length already and I think Senator Schatz asked it, but I would ask you, Mr. Law.

One of the issues that we talked about earlier is the shortcomings of the current broadband mapping data, something I think that, as Ms. Matthey spoke about, testified about, and those shortcomings are widely publicized and acknowledged, and so I would ask you what we can do to improve the accuracy of the maps and to ensure that reliable information's being assembled.

Mr. LAW. Thank you, Mr. Chairman.

I think a couple of things. In terms of the maps themselves, there has been a lot of discussion over the past several months, both by members of this committee and throughout the industry, as well, about the accuracy of maps and certainly the Mobility Fund discussion put a fine flashlight on challenges in terms of adequacy or accuracy of those maps.

At the end of the day, I do believe you will always need to rely on provider data to establish the baseline for those maps and the reason for that is whether it's mobile or whether it is fixed, we are the ones who either operate or own the network and are able to demonstrate or hopefully demonstrate, if we put it on a map, where that network exists and where it does not exist.

What I think the key thing that needs to be included and you saw it in the Mobility Fund was the ability of, I'll say in this case, entities. In this case, I think I saw a lot of states, I saw a Farm Bureau, I believe, in one of the states challenge the accuracy of the mobility map and was able to clarify that that map was not accurate.

I think the same is true for fixed broadband, quite frankly. Providers will continue to provide that data of where that is, but there has to be a second step. It does not need to be as lengthy or as full-blown work as the first step of providing that data but some type of second step to confirm, verify, whatever the phrase may be, that that broadband or that service is available at that location, and if it is, I'll say check the box. If it's not, revise the map.

Senator THUNE. OK. Anybody else?

Mr. FORDE. As a company, we provide multiple form broadband in multiple ways. So there are areas where we are running our fixed service and running those lines throughout service areas and those areas are services, but oftentimes there might be some place, just, say, short a half mile, quarter mile away, where, you know, we've seen inaccuracies where those folks will have that area as served, but we'll go ahead and using our fixed wireless service and you're drawing, say, a six-to-eight-mile circle around a town and an elevator or water tower where that fixed wireless service is coming out, that makes that whole area served. So then you can use that shape as a circle and cover that entire region.

So we've got to make sure that when we're bringing all these different maps together and all the different types of technologies, those are accurately represented on the maps. Just because I'm running a wire, you know, weaving through an area doesn't make that whole area served, and we've got to make sure that's accurate on a map.

Senator THUNE. Well, we've been making that point with the FCC for a long time, that this we've got to have better mapping and better capability of figuring out where areas that are served, unserved, underserved in order to make sure that the resources that are allocated to serving the underserved actually head in the right direction. So mapping is critical to that.

We've been joined by Senator Udall. So I'll recognize him.

**STATEMENT OF HON. TOM UDALL,
U.S. SENATOR FROM NEW MEXICO**

Senator UDALL. Thank you, Chairman Thune and Ranking Member Schatz. Thank you for this hearing.

Everyone here knows how critical, and I'm sure you've been talking about it here for hours, broadband connectivity is for the vitality of rural communities. It's rare that I'm home that I don't hear about the need for rural broadband and better wireless connectivity, regardless of where I am in New Mexico.

Too often, I hear from communities and members of tribal nations that they are being left behind and while I recognize there are some companies that are working hard to serve their communities with broadband, there are others that shrug their shoulders and say it's too hard or too expensive or walk away.

This problem impacts communities in every single one of our states and I look forward to continuing working with each of you how to best close the digital divide.

One part of the divide, one that some people call the cruelest, is the homework gap, having broadband connectivity is no longer a luxury for our students, and it most certainly impacts the economies of our rural communities when we lack basic connectivity for our children.

I've told this story before but I think it's worth retelling. In 2016, when Commissioner Rosenworcel was in New Mexico, we visited Hatch, New Mexico, a rural community in South Central New Mexico. There, we met a young man who was on the high school football team. He didn't have Internet at home, so he regularly stayed late in the school parking lot after coming home from football games to do his homework. That's just not right, not to mention risky.

Now imagine if he could have done that same homework when he was going to and from the football game on the bus. That young student athlete and the millions across the Nation need this advantage.

To help close the homework gaps, Senator Gardner and I have introduced a bill to expand the E-Rate Fund for Wi-Fi Service on School Buses.

The question for every member of the panel, as I've stated, is this bill this morning would allow schools to receive E-Rate funds for Wi-Fi connectivity for school buses. In your opinion, will this bill

help close the homework gap our students are facing? If any of you disagree, please offer your suggestion on how to close the digital divide for our students, and I think we can agree that no amount of deregulation can fully meet that need.

Why don't we start with Ms. Matthey? Let me start with you.

Ms. MATTEY. Sure. Well, I think enacting that kind of a measure is common sense, and I think it is something that the FCC should seriously consider and do.

Senator UDALL. Thank you.

Dr. JAMISON. My response would be I don't know why that restriction was ever there in the first place. If the goal is to have broadband access for schools and students, why would we put boundaries on that to stop good ways of doing it, I don't know. So I've not read the legislation, but the concept sounds sound to me.

Senator UDALL. Great. Thank you. Please, Mr. Forde.

Mr. FORDE. We have been recipients of the E-Rate funding and we would certainly support that. It would be great if we had the right spectrum, 2.5 gigahertz, as an educational spectrum. If that was freed up, that would be more useful to reach some of those areas.

And then I also added some of our Connect America funds. We will be serving some tribal regions and tribal areas in Senator Thune's home state of South Dakota, in the Sisseton-Wahpeton area, to serve some of those areas with fixed wireless service using Connect America funds, as well.

Senator UDALL. Great. Mr. Law.

Mr. LAW. Thank you, Senator.

In terms of E-Rate and the homework gap, obviously there are three primary things that you've identified. First, they need connectivity in the school. Secondly, they would need connectivity at home where providers, such as us, play a role, as well as at the school, and then the third is that gap in between, and you've identified one of those items. So I don't see a reason why that would not be supportable.

Senator UDALL. Great. Thank you, Mr. Chairman. Yield back.

Senator THUNE. Thank you, Senator Udall.

Senator Schatz, anything else for the good of the order? OK.

Well, listen, we want to thank all of you. We really do appreciate the perspective that you added to this discussion. We all talk about bridging the digital divide in our country and a lot of headway has been made, thanks to companies like Golden West and Midco and others, but there is a lot more that we can do, and we want to make sure that the resources that are allocated to that end are used in the most efficient and effective way possible, preferably without duplication.

But this is a goal of this committee, has been, I think, for a long time, and that is to extend these types of technologies and services to people all across our country and that they all might enjoy and share in the benefits of the things that even those in more populated areas get to take advantage of on a regular basis.

So you all are on the front lines of doing that and we thank you for that.

So appreciate your testimony today and your responses to our questions and we will keep the hearing record open for a couple of

weeks and Senators will be asked to submit any questions for the record and upon receipt, we ask our panelists to submit their written answers to the Committee as soon as possible.

I also want to ask for a statement submitted by Senator Blunt to be made a part of the hearing record. We'll do that without objection.

[The prepared statement of Senator Blunt follows:]

PREPARED STATEMENT OF HON. ROY BLUNT,
U.S. SENATOR FROM MISSOURI

For Chairman Thune:

Thank you for convening this hearing to discuss the important issue of rural investment in modern broadband networks. This issue is one of particular importance to Missouri. Around half of rural Missourians don't have access to high-speed broadband internet, making it harder for them to compete and succeed. Ensuring rural Missourians have access to broadband will improve quality of life and enhance economic opportunities, whether it's a farmer utilizing precision agriculture, a doctor treating patients through telemedicine, or a student studying for final exams.

During my time in the Senate, I have worked to expand rural access to Federal resources for modern broadband deployment, and I think it is very appropriate for this Committee to evaluate how those resources can not only be expanded upon, but also made more efficient in accomplishing the goal of extending broadband service to unserved areas of the country. This includes resources allocated from the Universal Service Fund.

The Universal Service Fund recently awarded approximately \$254 Million over 10 years to serve unserved areas of Missouri with modern broadband service through the Connect America Fund Phase II Auction. This sum was awarded to a wide range of providers like traditional wireline operators, wireless Internet service providers, and rural electric cooperatives which are connecting many communities with broadband for the first time. One of my goals this year is to work with the FCC to ensure that these providers are capable of building out the appropriate infrastructure in accordance with the Federal Communications Commission's requirements. In addition, I want to ensure that this funding remains in Missouri. The unserved communities that this funding will serve cannot afford to wait for the economic benefits that modern broadband connectivity provides. Likewise, this award is a promise from the FCC to my rural constituents, and it is a promise that I would like to see fulfilled.

I also agree with the Chairman and this Committee that the Universal Service Fund needs to ensure a long-term, predictable stream of funding to providers that are building out home-by-home in high-cost areas. And, in order to better target this funding, we need more accurate and trustworthy maps that depict broadband availability.

I am grateful that the witnesses in attendance today are willing to share their expertise with me and this Committee, and I look forward to working with the members on this Committee to help better serve our unserved constituents.

Senator THUNE. So thank you all very much.

This hearing is adjourned.

[Whereupon, at 4:04 p.m., the hearing was adjourned.]

A P P E N D I X

PREPARED STATEMENT OF HON. SHELLEY MOORE CAPITO,
U.S. SENATOR FROM WEST VIRGINIA

Thank you Chairman Thune and Ranking Member Schatz for holding this hearing. This is an issue I am very passionate about and I look forward to today's discussion.

The benefits of broadband access are numerous, but too many parts of rural America can't attract the investment they need to get online and its hurting our economic potential.

Despite significant Federal and private funding, West Virginia is less connected than nearly every other state in America. We've been hamstrung by a lack of competition between service providers and overly burdensome regulations on our rural service providers.

If there is one thing that is for sure on this Committee—in terms of broadband access—it is that we ALL agree that we need more accurate, more granular to assess who has access and who does not.

Congress has taken significant steps towards fixing this problem, but we have a long way to go. Last year in the Consolidated Appropriations Act, we directed the National Telecommunications and Information Administration (NTIA) to update the National Broadband Map by leveraging previously developed state partnerships. Last month (February), NTIA announced the initial eight state partners—my home state of West Virginia included—that have active state broadband programs that could contribute data in order to improve our understanding of broadband availability.

I look forward to today's hearing on how Congress can help close the digital divide and benefit the rural economy.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JACKY ROSEN TO
DENNY LAW

Question 1. All across Nevada, I hear from business owners, medical professionals, educators, farmers, and tribes about the importance of high-speed broadband. Telemedicine and distance learning, which both require broadband access, are especially vital to residents of rural and remote areas, so people don't have to travel 100 miles for healthcare or for educational opportunities. That's why last year I led a bipartisan letter to House appropriators with Congressman Sean Duffy expressing strong support for the USDA Distance Learning and Telemedicine grant program, which helps rural communities invest in telecom equipment and technologies to assist its residents in accessing educational and health care services. This past fall, Valley Health System received one of these grants to improve telemedicine for patients in Nevada, including communities in Clark, Elko, Lincoln, Nye, and White Pine counties. One of the reasons this grant program is so successful is that it allows schools and hospitals to make investments in infrastructure to overcome barriers these communities face, including long travel distances and a shortage of providers.

- Given the important of broadband to rural healthcare, and education, how can we ensure that the telecommunications industry's focus on the transition to 5G doesn't leave behind rural communities who do not yet even have broadband access?

Answer. The buildout of 5G and access to high-speed broadband in rural America are, in many ways, two separate topics. Generally speaking, fixed and mobile broadband should be seen as complements, rather than substitutes. While mobile broadband offers many great benefits for users, limitations in spectrum capability and coverage reach make it such that more robust, high-quality fixed broadband connections remain essential for rural and urban consumers alike to access online services and transact business. Moreover, to handle the kinds of data demands increasingly seen from broadband users, even the most advanced wireless network

will rely heavily upon wired connections to handle network loads and avoid congestion.

More specifically with respect to 5G-enabled services, despite what some claim 5G can promise in rural America, the reality is that the new mobile technology as defined today is not capable of deploying long-range wireless 5G across large swaths of rural land. It is also unrealistic to assume that wireless operators will deploy anytime soon the multitude of small cells every several hundred feet across rural America as needed to deliver on the full promise of 5G in a manner analogous to urban areas—and even if and when such small cells are deployed in rural areas, they will need robust wired backhaul to ensure yet again that data demands will not outpace available spectrum and to avoid congestion.

Therefore, while 5G offers great promise, policymakers should not look at 5G as a salvation for rural broadband challenges. Even the most advanced wireless 5G-enabled network will rely upon a foundation of substantial wireline infrastructure, and consumers will continue to need access to *both* fixed *and* mobile services to conduct business or otherwise make the most effective use of Internet access. It is therefore important that policymakers not confuse or conflate 5G policy and the separate need to tackle rural broadband challenges.

- What are other barriers for rural broadband deployment and how can Congress address these?

Answer. The biggest barriers to rural broadband deployment are distance and density—which in turn make it difficult, if not impossible, to make the business case for investment in rural networks. Programs such as the Federal high-cost universal service fund are critical to overcome these barriers, to help make the business case for deployment, and just as importantly, to help keep services affordable so that rural consumers can adopt broadband and make effective use of it. These programs are key to the sustainability of investments made for decades, and the most important thing that Congress can do to advance rural broadband is help ensure that universal service mechanisms are sufficient and predictable as intended by law.

But even as the business case for rural broadband is perhaps the greatest challenge, as mentioned in my written testimony, expensive permitting costs also plague rural broadband providers. From dealing with multiple agencies while trying to gain access to Federal lands to railroad right-of-way permits that can cost in excess of \$10,000 per railroad crossing, implementing sensible rules of the road that allow carriers like Golden West to work through a reasonable permitting process are paramount to swift broadband deployment in new areas.

Question 2. In the FCC's 2018 Broadband Deployment Report, the agency found that over 35 percent of people living on tribal lands lack access to high-speed fixed broadband. That is compared to 90 percent of Americans overall who have access to high-speed broadband. In Nevada, home to nearly two-dozen tribes, our state's Office of Science Innovation and Technology is working with several tribes to get fiber assets when and where possible, or at least a very good wireless solution.

- Mr. Forde and Mr. Law—what are your two companies and others doing in your rural communities to include tribes in broadband deployment and help develop programs that address their unique needs?

Answer. Golden West Telecommunications Cooperative serves portions of five tribal reservations in South Dakota. Golden West serves the majority of the landmass of the Pine Ridge Reservation, Rosebud Sioux Reservation and the Lower Brule Reservation, as well as smaller portions of the Cheyenne River Reservation and the Yankton Sioux Reservation.

Golden West is committed to providing access to advanced telecommunications services, including broadband, throughout tribal and non-tribal lands in our service area.

As an example of Golden West's commitment to serving tribal lands, our largest fiber project in 2018 brought fiber optic service to every home, business and government location in Pine Ridge village, the largest community on the Pine Ridge Reservation and the location of the tribal headquarters. Golden West has also installed fiber optics to a large portion of the rural area within the Pine Ridge Reservation, including the rural areas surrounding Oglala and Slim Buttes. Golden West's 2019 plans include upgrading portions of the Interior exchange within the Pine Ridge Reservation to fiber optic service and Golden West's 2020 plans include additional fiber optic upgrades on the Pine Ridge Reservation as well as the Lower Brule Reservation.

On the Cheyenne River Reservation, Golden West upgraded the entire portion of its service area to fiber optics in 2010.

Golden West has also deployed fiber optic service to every K–12 school and higher education facility located within our service area in any tribal lands.

Telecommunications companies face many challenges when seeking to deploy or upgrade telecommunications services in rural areas and specifically on tribal lands. The challenges may include:

- Rugged terrain that is sparsely populated resulting in higher construction costs
- Lack of major business customers to offset the high cost of upgrades/construction
- Economic conditions that make affordability for consumers difficult
- Excessively lengthy and expensive processes to acquire rights-of-way for facility placement
- Additional cost to comply with THPO (Tribal Historic Preservation) and TERO (Tribal Employment Rights) obligations on tribal lands
- Assertion of tribal law, which may be in conflict with federal/state telecommunications law
- Additional discretionary fees charged per-foot, per-rod or per-mile-of-fiber installed that are imposed by tribal authorities solely on telecommunications providers attempting to install or upgrade broadband service.

Question 3. E-rate program: The Schools and Libraries Universal Service Fund, commonly referred to as “E-rate,” is the Nation’s largest education technology funding program. Over the past 10 years, the E-rate program has provided over \$3.4 billion to K–12 schools and public libraries in Nevada alone—funding that has supported the purchase of telecommunications and Internet services. E-rate and Universal Service Fund programs in general are great examples of how public-private partnerships in the broadband space can be very successful.

- In Nevada, our former Governor spearheaded the acquisition of state-matching funds for special construction projects. Mr. Law, in your testimony you describe the importance of matching funds and public-private partnerships. Can you elaborate on this?

Answer. Oftentimes, the most successful stories of rural broadband deployment are ones where all relevant stakeholders have “skin in the game.” Situations where federal, state, and local stakeholders and providers are all working collaboratively to deploy new broadband infrastructure to a school, hospital, or rural community have shown demonstrated success. Regardless of the source of public funds (federal or state), with rare exception, we believe that the best, most successful projects are those where a private operator brings its own resources and expertise to the table and then is able to leverage those government resources to build and maintain a network for years to come. This mix of public and private capital helps to advance broadband deployment projects that might otherwise not proceed, while also making sure that all involved have a stake and interest in the long-term success of the projects.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JACKY ROSEN TO
JUSTIN FORDE

Question 1. All across Nevada, I hear from business owners, medical professionals, educators, farmers, and tribes about the importance of high-speed broadband. Telemedicine and distance learning, which both require broadband access, are especially vital to residents of rural and remote areas, so people don’t have to travel 100 miles for healthcare or for educational opportunities. That’s why last year I led a bipartisan letter to House appropriators with Congressman Sean Duffy expressing strong support for the USDA Distance Learning and Telemedicine grant program, which helps rural communities invest in telecom equipment and technologies to assist its residents in accessing educational and health care services. This past fall, Valley Health System received one of these grants to improve telemedicine for patients in Nevada, including communities in Clark, Elko, Lincoln, Nye, and White Pine counties. One of the reasons this grant program is so successful is that it allows schools and hospitals to make investments in infrastructure to overcome barriers these communities face, including long travel distances and a shortage of providers.

- Given the importance of broadband to rural healthcare, and education, how can we ensure that the telecommunications industry’s focus on the transition to 5G doesn’t leave behind rural communities who do not yet even have broadband access?

Answer. As your question acknowledges, the transition to 5G, especially with the current focus on mobile, small-cell technology, threatens to leave rural America even further behind. Current 5G technology measures the distance from the small cell

to the customer *in feet*. Rural solutions, however, must be measured *in miles*. Remote rural areas lack the heavy infrastructure and the capital needed to support a 5G small cell deployment. At a time when too many areas such as those in rural Nevada or rural South Dakota or North Dakota in our footprint are “0G” areas lacking *any* access to broadband, policies, regulations, and legislation must promote entry not just by 5G but by other technologies that present solutions to close the rural digital divide.

For example, legislation, rules, and regulations for opening and repurposing spectrum should be technology neutral. Fixed wireless operations can solve the digital divide but need spectrum to do so. Precious and finite spectrum should not be allocated to 5G or mobile users only and must also include fixed wireless operators. Similarly, legislation, rules, and regulations aimed at speeding up small cell or 5G deployments or reducing permitting costs should include other technologies, such as fixed wireless.

- What are other barriers for rural broadband deployment and how can Congress address these?

Answer. Another barrier is inaccurate data about rural broadband coverage. Without accurate data on which areas do or do not have access to broadband service, it is difficult to ensure that Federal subsidies for rural broadband deployment, such as the FCC’s *Connect America Fund* or the USDA *ReConnect* program, are targeted to the areas of greatest need. Congress can continue to support rural broadband deployment by revising and refining broadband maps to reflect which areas actually have service.

Specifically, the FCC currently considers an area served if one household in a census block is served. In western and largely rural states like Nevada or my home state of North Dakota, census blocks are significantly larger than in more densely populated urban areas and reporting on census blocks overstates coverage. NCTA—the Internet and Television Association has proposed, and Midco supports as a first step in reforming coverage maps, a requirement that broadband providers submit “shapefiles” of their respective service areas. A “shapefile” is a digital representation, overlaid on a map, that better reflects the actual contours of a provider’s Internet service area than census blocks. The FCC could compile shapefile data from all providers into a national map that would be more granular—and more accurate—than the current census block approach. These improved maps could be rolled out nationwide by the end of 2020 as an initial step in reforming broadband mapping.

Finally, once government agencies determine areas of greatest need, it is important that funding programs are open to all companies that can demonstrate an ability to provide service, regardless of their underlying technology. As we saw in the FCC’s CAF Phase II reverse auction, by instilling technology-neutral competition into the program, the Commission was able to stretch limited dollars further and ensure more locations were served.

Question 2. In the FCC’s 2018 Broadband Deployment Report, the agency found that over 35 percent of people living on tribal lands lack access to high-speed fixed broadband. That is compared to 90 percent of Americans overall who have access to high-speed broadband. In Nevada, home to nearly two-dozen tribes, our state’s Office of Science Innovation and Technology is working with several tribes to get fiber assets when and where possible, or at least a very good wireless solution.

- Mr. Forde and Mr. Law—what are your two companies and others doing in your rural communities to include tribes in broadband deployment and help develop programs that address their unique needs?

Answer. As part of our Connect America Fund Phase II buildout, we will provide high-speed, low latency fixed wireless services within the Lake Traverse Tribal Area in South Dakota. In doing so, we will work with the local Tribal regulatory authorities in offering services on Tribal lands. Otherwise, Midco is not aware of other companies’ practices with respect to Tribal lands.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JACKY ROSEN TO
MARK JAMISON

All across Nevada, I hear from business owners, medical professionals, educators, farmers, and tribes about the importance of high-speed broadband. Telemedicine and distance learning, which both require broadband access, are especially vital to residents of rural and remote areas, so people don’t have to travel 100 miles for healthcare or for educational opportunities. That’s why last year I led a bipartisan letter to House appropriators with Congressman Sean Duffy expressing strong support for the USDA Distance Learning and Telemedicine grant program, which helps

rural communities invest in telecom equipment and technologies to assist its residents in accessing educational and health care services. This past fall, Valley Health System received one of these grants to improve telemedicine for patients in Nevada, including communities in Clark, Elko, Lincoln, Nye, and White Pine counties. One of the reasons this grant program is so successful is that it allows schools and hospitals to make investments in infrastructure to overcome barriers these communities face, including long travel distances and a shortage of providers.

Question. Given the important of broadband to rural healthcare, and education, how can we ensure that the telecommunications industry's focus on the transition to 5G doesn't leave behind rural communities who do not yet even have broadband access?

Answer. You are right that people in rural areas value broadband for many reasons, including its ability to improve health care and education. In my opinion the most important thing you and your colleagues can do is reduce waste in the current broadband subsidy systems as this would liberate resources for further development. As you know, billions of dollars have been delivered to companies to provide broadband in rural areas. Unfortunately, the measurable impacts have been negligible. I have not seen an estimate of the total amount of waste, but the Federal Communications Commission (FCC) experienced at least a 70 percent savings in its recent auction. That was \$1.2 billion in savings for the specific program that was subject to the auction. If that same savings had been achieved in the entire high-cost subsidy program, which cost \$42 billion from 2012 through 2016, there would have been an additional \$29.4 billion available for expanding broadband. Just think of the greater service expansion that could be made with the money made available by improved efficiency.

There are two important things that should be done to reduce waste. One is to expand the use of reverse auctions. The FCC has used it for one aspect of its subsidy program. It should be supported in extending the use of auctions in other parts as well.

The second thing to do to reduce waste is to consolidate Federal subsidy programs so there are no conflicting or duplicative efforts. As we discussed in the hearing, there are many instances of duplication of subsidies and of subsidies being given to build infrastructure where service already existed. Consolidation should eliminate such possibilities. If consolidation is not feasible at this time, I would suggest considering a one-subsidy policy as I outlined in a blog following my Senate testimony.¹ In a nutshell, the one-subsidy policy would direct the FCC to ensure that its subsidy program (which is the most comprehensive in my estimation) adjusts to remove duplicative subsidies elsewhere. That is to say, if the FCC found that a state or Federal subsidy program other than its own provides a subsidy that in any way duplicates an FCC subsidy, then the FCC would deduct the duplicative subsidy amount from its commitment to the recipient broadband providers. This would reduce duplication, further saving subsidy dollars that could be redeployed to speed broadband adoption where it does not exist.

With respect to 5G, I would encourage you and your colleagues to focus on broadband in general and not specifically on 5G. 5G will play an important role in advanced telecommunications infrastructure for the foreseeable future. But it is unlikely to be the best broadband solution in all situations. For example, some industry analysts are finding evidence that other technologies outperform 5G in some areas with low population density.² These conclusions may prove incorrect, but they serve as a reminder that public policy should remain technology neutral wherever practical.

Regarding health care and education, I would encourage you and your colleagues to consider whether broadband-specific subsidies are the best solution for improved services. In my experience solution-specific subsidies are often less efficient than subsidies that allow greater local discretion. I recall when I lived in Iowa in the early 1990s that the state government built a broadband network for local governments and for education. I do not recall the amount of money spent, but several cases arose where schools could have improved education more if they had been allowed to spend the monies on other learning resources. So while the technology was useful, it was not the best use of taxpayer money.

¹Mark A. Jamison, "The FCC Is Fixing a Rural Broadband Embarrassment, but Work Remains," AEIdeas, March 18, 2019, <https://www.aei.org/publication/the-fcc-is-fixing-a-rural-broadband-embarrassment-but-work-remains/>.

²See, for example, John Hruska, "Report: Verizon's Fixed 5G Broadband Service Economically Flawed, Unsustainable," ExtremeTech, March 25, 2019, <https://www.extremetech.com/mobile/288254-report-verizons-fixed-5g-broadband-service-economically-flawed-unsustainable>.

Question. What are other barriers for rural broadband deployment and how can Congress address these?

Answer. Two key barriers are permitting and access to Federal lands and buildings. These issues are being addressed in concert by the White House and several Federal agencies, including the Department of Commerce, the Department of Interior, and the FCC. To my knowledge, no action by Congress is needed, but the working group members could provide better insights than can I.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JACKY ROSEN TO
CAROL MATTEY

Question 1. All across Nevada, I hear from business owners, medical professionals, educators, farmers, and tribes about the importance of high-speed broadband. Telemedicine and distance learning, which both require broadband access, are especially vital to residents of rural and remote areas, so people don't have to travel 100 miles for healthcare or for educational opportunities. That's why last year I led a bipartisan letter to House appropriators with Congressman Sean Duffy expressing strong support for the USDA Distance Learning and Telemedicine grant program, which helps rural communities invest in telecom equipment and technologies to assist its residents in accessing educational and health care services. This past fall, Valley Health System received one of these grants to improve telemedicine for patients in Nevada, including communities in Clark, Elko, Lincoln, Nye, and White Pine counties. One of the reasons this grant program is so successful is that it allows schools and hospitals to make investments in infrastructure to overcome barriers these communities face, including long travel distances and a shortage of providers.

- Given the importance of broadband to rural healthcare, and education, how can we ensure that the telecommunications industry's focus on the transition to 5G doesn't leave behind rural communities who do not yet even have broadband access?

Answer. Private sector firms that are focused on 5G are not likely to invest in low-return rural areas if they have opportunities to earn higher returns in suburban and urban areas. Additional funding is critical to bring universal access to broadband in rural areas. The reason why certain areas aren't served today is that they are low density: the costs to deploy broadband are too high compared to the anticipated revenues from the relatively few customers in the area. The availability of funding for specialized networks that only serve educational or health care institutions can have the perverse effect of making the business case more challenging for other providers that intend to serve residential and business customers alike. Today, the FCC's Connect America Fund, E-rate and Rural Health Care programs are administered independently of one another, in separate silos, with little effort to fund broadband network expansions on a more holistic basis to all users in the community. This is an area deserving of greater attention. Congress could make clear that there are no statutory impediments to measures that would create incentives for more coordinated efforts across these three programs to deploy broadband networks in rural America.

- What are other barriers for rural broadband deployment and how can Congress address these?

Answer. Aside from funding to improve the business case for broadband in rural areas, it's necessary to have a willing service provider. Some states have laws that prohibit certain entities from becoming broadband providers. Federal tax laws may create disincentives for existing service providers to sell rural exchanges to companies that have a deeper local commitment and willingness to build broadband in rural areas. These are just a few of the barriers to rural deployment that Congress might wish to examine further.