

Statement by

**Denny Law
Chief Executive Officer
Golden West Telecommunications Cooperative, Inc.
Wall, SD**

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Hearing on

Building Resilient Networks

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Chairman Luján, Ranking Member Thune, and members of the Subcommittee, thank you for the opportunity to participate in today's hearing focused on building resilient networks.

I am Denny Law, Chief Executive Officer of Golden West Telecommunications Cooperative, Inc. in Wall, South Dakota. For over a century, Golden West and its subsidiaries have provided communications services to rural South Dakota, starting in 1916 with the stringing of a telephone line along fence posts. Today, Golden West has more than 30,000 accounts, including 29,000 broadband subscribers and nearly 9,000 cable television customers. Our customers are located across 24,500 square miles—an area approximately the size of Maryland, New Jersey, Connecticut, and Delaware combined—which equates to fewer than 2 customers per square mile. In addition to robust service for consumers and businesses within our territory, we serve numerous anchor institutions, including 73 K-12 schools, 62 health clinics and hospitals, 20 libraries, five Veterans Administration facilities, and five Public Safety Answering Points (PSAPs).

Golden West is a member of NTCA—The Rural Broadband Association (NTCA), which represents approximately 850 rural, community-based carriers like Golden West that offer advanced communications services throughout the most sparsely populated areas of the nation. All NTCA members are fixed voice and broadband providers, and many members also provide mobile, video, and other communications-related services in their communities. Operators like those in NTCA's membership serve less than five percent of the population of the United States but cover about one third of its landmass. We operate in rural areas left behind decades ago when networks were first being built out by other service providers because the markets were too sparsely populated, too high cost, or just too difficult to serve in terms of terrain. In the vast majority of these rural areas, companies like Golden West are the only full-service fixed communications networks available.

Despite the challenges of distance and density, Golden West and its fellow small broadband providers have led the charge in deploying advanced communications infrastructure that responds to consumer and business demands and connects rural America with the rest of the world. In rural America, broadband infrastructure enables economic development and job creation not only in agriculture, but for any other industry or enterprise that requires advanced connections to operate in today's economy. Yet those networks need to keep pace with consumer demand and provide reliable connections that deliver consistent performance for users when they depend on those services the most. Throughout the pandemic, as Americans worked and learned from home, consumers drove up network bandwidth usage and demand. Golden West and other small rural operators were able to meet those demands thanks to years of network investments and upgrades in robust and reliable networks.

Yet, for all our progress to date, we still have more work to do in deploying and operating this critical infrastructure, as too many rural consumers still lack sufficient connectivity altogether. And, even where networks exist, operators face the challenges of: (1) sustaining and upgrading them to keep pace with consumer demand; (2) delivering affordable services that can be relied upon both for everyday functions that have become increasingly important during the pandemic; (3) ensuring users have access to them in the face of emergencies that may range from extreme

heat or cold to wildfires, earthquakes, or other natural disasters; and (4) taking reasonable steps to manage risk and promote the security of networks from intrusions of all kinds.

In short, network deployment is an essential goal and a condition precedent to achieving national connectivity objectives, which includes making sure that these networks are there for consumers in their times of greatest need. But the job is not done when the network is built, as community-based providers like Golden West and other smaller rural broadband providers know all too well. Living in the communities we serve, we can see firsthand how the decisions we make and the measures we implement affect our neighbors, friends, and family, and we therefore have substantial incentive to do what we can to make sure they have access to the best possible communications services. At the same time, however, the fact is that we operate in deeply rural markets where the costs of deploying and operating networks can be higher, and a tailored approach to managing risk, resiliency, and redundancy is necessary to create sustainable networks that provide services customers can afford. In this testimony I will provide examples of the kinds of measures we take – starting with network architecture and deployment and continuing through ongoing operations – to promote the availability of robust and reliable communications services for our users.

Network Resiliency Starts with Smart Network Investment

As an initial matter, networks must address the rising demand of consumers' bandwidth needs and be easily scalable to meet that demand. The COVID-19 pandemic has underscored the essential nature of high-speed download and upload connectivity for every American, whether at work or at home. For years, small rural community-based providers like Golden West have seen that high-speed broadband facilitates so much more than just downstream applications like streaming video entertainment, and the value of these other uses (and a network capable of supporting them) have been recognized and realized more widely now during the pandemic. Indeed, many Americans now realize the importance of robust broadband in connecting with a doctor without traveling to the medical office or hospital and for students to continue their education even when the classroom is hundreds of miles away or just right down the street but closed. A high-capacity network capable of handling significant upload speeds is also critical for people to continue receiving paychecks by working remotely using secure and bandwidth-intensive virtual private networks. Additionally higher upload speeds enable better two-way capability and network performance that not only allows us to video conference during the work day, but to maintain social interactions with friends, family, and other loved ones.

A robust network is also important of course to accommodate the needs of public safety – and the public served by first responders and other professionals in the case of emergencies. Deployment of cheaper technologies often sounds attractive in rural markets, but it comes at a different kind of cost. Connectivity that is spotty when it rains, unreliable when it snows, suffers from degradation or complete shutdown in higher or lower temperatures, encounters line-of-sight issues when foliage grows back on trees, or has network components exposed to the elements may be less expensive to install initially, but these technologies often come with higher operating costs over time, are often unable to keep pace with ever-escalating consumer demand, and lack the kind of reliability that one wants for the conduct of everyday life such as telework, remote learning, or telemedicine, and especially in the case of an emergency. In short, no one wants to

be in the position of being unable to access 911 in the event of a hurricane because the underlying network does not perform reliably in the rain.

Golden West and other small rural broadband providers have used a variety of methods over the years to deploy service and, as a result, have gained first-hand experience with the differing capabilities and shortcomings of certain technologies. As we look to future needs of our customers and our communities, we have taken aggressive steps to focus on anticipated increases in usage and make network choices that will give our communities that they can rely upon for essential functions such as working or learning from home – and to reach public safety or others in the event of emergencies. Put plainly, we are investing in more and more fiber technology to meet that demand. Golden West has invested in physically-diverse fiber routes connecting to each Golden West network office, coupled with redundant electronics with multiple connections to the network to prevent large numbers of customers from being isolated from Golden West’s local network.

In addition to continuing to deploy “last mile” fiber as fast as we can where we can, we have taken measures to establish robust and reliable connections to statewide fiber networks that provide “middle mile transport” between our local communities and the rest of the world, and by adding redundant connections to separate internet points-of-presence where possible. SDN Communications, an entity owned by Golden West and a number of other small community-based providers in South Dakota, was created 30 years ago to help connect rural markets to better long distance telephone service and today it has a 50,000-mile fiber network that enables more robust broadband data connectivity between rural South Dakota and the rest of the world. In partnership with SDN, Golden West maintains multiple connections to the Internet backbone to ensure Golden West customers do not get isolated from the world in the event of a fiber cut or single network disruption.

Efforts to deploy more robust and resilient networks, however, come at a cost. Whether we are talking about wired or wireless networks, building redundancy and greater resiliency into networks – especially in rural areas where distances are great and densities are low – can be a challenge. For example, redundancy in a wireless network translates to placement of more antennas or towers and more backhaul capacity such as fiber. Similarly, burying fiber provides relatively greater resiliency and security for both wired connections themselves and for the wireless services that depend upon that fiber foundation. Indeed, one must not overlook how critical a fiber foundation is to *every* kind of communications technology – wired or wireless. Fiber not only offers the most efficient and economical means of meeting consumer demand well into the future,¹ but it also is essential to our nation’s 5G future. As the Wireless Infrastructure Association aptly captured in a report last year, “The buzz around 5G focuses on the wireless

¹ See BROADBAND TODAY: Rural America’s Critical Connection, Foundation for Rural Service (Mar. 8, 2021) (“BROADBAND TODAY”), available at: <https://www.ntca.org/sites/default/files/documents/2021-02/Rural%20America%27s%20Critical%20Connection%20--%20FRS%20White%20Paper.pdf>.

aspect of the technology. However, the connectivity it advances is only made possible by extremely dense fiber networks.’²

But burying wires to fulfill the needs of users for better and more reliable wired and wireless connections alike can often be more costly than if one were to string aerial fiber on poles – and in certain parts of the country, it is difficult to impossible at this point to bury fiber for a variety of logistical, environmental, and economic reasons. Similarly, procuring redundant connections to distant peering points hundreds if not thousands of miles away for Internet connectivity is expensive, and it is a cost that is not entirely under our control as many smaller providers must purchase such capacity from larger regional or national operators. In a number of rural states, smaller operators have taken steps to mitigate such costs by banding together to form statewide fiber networks; as noted above, and Golden West is proud to be a member of SDN Communications one of the earliest such statewide collaborative ventures that today provides robust connections to multiple Tier 1 Internet backbone providers. Nonetheless, even as we have taken these great strides to become more efficient while putting into place such redundancy and promoting the reliability of our connections to the rest of the world, we still are forced to rely upon – and pay – the Tier 1 operators.

Local providers like Golden West are well-positioned to assess the balance needed in investment strategies and have sound incentives to do all they reasonably can to ensure the communities they serve have services they can depend upon. Our commitment can be seen in the efforts we have made to deploy the best possible networks. Indeed, as NTCA’s annual broadband survey confirms year after year, small community-based providers like Golden West have consistently led the charge in rural broadband deployment, with the most recent report indicating that nearly two-thirds of NTCA members’ rural customers have access to fiber-to-the-premises connectivity and speeds in excess of 100 Mbps. Golden West is in the midst of a multi-year upgrade to replace our decades-old copper network with fiber optics. With more than 14,000 network route miles within South Dakota, at the end of 2021 we will have successfully completed 70% of the copper network replacement with fiber optic service. This is the kind of connectivity that provides a reliable foundation for users when emergencies strike and a platform for community development and sustainability in rural areas that face many other challenges as well.

Nonetheless, because of the higher costs of operating in rural areas, there is a need for governmental support to make the business case work and ultimately to support the kinds of networks that will provide greater resiliency, reliability, redundancy, and capability for rural users. Smaller rural telecom providers like Golden West have long leveraged support from the High-Cost Universal Service Fund (USF) overseen by the Federal Communications Commission (FCC) and Rural Utilities Service (RUS) loans through the Department of Agriculture in concert to deploy advanced telecommunications services in the most rural areas of the United States. Many smaller providers have successfully leveraged a mix of funds from these programs and private investment to deploy robust broadband to millions of homes, businesses, farms, and anchor institutions including public safety entities. While RUS lending programs have helped to finance the substantial upfront costs of network deployment, the USF High-Cost Fund helps

² Fiber, An Essential Facet of the Connected Community, WIA Innovation & Technology Council (Jul. 22, 2020), p. 4, available at: <https://wia.org/wp-content/uploads/Fiber-v3-1.pdf>.

make the business case for construction and sustains ongoing operations at affordable rates. More specifically, USF by law aims to ensure “reasonably comparable” services are available at “reasonably comparable” rates.

Both the RUS loan programs and the FCC’s USF programs are therefore critical to the deployment of the best possible networks in rural areas that meet the objectives of this Subcommittee and other policymakers when it comes to network performance and reliability. It is worth noting, however, that these programs are limited in their resources. Indeed, at times over the past decade, we have seen caps and even cuts in support enacted to the FCC programs in particular that have undermined, rather than furthered, the goal of deploying more robust and reliable networks more deeply into rural areas. In fact, we even saw for a time some policies that encouraged providers *not* to invest in network deployment as rapidly or that penalized perceived “gold-plating” of networks that would be more robust and reliable – these caps and constraints certainly did not place value on the notion of redundant connections or help in spurring their deployment. In recent years, however, steps have been taken to enhance and address such concerns in these programs, but the fundamental point remains – rural broadband is not easy, it faces challenges of distance and density that make it higher cost than deploying and operating networks in an urban or suburban area, and without sufficient and predictable support, the goal of promoting resilient and redundant networks in rural American will be far more difficult to achieve.

Ongoing Efforts to Promote Resilient, Reliable, and More Secure Networks

Often, the primary focus in national broadband discussions is on the one-time act of building networks while insufficient attention is paid to what comes next. Once built, networks must be maintained, upgraded, and made useful over their entire lives, or those investment could be wasted or ultimately become incapable of meeting consumer demands whether in everyday life or in the context of an emergency. Services must be delivered over that infrastructure on an ongoing basis, at rates that are affordable enough for consumers to make good use of them and at consistent and reliable levels of performance. Maintenance must be performed, customer calls must be answered, “middle mile” capacity to reach distant internet points of presence must be procured, and upgrades must be made to facilities and electronics to enable services to keep pace with consumer demand and business needs. Constant concerns arise too in the form of bad weather, natural disasters, and third-party risks that make it important both to make sound choices in what kinds of networks to deploy in the first instance and then how those networks will be managed over time.

All of this bears witness to the fact that as policymakers consider how best to promote broadband access going forward, we need to consider not only current demand, but also reliability and future projections for performance. When being built – or being funded – networks must account for potential surges or shifts in utilization and how demands on networks continue to increase at astounding rates. The pandemic has certainly highlighted the need for such advance planning and forethought, with a recent report indicating that broadband providers saw a 40% increase in broadband usage between the end of 2019 and 2020 and estimating that around 30% of the modern workforce could be working from home multiple days a week by as soon as the end of

2021, creating a permanent demand for higher speeds and upload capacity.³ Similarly, OpenVault has found that upstream broadband that upstream broadband traffic increased by 63% from December 2019 to December 2020,⁴ underscoring the shifts in network utilization and the need for reliable networks that will deliver consistent performance for those working, learning, or seeking medical assistance from home. Golden West’s network usage during the pandemic experienced dramatic changes. In the span of just 90 days from January 2020 to April 2020, Golden West’s overall network usage increased by 25%, and the bandwidth usage for upstream alone increased by 41% in that time. Golden West’s network was able to withstand the sudden and unpredicted increase in usage and our customers were able to seamlessly transition to their remote work and education activities.

Fortunately, networks like those built by Golden West, SDN, and other providers based in rural America were architected to meet such demands brought on by shifting consumer and business usage. Indeed, as NTCA’s annual broadband survey confirms year after year, NTCA members have led the charge in rural broadband deployment, with the most recent report indicating that nearly two-thirds of their rural customers have access to fiber-to-the-premises connectivity and speeds in excess of 100 Mbps. Throughout the pandemic, NTCA members reported that their networks performed as designed, without congestion or disruption despite unprecedented increases in demand.

Continued growth in demand is expected to increase significantly in coming years, such that peak demand for a family of four is projected to exceed 400 Mbps symmetric in just seven years, with bandwidth needs accelerating in the years after that.⁵ These imminent increases are anticipated due to an array of new technologies that hold substantial promise for consumers and businesses alike, such as greatly improved virtual education, telemedicine, agriculture, business, security, and entertainment. Golden West submits that federally funded broadband programs should therefore focus on the consumer experience and the long-term implications for rural communities by requiring the deployment of networks that in a decade or more will still deliver reliable and resilient services that consumers can depend upon. More specifically, we believe that fiber represents the best choice of network technologies to promote reliability in meeting these demands and ensuring that users have reliable access to public safety and other essential services as well. We also support an increase in the minimum broadband deployment performance benchmark to at least a symmetrical speed of 100 Mbps/100 Mbps to ensure that federally supported networks will meet the future needs of consumers. Any funding programs going forward should generally aim to ensure that new deployments perform at least at this speed threshold.

The same reasoning with respect to “planning ahead” and not treating the job as done once the network is built in the first instance follows with respect to promoting network reliability,

³ BROADBAND TODAY, pp. 2, 15.

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Dan O’Shea, *Pandemic Drove Upstream Broadband Traffic Boom: OpenVault*, Fierce Telecom (April 1, 2021, 12:46 PM), <https://www.fiercetelecom.com/telecom/pandemic-drove-upstream-broadband-traffic-boom-openvault>.

⁵ See Comments of The Fiber Broadband Association, GN Docket No. 20-269 (fil. Sep. 18, 2020), pp. 9-10.

resiliency, and security. Achieving these objectives in more rural areas turns not just upon the kind of network built – although that is certainly an important factor for the reasons discussed above – but also on the efforts made to operate and upgrade that network over time. Golden West’s technology infrastructure is designed with resiliency in mind, including the construction of hardened buildings to withstand extreme weather conditions and large banks of redundant batteries in every network office that are also backed up by standby generators. For all of our customers that are served directly by fiber optics, Golden West installs UPS batteries at customer’s homes and businesses to ensure performance during limited power interruptions.

Golden West and smaller broadband providers also take seriously network security. On a daily basis, our networks can face the same security threats of intrusion and denial of service attacks as the larger, nationally known broadband providers. As one example of the measures we take to help mitigate these risks, Golden West has partnered with SDN Communications and its other members to collectively deploy Distributed Denial of Service (DDoS) protection across our respective networks. More broadly, smaller rural network owners again have sound incentives to take reasonable steps to secure their operations and manage risks given that any threats to their networks affect the communities in which they live and work – any incidents can affect their own homes and their friends, family, and neighbors. The hardest part for many smaller providers can simply be monitoring threats and taking reasonable steps to manage risk. To enable and empower such efforts, NTCA has worked with a number of members and collaborated with other stakeholders in a variety of ways to raise awareness of cybersecurity issues and to provide tools and actionable information to members regarding cyber risks. Such efforts include participation on the Executive Committee of the Communications Sector Coordinating Council and co-chairing of the Small and Medium-Size Business Working Group organized under the Information and Communications Technology Supply Chain Risk Management Task Force. NTCA also hosts an annual Cyber Summit for members and other small broadband providers that often includes presenters from key agencies such as the Cybersecurity and Infrastructure Security Agency. Finally, NTCA created CyberShare: The Small Broadband Provider Information Sharing and Analysis Center, a member of the National Council of Information Sharing and Analysis Centers, that among other things provides access to daily threat indicators curated for smaller operators’ needs along with weekly technical analysis and bi-monthly calls in which providers can share experiences and resources.

It is worth noting again, however, that these efforts do not come at a small cost in rural America. As noted earlier, Golden West’s serving area is 24,500 square miles – roughly equal in scale to Maryland, New Jersey, Connecticut, and Delaware combined. Dispatching technicians to address network resiliency or redundancy needs across such a wide swath of rural America is not easy, and recovering the costs of doing so from 30,000 customers stretched across this vast terrain would render services unaffordable. For this reason, I must emphasize again the significance of predictable and sufficient ongoing USF support for smaller operators – without such resources, efforts to promote greater resiliency, redundancy, and security in rural networks will run headfirst into the economic realities of operating in areas where there are at most a handful of customers per square mile.

Other Considerations

While high costs are perhaps the most imposing obstacle to deploying and maintaining reliable broadband in rural areas, other barriers can affect the ability to achieve resiliency, redundancy, and security objectives. Several of these are discussed below.

Permitting Delays

Infrastructure investment depends on prompt acquisition or receipt of permissions to build networks. Roadblocks, delays, and increased costs associated with permitting and approval processes are particularly problematic for Golden West and other NTCA members, each of which is a small business that operates only in rural areas where construction projects are undertaken over wide swaths of land. The time involved in obtaining construction permits can take substantial amounts of time, undermining the ability to plan for and deploy broadband infrastructure – especially in those areas of the country with shorter construction seasons due to winter temperatures that freeze the soil and prevent any excavation for burying fiber. Additionally, in some areas of the country, obtaining reasonable terms and conditions for attaching network facilities to poles that are owned and operated by other entities or for installing fiber near or under railroad crossings can result in long delays and costly fees charged to providers seeking to build out networks to rural communities lacking service. These can all affect both the timing for and economics of deploying resilient networks, and redundant facilities in particular.

Navigating complicated application and review processes within individual federal land-managing and property-managing agencies can be burdensome for any network provider, but particularly the smaller network operators that serve the most rural portions of the country. The lack of coordination and standardization in application and approval processes across federal agencies further complicates the deployment of broadband infrastructure. Congress should look to implement the recommendations of the FCC’s Broadband Deployment Advisory Committee’s Streamlining Federal Siting Working Group final report issued in January 2018.⁶ NTCA participated in the development of these recommendations, which address streamlining of environmental and historical reviews and application review periods, among other pertinent recommendations in removing further regulatory barriers to broadband deployment. Such measures will be critical to the deployment and sustainability of wired and wireless networks alike, all of which rely in many rural areas upon robust fiber backbones that must often traverse federal lands.

Addressing Supply Chain Concerns

In recent years, Congress has provided significant funding through several agencies to deploy broadband infrastructure with the goal of bridging the digital divide. However, as broadband providers construct these networks, it is important to monitor the status of the communications supply chain. Many have been rightly focused on supply chain *security* in recent years – but

⁶ Broadband Deployment Advisory Committee, Streamlining Federal Siting Working Group, Final Report, Federal Communications Commission, (Jan. 23-24, 2018), available at: <https://www.fcc.gov/sites/default/files/bdac-federalsiting-01232018.pdf>.

there is a looming concern about supply chain *resiliency* as well, and this has the potential to undermine national objectives to deploy the best possible networks to as many Americans as possible in the coming years.

Specifically, NTCA members are beginning to report significant backlogs for critical communications equipment like fiber, routers, antennas, network terminals, and customer premise equipment—ranging from several weeks to more than one year. As an example, Golden West is now finalizing our 2022 network and fiber optic buildout plans. As recently as last week, our fiber optic suppliers have indicated the delivery date for fiber-optics is 42 to 65 weeks out. Delays in production of necessary equipment appear to be related to both increased demand for broadband investment as well as ongoing effects of the pandemic. To ensure that existing and new infrastructure initiatives are as successful as possible in responding to consumer needs and demands, we believe it is important that the federal government work closely and directly with manufacturers, distributors, and other suppliers to avoid disruptions in the communications supply chain. For these reasons, while there has been a great deal of focus on the *security* of our supply chains, we strongly encourage Congress to consider supply chain *resiliency* as a key component of delivering on national broadband objectives.

Workforce Development

We also recommend Congress help in the development of a skilled telecommunications workforce that can help providers of all sizes deploy robust networks and help to keep them resilient and more secure. Earlier this year, NTCA and a number of other telecommunications associations sent a letter to the White House regarding how the United States currently faces a shortfall of skilled workers needed to ensure the deployment of robust fiber, mobile, and fixed wireless networks. A concerted effort by industry and government will likely be needed to develop a skilled workforce able to deploy next generation wired and wireless networks. To develop the telecommunications jobs needed, Congress could help by bolstering the capabilities of institutions of higher education and other institutions and providing support for employers to expand registered apprenticeships and associated technical instruction and certification costs. Several legislative proposals, including Senator Thune’s Telecommunications Skilled Workforce Act, which would establish an interagency working group to develop telecommunications industry workforce solutions, or Senators Wicker and Sinema’s Improving Minority Participation and Careers in Telecommunications Act to address this need by awarding grants to Historically Black Colleges and Universities and Tribal Colleges and Universities for workforce training, could go a long way in achieving this goal. We cannot build the networks of tomorrow without a skilled and diverse workforce today.

CONCLUSION

Community-based providers like Golden West are deeply committed to the customers we serve and, given our experience and success in serving the most rural areas, we are critical components of any strategy seeking to achieve the nation’s broadband goals. We look forward to working with policymakers and other stakeholders to ensure that all Americans have access to sustainable and affordable networks that successfully manage risk, resiliency, and redundancy, so that those services are available when needed the most.

Thank you for the opportunity to testify, and for the Subcommittee's commitment to broadband infrastructure investment in rural America.