Statement by

Michael Romano
Senior Vice President – Industry Affairs & Business Development
NTCA–The Rural Broadband Association
Arlington, VA

Before the

United States Senate Commerce
Subcommittee on Communications,
Technology, Innovation, and the
Internet

Rebuilding Infrastructure in America:
Investing in Next Generation Broadband
Washington, DC

March 13, 2018

INTRODUCTION

Chairman Wicker, Ranking Member Schatz, and members of the Subcommittee, thank you for this opportunity to testify today to discuss rural broadband infrastructure. My name is Michael Romano, and I am the Senior Vice President for Industry Affairs and Business Development at NTCA–The Rural Broadband Association.

NTCA applauds the increasing focus on rural broadband from Congress and the Administration. Our association and the approximately 850 small, hometown-based rural telecom providers in our membership stand ready to work with this Subcommittee and others in Congress on comprehensive, coordinated strategies that can help connect rural Americans with the world. NTCA welcomes the prospect of much-needed additional resources for rural broadband deployment, but, at the same time, it is critical policymakers closely examine not only what is needed, but also what federal initiatives are already working well and what lessons can be learned from past and current broadband deployment efforts. Any new initiatives must build upon – or at least take stock of – efforts already underway, and also draw upon lessons to be learned from earlier programs.

BACKGROUND

NTCA's cooperative and small company members live and work in rural America. They operate in the "original unserved" areas – those areas left over when telephone service was first deployed starting over a century ago. These are the most rural parts of the United States, spread across more than 35 percent of the U.S. landmass but containing less than five percent of the U.S. population. The average density is about seven customers per square mile.

In the face of such distance and density challenges, these committed hometown small businesses have nonetheless already made substantial efforts to deploy, upgrade, and sustain advanced networks that connect rural America to the rest of the world and to respond to demands for cutting-edge services. The rural telecom industry has always been resourceful and innovative – leading the way in converting to digital switched systems, deploying creative technological solutions to their hardest-to-reach customers, enabling distance learning and tele-health applications, and ultimately deploying scalable broadband networks.

For all this progress and commitment, however, the job is not done in either the areas our members serve or in the areas not fortunate enough to be served by a small hometown communications provider. In the areas served by NTCA members – again, many of the most rural parts of the country – 13 percent of consumers still cannot get 10 Mbps broadband, while 33 percent are unable to obtain 25 Mbps broadband that is considered a threshold level today.[1] And the story appears worse in areas that are not fortunate enough to be served by cooperatives and other small hometown-based telecom companies like those in NTCA's membership; in these other rural communities, we know that many more consumers, businesses, schools, and medical facilities lack access to even basic levels of broadband.

[1] NTCA 2016 Broadband/Internet Availability Survey Report (2017), NTCA–The Rural Broadband Association, Arlington, VA.

But to be clear, even where broadband *is* available in rural America, the job is never done. Sustaining and upgrading broadband networks is essential because consumers and businesses depend upon reliable and affordable services that will remain high-quality and keep pace with advances in technology and user needs. Indeed, what was considered "high-speed" broadband just seven or eight years ago is today considered antiquated, meaning that networks must be scalable and upgraded over time to keep pace with consumer demand. Furthermore, in terms of comparative operating costs between rural and urban areas, when an urban operator has a "truck roll" to repair service, its technician might need to drive two miles; a "trouble call" for a rural operator by contrast might entail driving two hours – in each direction. Thus, even as we have successes to celebrate and roadmaps to look to for proven track records of success, we as a nation have much more to do *both* to reach unserved areas *and* to sustain robust and affordable rural broadband where it is available today.

KEY PRINCIPLES FOR BROADBAND-FOCUSED INFRASTRUCTURE INITIATIVES AND LESSONS LEARNED FROM PRIOR EFFORTS

As policymakers consider effective and efficient ways to include broadband deployment within broader infrastructure initiatives, it is important to take stock of what has been tried to date – to build upon (or at least take account of) existing initiatives and to draw upon lessons learned from prior initiatives. Based in large part upon such prior experiences, there are a number of principles to consider in shaping policy and crafting infrastructure initiatives going forward.

1. Making the Business Case for Rural Broadband is Job One

While rural broadband is not an easy challenge to overcome, it is not terribly complicated to identify the primary barrier to rural broadband – the economics of deploying and sustaining broadband are difficult, if not impossible, in many rural markets. The rates that rural consumers pay are rarely sufficient to cover even the costs of operating in rural areas, much less the upfront capital expenditures required to deploy reliable, high-speed broadband in rural America. While obtaining permits to build new infrastructure and navigating complex bureaucratic application processes can often be difficult for small businesses in particular, the single biggest challenge in rural America is simply making the business case to build any broadband at all. Put another way, permitting barriers and other impediments to construction are no barriers at all if one cannot justify even building a network in the first place.

Without a reasonable business plan, providers are hard-pressed to justify borrowing funds or using one's own capital to build, and then harder-pressed still to sustain networks in areas where densities are low, distances are great, and terrain and topography complicate operations. Ongoing support from the High-Cost Universal Service Fund (USF) initiatives overseen by the Federal Communications Commission (FCC) has therefore been critical to making the business case for investing in and then sustaining rural broadband. The USF programs help providers to keep rates more affordable and to justify either use of a provider's own cash or financing from the few lenders that tend to serve rural Internet service providers – the Department of Agriculture's Rural Utilities Service (RUS), the Rural Telephone Finance Cooperative, CoBank, and some community banks.

For these reasons, it is essential that infrastructure initiatives include sufficient resources to meet the challenges of deploying and sustaining broadband in rural America. Without such resources, any effort is likely to be effective only on the margins or in very limited respects, leaving behind many areas that still lack broadband access and/or putting at risk investments already made to deploy advanced broadband networks in deeply rural areas.

2. The Importance of Proven Track Records and Technical Know-How

The operational challenges of deploying networks over great distances through sparsely populated rural areas are quite different than any other network construction project. Just because an operator has constructed a network in a downtown business district in an NFL city – where there could be more people in a single building than in an entire rural town and surrounding areas – this does not necessarily translate into success in rural broadband.

It is therefore important to seek a proven track record of delivering real results in rural areas. For example, while both American Recovery and Reinvestment Act (ARRA) programs asked for information on the capability of applicants to perform, only one included an explicit preference for real-world experience in rural broadband. Any finite resources put toward supporting rural broadband are too important to gamble. Although new infrastructure initiatives should consider the merits of all comers willing and able to make the effort to deploy rural broadband, in the first instance we should also look to leverage the experience and existing assets of those that have in fact deployed and operated a rural network and then delivered services atop that network.

This last point is particularly important. Our nation is not building networks just for the sake of building shiny new networks. Congress and the Administration are considering broadband infrastructure initiatives because they care in the end about the consumers and businesses in rural America that will use those networks., and they recognize the benefits to the nation as a whole To this end, any initiative should look first to operators that are currently in the business of rural broadband, delivering high-quality broadband day after day to hundreds of customers spread over dozens or even hundreds of miles in rural areas. If public resources are leveraged to help make the business case to deploy networks, the sustainability and usability of those networks are just as important as the act of initially constructing them.

On a similar note, it is important to ensure that any entity wishing to leverage federal resources to deploy a rural broadband network is technically capable of delivering on its promise. The FCC's new Connect America Fund Phase II USF auction program, for example, includes a "screen" that will aim to test technical assumptions of applicants prior to providing any funding; the State of New York's broadband grant program seems to have gone even further in ensuring that those claiming to have solutions for rural broadband can in fact deliver on their promise from a technical perspective. Similarly, the ARRA programs required network proposals to include certification from a professional engineer that the proposal would operate as designed and claimed. Robust but reasonable "technical screens" are essential to establish that a particular solution can in fact deliver upon the promise asserted.

3. A Long-Term Investment Strategy is Far More Effective and Efficient

Any resources provided in connection with an infrastructure plan will be finite, and thus should aim for the best return. In the case of long-term capital investments such as networks that will last for decades, this means that networks must be scalable and capable of meeting user demands over the full life of such assets. Putting resources toward inferior infrastructure that might seem cheaper upfront but needs to be substantially rebuilt in only a few years' time could turn out to be resources wasted – and risks leaving rural America behind.

This concept can be referred to as "total cost of ownership" – estimating the total costs of owning and operating (and needing to reinvest in) an asset over its economic life, rather than looking merely at the upfront costs of procuring the same asset. Policymakers should craft an infrastructure initiative with this in mind; it will do neither the rural Americans that depend upon broadband nor the broader American economy any good to spend billions of dollars now just to have another conversation about the need to rebuild that broadband infrastructure five years from now. Like bridges and roads, broadband networks are long-term infrastructure assets, and our nation should adopt a similar planning horizon based upon scalable networks that can meet user demands now and over the useful lives of these valuable assets. Put another way, sustainability is key. It is not just about *getting* broadband out there; from the perspective of consumers and communities, it is about *keeping* broadband out there, and *keeping* it affordable and up-to-date with user demand.

4. Targeting Resources for New Construction is Critical

It is important to target any resources made available to minimize the prospect of overbuilding existing networks. Unfortunately, as discussed further below in connection with broadband mapping, identifying where service is or is not available has proven vexing. The ARRA programs did not contain effective processes to validate existing service coverage, and in some respects their rules all but invited at least limited overbuilding. For example, the Broadband Technology Opportunities Program ("BTOP") overseen by the Department of Commerce largely eliminated any firm bars to overbuilding by the time of its second round of funding, instead merely weighing projects by the degree of unserved areas reached. By contrast, the FCC employs a variety of processes in its USF programs aimed at validating where service is or is not already available in order to direct funding to where it is needed most; these processes may not be perfect in scope or granularity, but each is an improvement upon the baseline data available in the FCC's Form 477 availability database or from any other current source.

5. Coordinating Efforts Among Federal and State Broadband Initiatives is Essential

Coordination among programs – both those that may be created as part of any infrastructure plan and those already in place – is essential to maximize the effectiveness of finite resources and achieve the goal of robust and sustainable universal broadband. In fact, to minimize the likelihood of "making new mistakes" (or even repeating old ones) in the rush to stand up any new program, as discussed further below, NTCA submits that it makes sense in the first instance to leverage existing programs that have time-tested processes and procedures to direct funds to the right places and already have experience in vetting proposals to deploy and sustain rural broadband.

If, however, new programs are to be created, these programs should not only take stock of the lessons learned and principles to be derived from prior experience as outlined in this testimony, but such new efforts must also ensure that they complement – and do not compete with – the existing efforts already underway. For example, some providers receiving federal USF support have complained that BTOP funds were used to connect anchor institutions that already had broadband service leveraging that USF support. Similarly, RUS resources should work in concert with USF as described further below, rather than having multiple federal programs stimulate the construction of duplicative networks in rural areas where the costs of deploying and operating even just one network are prohibitive. Any federal resources made available to promote broadband availability should therefore be directed through existing programs to maximize their effectives, and sufficient "guardrails" should be put into place to ensure that any new efforts complement, rather than undermine, the good work that existing broadband-focused programs already enable.

6. Streamlining Construction Processes is Necessary

Once the business case can be made for deployment and ongoing operation of a rural broadband network, this is where impediments that can delay or deter a project come into play. Steps can and should be taken to mitigate permitting delays, complicated application procedures, and high costs of access. Such efforts are especially important to enable any federal resources made available as part of an infrastructure plan can begin delivering on their promise as soon as possible.

Smaller providers like those in NTCA's membership have neither the staff nor the resources to navigate complex agency structures in search of permits to build broadband; for companies and cooperatives with an average of approximately 25 employees, time and money spent on such efforts translates to time and money not spent building broadband. At the same time, in serving many of the most remote parts of the United States, our members have deep experience with the Bureau of Land Management, U.S. Forest Service, National Park Service, and many other land-owning and property-managing agencies across the federal government. Especially when crossing federal lands or railroad rights-of-way, small rural providers must address permitting concerns or contractual obligations that can delay projects and increase their already high costs.

7. Accountability Must be Part of any Program

One final principle to consider in connection with any infrastructure plan is how to hold recipients of any resources accountable for use of the support they may receive. Concerns have been raised in the past, for example, that it is difficult to discern the precise locations reached leveraging ARRA resources. Similar concerns were raised in the past with respect to use of USF funds, particularly in areas where broadband remained lacking notwithstanding the sums disbursed to certain carriers. In more recent years, however, the FCC has established a robust accountability program that imposes specific buildout obligations and requires recipients of USF support to to capture the latitude and longitude of every new location to which they deploy broadband using such support. The FCC is also in the process of developing measures by which USF recipients will verify the availability of services at the levels required by the program. Similar measures should be considered in any new program – or, yet again, this provides good cause to leverage existing efforts in lieu of creating new programs and compliance measures from scratch.

PROPOSED STEPS FORWARD BASED UPON THESE KEY PRINCIPLES AND LESSONS LEARNED

The principles and lessons learned described above can provide guidance in considering the most effective and efficient steps in addressing our nation's remaining rural broadband challenges. I will next discuss a few steps that NTCA suggest should inform and shape any infrastructure plan.

1. Leverage Existing Initiatives to the Maximum Extent Possible

a. Universal Service Fund

Standing up new programs from scratch is not easy, and if a new broadband infrastructure initiative conflicts with existing efforts, this would undermine, rather than further, our nation's broadband deployment goals. For these reasons, strong consideration should be given to leveraging – and supplementing – the FCC's existing High-Cost USF initiatives as a primary means of implementing a broadband infrastructure initiative.

USF programs have been in place for years, and the FCC has recently reoriented these efforts under the "Connect America Fund" banner to promote broadband in high-cost rural areas. As discussed earlier in this testimony, the high-cost USF/CAF initiatives are essential both in justifying the business case for broadband infrastructure investment in the first instance, and then sustaining such investments by keeping rates for services more affordable once networks are built.

Unfortunately, although the FCC is considering steps to partially address a current USF funding shortfall, these otherwise effective broadband-promoting initiatives remain woefully underfunded to achieve their goals. More than $100 million per year is still needed to fund a USF model that the FCC created to promote broadband deployment. In addition, under a budget control mechanism included within 2016 reforms that applies only to some carriers, many small rural telecom operators have had their support slashed by an unpredictably escalating budget control that now equals 12.3 percent on average, translating into denied recovery of more than $170 million in actual costs this year for private broadband investments *that they have already made*.

Indeed, the impacts arising out of insufficient funding of the USF programs are striking, and they underscore how more sufficient funding could yield compelling results. Because of the USF model budget shortfall, 71,000 rural locations will receive lower-speed broadband, and nearly 50,000 may see no broadband investment at all. Meanwhile, a NTCA survey found that 183 small business member companies were facing annual USF support reductions of more than $500,000 on average, with a corresponding average decline in planned network investment of nearly $950,000 that translated to delays or denials of upgraded broadband to more than 850 customers on average. (This last set of figures would add up to an estimated $91.5 million in reduced USF support leading to nearly $174 million in declined or deferred broadband investment, and more than 150,000 customers estimated to remain without access to upgraded services.) Moreover, NTCA members estimated that the USF support reduction would contribute to standalone broadband prices $50 higher *per month* than they would otherwise have been for rural consumers.[2]

[2] NTCA 2017 USF Budget Control Impact Survey Results (2017), NTCA–The Rural Broadband Association, Arlington, VA.

The FCC's High-Cost USF efforts therefore represent a logical focal point for future broadband infrastructure initiatives. The FCC is the nation's expert agency in telecom policy, and it is already tackling broadband challenges with respect to availability and affordability. Moreover, recent CAF reforms adopted by the FCC have sought to: (1) reorient the USF programs toward broadband, (2) ensure funding is targeted to where it is needed (*i.e.*, to places where the market does not enable service delivery on its own), and (3) define what the FCC considers an efficient level of support in each area. The FCC will also be conducting an auction later this year that will allow interested bidders of all kinds to seek USF/CAF support for unserved areas. Finally, the reformed program rules compel significant accountability, to the point that support recipients must meet specified deployment obligations and geocode every new location to which they deploy broadband leveraging USF support.

The FCC's various High-Cost USF programs offer a ready-made platform that, with additional resources but with very little additional "heavy lifting" or process, could satisfy the principles articulated above and yield immediate, measurable benefits for rural consumers in the form of additional locations reached and higher-speed broadband. By contrast, creating new programs would require more administrative effort, and the rules for any such new programs must still be informed by the objectives and "lessons learned" articulated above – while also making sure not to undermine the important work that existing programs are already undertaking.

b. Rural Utilities Service

Additional resources for rural broadband could also be directed to the Department of Agriculture's RUS programs that have likewise been important in stimulating rural infrastructure deployment. The RUS has long played a crucial role in addressing rural broadband challenges through its telecommunications programs that finance network upgrades and deployment in rural areas, and these programs remain just as vital today. If any infrastructure resources are directed to RUS rather than to the FCC's USF/CAF efforts, it will then be essential, however, to ensure that such programs are coordinated effectively with and complement, rather than compete with, the ongoing efforts of the federal USF programs.

At times, some confuse the roles of RUS programs and the USF, thinking them repetitive or redundant. But this reflects a fundamental misunderstanding of the unique and distinct role each has played. USF does not finance networks; banks and other lenders (including RUS programs) provide upfront financing necessary to construct networks (although not too many banks lend to construct broadband infrastructure in rural America where return on investment is typically measured in decades). On the other hand, RUS programs and other banks and financing programs do not *sustain* networks or make services atop them affordable for consumers; again, loans from private lenders or through the RUS programs focus upon upfront financing. It is the federal USF program that is essential to ensure that consumers can obtain reasonably comparable services at reasonably comparable rates atop the networks once financed and built. In other words, USF is the linchpin of making the business case in the first instance to *obtain* financing from any lender – RUS or otherwise – to build networks in rural areas.

It is essential that this long-standing complementary relationship between RUS and the USF initiatives continue, rather than revising the programs or using any new infrastructure plan resources in a manner that pits federal efforts against each other. RUS already has policies in place precluding its own programs from competing with one another; it is important to take this a step further and ensure that *all* federal programs work in concert rather than potentially undermining each other's important pro-investment policies. To this end, NTCA suggests ensuring that any federal RUS program funds and new infrastructure resources not be used to overbuild another provider's broadband network if supported by federal USF resources, provided that the USF recipient is meeting its buildout obligations under the USF program. Such a reasonable measure will ensure the ongoing complementary nature of these efforts, maximize the effectiveness of any federal resources put toward broadband infrastructure, and ultimately enhance the likelihood of success of new infrastructure initiatives in reaching as many rural Americans as possible.

2. Conduct Better, Smarter Mapping of Service Availability

This Subcommittee's attention to mapping is much-needed and appreciated by NTCA and its members. We need more accurate, granular data on service availability to ensure that government efforts to support broadband target resources as efficiently as possible. Such data serve two important functions, in fact, in the context of broadband infrastructure policy. First, better data will help ensure that federal support is not withdrawn when still needed because there is no other network in a given area. Second, better data can help avoid the prospect of federally-supported duplicative infrastructure deployment in an area that might at first appear "unserved."

Unfortunately, there is no single, current, fully reliable source of data with respect to broadband availability in the United States. The National Broadband Map administered by the Department of Commerce has not been updated since June 2014 – ages ago in the evolution of broadband network coverage and speeds. Moreover, depending on the state process that went into gathering such data, that map appeared to contain anything from carefully vetted information to self-selected claims of coverage based more upon marketing interest than actual network capabilities. In the interim, the FCC has started to publish more tools showing the data gathered through provider Form 477 submissions, but the underlying Form 477 process itself suffers from imprecision and an inherent lack of granularity. The Form 477 is certified by the provider, but there is no means of validating the data submitted. In addition, the Form 477 data is submitted by census block – meaning that in a rural area, one consumer with service in a block can result in unserved consumers miles away looking "served" nonetheless. It is for these reasons that the FCC has engaged in substantial periodic data collections and additional "challenge processes" in the context of its fixed and mobile USF proceedings, so that it can develop a record of better evidence to validate where service truly does and does not exist notwithstanding the face of Forms 477 received.[3]

[3] *See Connect America Fund, et al.*, WC Docket No. 10-90, *et al.*, Report and Order, Order and Order on Reconsideration, and Further Notice of Proposed Rulemaking, FCC 16-33 (rel. Mar. 30, 2016), ¶¶ 70-71 (directing a challenge process for recipients of model-based USF support) and ¶¶ 116-145 (creating a challenge process for carriers receiving cost-based USF support); *Connect America Fund, et al.*, WC Docket No. 10-90, *et al.*, Order on Reconsideration and Second Report and Order, FCC 17-102 (rel. Aug. 4, 2017), ¶¶27-64 (adopting a challenge process intended to direct Mobility Fund support to rural areas that lack unsubsidized 4G LTE service).

Better methods to ascertain broadband availability exist. The FCC's High-Cost USF program requires recipients of support to geocode individual locations where new broadband is installed (and, in some cases, for prior deployments, too). Such measures – particularly the geocoding of new installations and upgrades going forward – can bring us closer to identifying where broadband exists with much greater precision, which would then allow targeting of support and other efforts to promote broadband deployment where needed most. On a going forward basis, geocoding could perhaps offer promise in transitioning from the current maps to better information. Whatever means might ultimately be chosen to obtain more accurate and granular data, however, it will be important to: (a) avoid unreasonable burdens in the data-gathering process, including any duties to go back and geocode prior installations; and (b) reconcile and coordinate data-gathering and mapping efforts to avoid duplicative reporting requirements for operators and the prospect of generating inconsistent data due to differing standards among reports at different agencies.

3. Streamline Permitting

As discussed earlier in this testimony, the primary challenge to rural broadband deployment is making the business case at all for rural broadband deployment. Where such business case exists however, removing barriers to deployment through streamlining of governmental permitting procedures can in turn drive more rapid rural broadband deployment at relatively lower cost. Several steps can and should be taken to address such concerns, and NTCA is encouraged that Congress and the Administration continue to examine these issues on so many fronts.

As an initial matter, NTCA and its members have urged that differences in federal agency policies and procedures with respect to installation of communications facilities should be the exception rather than the rule, applying only where needed to implement a unique statutory directive to the agency in question. A lack of coordination and standardization in environmental and historical application and approval processes across federal agencies increases the cost and further complicates and delays the deployment of broadband infrastructure – especially for small providers. Several NTCA members joined NTCA's CEO, Shirley Bloomfield on the FCC's Broadband Deployment Advisory Committee's Streamlining Federal Siting Working Group that put forth recommendations, which will hopefully be implemented to further accelerate the broadband deployment permitting process. Those recommendations included:

- *Standardize and publish fee schedules, and utilize revenue in a way that promotes expediting federal siting processes.*
- *Harmonize permitting processes across agencies to the extent feasible and ensure the process is uniformly applied across regional and state offices.*
- *Recognize and accept existing completed studies in previously disturbed areas.*
- *Harmonize environmental assessments across federal landholding or managing agencies, further streamline National Environmental Protection Act and National Historic Preservation Act exclusions, and eliminate duplicative environmental studies.*
- *Make current environmental and historic review streamlining mechanisms mandatory for all agencies.*

- *There should be a single, easily accessible online-tracking mechanism at each federal agency for the permitting process. All agencies should regularly report on permit status and the number of permitting applications they have processed.*
- *The common application form should accommodate changes to existing installations and applicable leases and easements. Agencies should accommodate and incorporate new broadband infrastructure technologies into their review processes.*[4]

As Congress considers any permitting reforms, however, it is important to emphasize that any changes and coordination with respect to permitting should be made on a "technology neutral" basis. Much of the discussion with respect to streamlining of permitting processes appears driven by a desire to promote the availability of 5G wireless capabilities through the increased placement of small cells. This is understandable given the promise of faster mobile broadband services and the fact that massively expanded small cell placement is critical to the availability of such services.

At the same time, it is important to take realistic stock of whether, when, and to what degree 5G services will be available on a widespread basis in rural America. A technical paper released last year found that the full promise of 5G capability can only be realized in rural America if small cells are placed every several hundred feet apart,[5] and it will take significant amounts of backhaul capacity – "densification" of fiber[6] – to manage the data loads that 5G is hoping to handle.[7] In short, the deployment of 5G-capable networks in rural areas where there are only a few households per square mile would effectively seem to translate to a fiber-to-the-premise construction. Put another way, the old mantra of "wireless needs wires" is quickly becoming "5G needs fiber." In addition, it has been explained that taking steps to rationale 5G permitting alone "will not solve the problem in unserved areas;" it will clearly take both permitting relief and additional resources if the promise of 5G will come to rural America within the foreseeable future.[8]

In the end, for rural consumers to have a broadband experience reasonably comparable to that in urban America, they must have meaningful access to both fixed and mobile broadband services. Placing too much hope on mobility alone without recognizing "wireless needs wires" – or, these days, "5G needs fiber" – is a recipe for insufficient access in rural America.

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[4] Broadband Deployment Advisory Committee: Federal Siting Working Group, Final Report, (2018).
[5] Evaluating 5G Wireless Technology as a Complement or Substitute for Wireless Broadband, Vantage Point Solutions (2017).
[6] See Remarks of Federal Communications Commission Chairman Ajit Pai at the Mobile World Congress, Barcelona, Spain, February 28, 2017.
[7] The Road to 5G is Paved with Fiber, Fiber Broadband Association, December 2017; Sean Buckley, "Verizon's McAdam: Our multiuse fiber approach offers more cost efficiencies," Fierce Telecom, May 22, 2017.
[8] Holmes, Allan, "5G Cell Service is Coming. Who Decides Where It Goes?" The New York Times, March 2, 2018; *see also* remarks of CTIA during "Closing the Digital Divide: Broadband Infrastructure Solutions" hearing, U.S. House of Representatives Energy & Commerce Communications and Technology Subcommittee, January 30, 2018.

CONCLUSION

The current national infrastructure debate represents a significant opportunity to make progress on rural broadband deployment, and we hope that the promise of broadband will be recognized among the many other compelling infrastructure priorities also in need of attention and resources. We look forward to working with you and greatly appreciate the work of this subcommittee in helping to solve the challenges of rural broadband.

Due in part to the leadership of this subcommittee, small, rural broadband providers like those represented by NTCA–The Rural Broadband Association continue to make great strides in overcoming the challenges of providing broadband to rural America. Your commitment to identifying and solving these challenges is greatly appreciated. Thank you for inviting me to be with you today, and I look forward to your questions.