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STATE-LEVEL BROADBAND POLICY

A COMPENDIUM OF RESOURCES AND APPROACHES

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WHY BROADBAND POLICY MATTERS

The Internet is a tool that many of us use every day—to work, to locate information, to correspond, to shop, and to play. More broadly, it can help us strengthen our communities, create more responsive and efficient government, and keep our economy moving. Civic participation, education, health care delivery, economic growth, worker training, and public safety are all considered “national purposes” in the National Broadband Plan¹ that are served by the expansion of robust and affordable, high-speed networks.

As our society and our technology evolve, and the use of online services grows exponentially, the availability of fast, reliable Internet becomes more and more indispensable for individuals and families, businesses and institutions, cities and states. Thus broadband infrastructure, and access to it, is increasingly essential to the wellbeing of the United States and everyone who lives here.

This report offers state-level decision-makers and stakeholders an overview of how broadband policy can promote the public good, and why it is so critical. While many actions and decisions regarding broadband are inherently local, the state has an important role in supporting those local solutions. The infrastructure to provide broadband access—including wired and wireless networks—is created to serve particular localities. Likewise, steps to ensure that there is widespread access to this infrastructure—that is to say policies related to public access, home broadband access, training, and support—must be tailored to the needs of the community. State-level decisions can play an important role in determining whether such local efforts succeed or fail.

Key terms in the report include:

- **Broadband:** access to the Internet at speeds sufficient to take advantage of email, web browsing, streaming high-quality video, and other increasingly robust applications. Most (74.4%) Americans² have broadband service at home, delivered through high-speed cable, wireless, or fiber.



Workers for Com Net, Inc. and its wholly owned subsidiary Independents Fiber Network, installed nearly 700 new miles of broadband fiber to rural and underserved communities throughout western Ohio, thanks to federal stimulus funding under the American Recovery and Reinvestment Act. Their application for funding was part of a coordinated effort by Com Net, Inc., Horizon Telecom, OneCommunity and OARnet to create a comprehensive statewide plan to expand broadband infrastructure throughout the state.

Photo courtesy of OARnet. <https://www.oar.net/>

¹ Federal Communications Commission, *Connecting America: The National Broadband Plan* (Washington, DC: 2010). Accessed online at <http://transition.fcc.gov/national-broadband-plan/national-broadband-plan.pdf> April 25, 2015.

² U.S. Census Bureau, “Census Bureau’s American Community Survey Provides New State and Local Income, Poverty, Health Insurance Statistics,” last modified September 18, 2014. Accessed online at <http://www.census.gov/newsroom/press-releases/2014/cb14-170.html> April 25, 2015.

- **Internet Service Providers (ISPs)**—typically, private companies—provide Internet service to homes and businesses either through wires or wirelessly. Even if delivered wirelessly to consumers, the Internet service almost certainly connects to the rest of the Internet via wires after the signal travels between the consumer and ISP via an antenna on a tower. (The wires and towers are key elements of the physical infrastructure.)
- **Access to the Internet** refers to the availability of Internet service to users, either free or at a cost.
- **Broadband adoption** refers to the actual use of the Internet via high-speed connections, at home, work, school, library, or other access locations. Higher adoption means more people are choosing to use the connections, and finding ways to do so.
- **Bandwidth** refers to the amount of data a network can carry. Higher bandwidth means more information flowing faster.

Today, broadband access is essential to economic development, civic engagement, education, healthcare, and public safety. For maximum impact, however, more people need better, faster, more reliable access.

Economic Development

A state's economy is one of the clearest and most often-cited areas in which broadband matters. Reasonably priced, high-speed broadband has become an essential element of infrastructure in a multitude of industries beyond information technology—including manufacturing, retail, farming, and service. The Internet has also helped local businesses extend their customer bases globally. Communities are now integrating broadband into their strategies for attracting and retaining businesses. Julia Pulidindi of the National League of Cities states that, "Communications services and technological innovations should be accessible and affordable to all because of the implications they have for sustained economic development."³

Individual participation in the economy can depend on good online access too. According to the U.S. Department of Commerce, "Internet use among adults ages 25 and older [is] associated with a 6 percentage point increase in probability of employment, relative to individuals who [are] not online."⁴

Civic Engagement

Civic engagement has, to a substantial degree, moved online. According to the Pew Research Center, 39% of adults recently contacted a government official or spoke out in a public forum via offline methods, and nearly as many (34%) took these civic actions online.⁵ Considering the prolific use of technology by children and young adults, any long-term plan to increase civic engagement must have a strong online component.

³ Julia Pulidindi, *Why Broadband Matters: A Look at its Impact and Application for Cities* (Washington, DC: National League of Cities, 2013). Accessed online at http://www.nlc.org/Documents/Unassigned/RI_Broadband_Matters2013_final.pdf April 25, 2015.

⁴ National Telecommunications and Information Administration and Economics and Statistics Administration, *Exploring the Digital Nation: America's Emerging Online Experience* (Washington, DC: U.S. Department of Commerce, 2013). Accessed online at http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_-_americas_emerging_online_experience.pdf April 25, 2015.

⁵ Pew Research Center's Internet & American Life Project, *Civic Engagement in the Digital Age* (Washington, DC: Pew Research Center, 2013). Accessed online at http://www.pewinternet.org/files/old-media/Files/Reports/2013/PIP_CivicEngagementintheDigitalAge.pdf April 25, 2015.

Broadband access can also help correct economic gaps that affect civic participation. People who live in higher-income households and those with higher levels of education are consistently more likely to participate in civic engagement, whether on- or offline.⁶ Yet among the 60% of American adults that uses social networking sites such as Facebook or Twitter, political participation is more balanced between lower- and higher-income users. Aside from promoting greater participation overall, policies that expand access to broadband can promote more equal levels of civic and political participation across the population.

Education

The State Educational Technology Directors Association states in its 2012 national policy paper that “access to high-speed broadband is now as vital a component of K-12 school infrastructure as electricity, air conditioning and heating.”⁷ Technology is being used in and out of the classroom to customize learning to individual students’ needs, increase student interaction with the subject, and engage parents. Thanks to the low cost of laptops, tablets, and other mobile devices (whether provided by the school or the family), online learning also continues outside school within families who have the technology available. Schools and students without broadband access are increasingly at a distinct educational disadvantage.



Gene Woo is a regular at the Richmond Senior Center in San Francisco, and he was excited to discover that there was a Chinese-speaking tutor from Community Technology Network available in the computer lab. After learning basic computer skills, he discovered a passion for finding music online, which he records by putting his tape recorder in between the headphones; he later uses the recordings to practice singing in Mandarin at home.

*Photo courtesy of Community Technology Network
www.ctnbayarea.org*

Healthcare

Broadband enables healthcare providers to remotely conduct patient visits, monitor patients, review lab results, and consult colleagues. Telemedicine reduces travel time and costs for patients and healthcare providers, and increases healthcare options for individuals in rural areas who might not otherwise have access to specialists and services that are available in more urban areas. State-level decision-makers who recognize these benefits are taking steps to ensure that health stakeholders have access to up-to-date networks and ways of using them effectively, for instance by securely sharing health information between healthcare providers and patients.⁸

⁶ Ibid.

⁷ C. Fox, J. Waters, G. Fletcher, and D. Levin, *The Broadband Imperative: Recommendations to Address K-12 Education Infrastructure Needs* (Washington, DC: State Educational Technology Directors Association, 2012). Accessed online at http://www.setda.org/wp-content/uploads/2013/09/The_Broadband_Imperative.pdf April 25, 2015.

⁸ For example, the Nationwide Health Information Network provides a set of standards, services, and policies that enable the secure exchange of health information over the Internet. See HealthIT.gov, “Nationwide Health Information Network.” Accessed online at <http://www.healthit.gov/policy-researchers-implementers/nationwide-health-information-network-nwhin> April 25, 2015.

Public Safety

Access to reliable, secure high-speed broadband—and the communication tools necessary to access information and each other—is a game changer for first responders. For instance, it gives firefighters, EMS, and police access to real-time intelligence on the way to a scene, allowing them to prepare their strategies. On the prevention side, broadband is being used “to regulate stop lights, monitor and update road construction and delays, and alert the public of potential dangerous situations by enabling severe weather alerts, missing children alerts, or escaped criminal alerts.”⁹

Congress has mandated First Responder Network Authority (FirstNet)¹⁰ to take all actions necessary to ensure the building, deployment, and operation of a nationwide public safety broadband network. FirstNet will be a powerful asset for first responders, particularly in states and communities that take an active role in establishing the network and envisioning how it will be used.

Growing Need

Predicting communities’ future broadband needs is difficult, but thinking about likely changes is essential. Considering that bandwidth use has been steadily rising, it is prudent to assume that demand will continue increasing from both homes and institutions.

Home Internet access is becoming more and more essential. Schoolwork does not end at the school doors, and kids are likely to need more access to participate in educational activities in coming years. Likewise, more workers are likely to need access as part of their jobs. The telecommunications company Ericsson forecasts that the monthly bandwidth used by the average laptop will jump from 3,300 MB in 2013 to 15,000 MB by 2020.¹¹

Businesses and non-profit organizations, schools, hospitals, and libraries all need significantly more broadband capacity than households, and this need is growing. For instance, adequate broadband access is needed as more consumer goods are sold online, more schools conduct online testing, more doctors conduct remote consultations, and more libraries host digital collections. In addition, more schools, libraries, and non-profits are providing residents and students with Internet access and training, which increases their bandwidth needs.

Networks also need to increase their reach and power because Internet connections are increasingly two-way. The Internet no longer simply supplies information that is consumed. When that was the case, download speeds were the main determinant when evaluating Internet service. Now that more and more organizations are working virtually—on systems located elsewhere, often requiring sharing large batches of data—substantial download and upload speeds are required.

Finally, future broadband policies should ensure that users have the appropriate skills and training needed to participate effectively online.

⁹ Phil Montgomery, Eric Callisto, and Ellen Nowak, *Wisconsin’s Playbook for Broadband Progress* (Madison, WI: Public Service Commission of Wisconsin and Link Wisconsin, 2013). Accessed online at http://www.link.wisconsin.gov/uploads/pdf/wi_playbook.pdf April 25, 2015.

¹⁰ <http://www.firstnet.gov/>.

¹¹ Ericsson, *Ericsson Mobility Report on the Pulse of the Networked Society, 2014*. Accessed online at <http://www.ericsson.com/res/docs/2014/ericsson-mobility-report-november-2014.pdf> April 25, 2015.

ELEMENTS OF GOOD BROADBAND POLICY

Planning and careful thought are essential when building parts of a broadband network, a whole network, or a digitally savvy community. How can affordable, high-speed broadband infrastructure be developed while increasing the availability of the Internet to all community members? While many of the concrete steps take place at the local level—laying fiber, installing antennas, developing programs—state government can play an important role by enacting policies that are carefully designed to support local innovation and action. The state can coordinate local initiatives to avoid recreating the (digital) wheel, facilitate key public-private partnerships, and help clear the way for creative solutions.

The remainder of this paper focuses on considerations that stakeholders should keep in mind as they develop sound broadband policy for their state. These considerations relate to factors such as keeping costs low for infrastructure expansion, taking advantage of federal funding, helping coordinate local efforts, serving as a source of information and best practices, and promoting greater broadband use in underserved communities.

Dedicated Office at the State Level

A dedicated state-level government office, staffed with individuals who understand broadband issues, can be a powerful tool for creating connections and sharing information among state agencies, broadband service providers, and other stakeholders. Whether as an independent agency or within a state agency, the office's responsibilities should include:

- being a trusted source of information about broadband infrastructure and digital inclusion, best practices, and lessons learned;
- supporting other state agencies' efforts to increase broadband access (to home, business, and community anchor institutions);
- supporting other state agencies' efforts to increase digital literacy;
- recommending broadband policies at the local and state levels;
- championing commercial access to state-owned and -managed assets;
- connecting communities working toward similar broadband-related goals or facing similar challenges;
- responding to consumer calls regarding broadband access; and
- helping coordinate and navigate federal and state funding sources.

In one example of how state-level coordination can yield benefits throughout the state, five Connecticut municipalities, coordinated by the Office of Consumer Counsel, issued a Request for Qualifications (RFQ) to Develop Gigabit Internet Networks in Connecticut.¹² The RFQ sought to create a world-leading, gigabit-capable network in targeted commercial and residential areas—at prices comparable to other gigabit fiber communities across the nation—and to provide free or inexpensive broadband to underserved areas. Over time, 46 Connecticut municipalities joined the RFQ.

¹² State of Connecticut, "News Release: Mayors Seek Partners to Develop Gigabit Internet Networks in Connecticut; Invite Others to Join the Effort," September 15, 2014. Accessed online at http://www.ct.gov/occ/lib/occ/091514_gig_press_release.pdf April 25, 2015.

In another example, the mission of the Digital Arizona Program¹³ is “To promote and facilitate broadband access through public-private cooperation—to provide all Arizona citizens and businesses the means to utilize high volume digital information and services at a reasonable cost—to create economic opportunity and improve quality of life for every person, organization, and community throughout Arizona.”

In addition, the ConnectME Authority¹⁴ is an independent agency within the State of Maine, which has the mission to facilitate the universal availability of broadband to all Mainers and help them understand the valuable role it can play in enriching their lives and helping their communities and businesses thrive. Its executive director stated:

Being an independent agency within the State of Maine has allowed us to act fully in the best interest of the residents of Maine. Just as important as being non-partisan is the perception of being available to any state or local agency, providing information and resources as requested. We are widely regarded as the broadband information clearing-house.

State Broadband Commissions

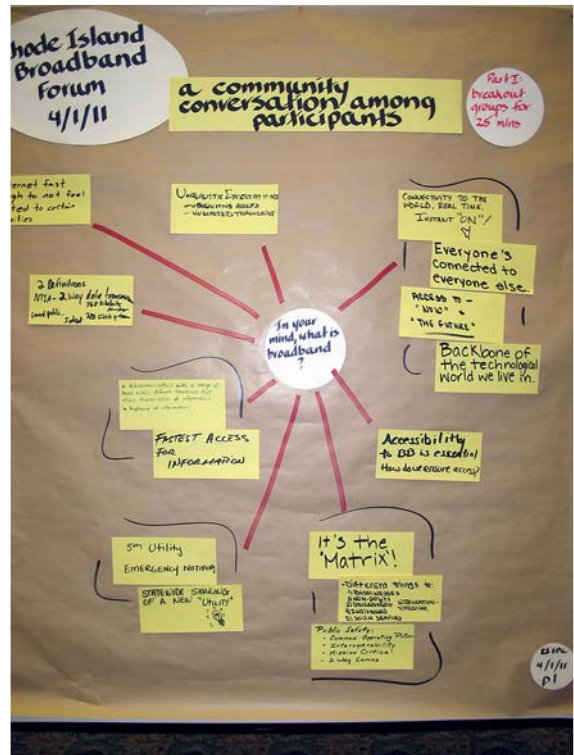
State-level commissions comprised of individuals from inside and outside government can help ensure that information and perspectives are shared effectively across the various stakeholders whose work affects (or depends on) broadband. In several states, these groups—referred to as broadband commissions, advisory councils, or task forces—are mandated by state legislation or authorized by executive order and tasked, for instance, with gathering data regarding gaps in broadband access and use, and recommending strategies for reducing these gaps. State broadband task forces have been instrumental in crafting broadband infrastructure bills and getting them passed in their state legislatures.

A state broadband commission might consist of representatives from the following:

- state broadband agency;
- public utilities commission;
- consumers council;
- state office of the chief information officer;
- state library;

¹³ <https://digitalarizona.az.gov/>.

¹⁴ <http://www.maine.gov/connectme/>.



Notes from Broadband Rhode Island stakeholder engagement process where participants from all sectors of the state were engaged in identifying and developing a set of broadband priorities for the state. The process resulted in the white paper “Broadband Policy of Rhode Island”.

Photo courtesy of Broadband Rhode Island.
<http://broadband.ri.gov/>

- research and education network;
- economic development;
- emergency services;
- K-12 education;
- higher education;
- healthcare; and
- Internet service providers.

In 2012, the National Conference of State Legislatures created a list of State Broadband Commissions, Task Forces or Authorities and Other Broadband Resources.¹⁵ For example, the goal of the California Broadband Council¹⁶—initially created by executive order and formally established by legislation in 2010¹⁷—was to help increase broadband network deployment and eliminate the digital divide by expanding broadband accessibility, literacy, adoption, and usage.

Telecom Modernization Bills

To serve the public good, states should consider telecom modernization bills ensuring that residents have access to affordable and reliable communications service, including broadband. Current telecommunications regulations are typically based on historical telephone communications via copper telephone lines. Phone companies around the country are planning to shift their service to networks that operate via Internet Protocol (IP) rather than older analog technologies. This switch is almost certain to take place; the question is how to achieve it while continually ensuring that all Americans have essential telecommunications services. The federal government does not currently regulate broadband, and most public utility commissions are not even tracking it. Relevant policies may include mandates directing state public utilities commissions to promote affordable and reliable broadband access.

Three additional resources in particular should be highlighted:

- Public Knowledge’s “Five Fundamentals for the Phone Network Transition”¹⁸ can help state-level policy-makers craft legislation that keeps the U.S. communications network 100% reliable and affordable.
- A recent report from the National Regulatory Research Institute includes a discussion of state-level broadband regulation legislation.¹⁹
- The Benton Foundation has examined how U.S. telecommunications systems can transition to IP while still ensuring easy and affordable access to future networks.²⁰

¹⁵ National Conference of State Legislatures, “State Broadband Task Forces, Commissions or Authorities and Other Broadband Resources,” 2012. Accessed online at <http://www.ncsl.org/research/telecommunications-and-information-technology/state-broadband-task-forces-commissions.aspx> April 25, 2015.

¹⁶ <http://broadbandcouncil.ca.gov/home.aspx>.

¹⁷ State of California Legislative Council, *Telecommunications: California Broadband Council: S.B. 1462, 2010*. Accessed online at http://www.leginfo.ca.gov/pub/09-10/bill/sen/sb_1451-1500/sb_1462_bill_20100927_chaptered.html April 25, 2015.

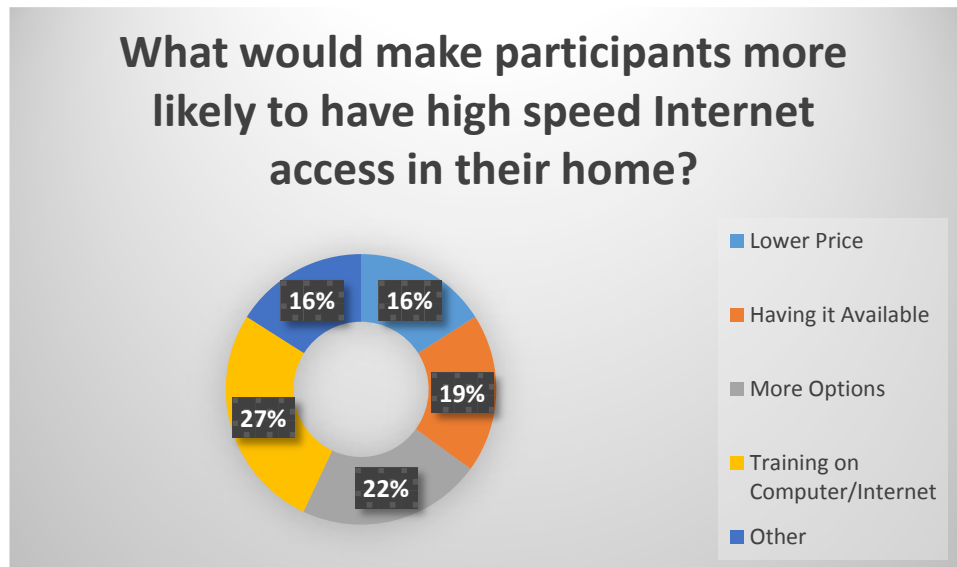
¹⁸ Public Knowledge, “Five Fundamentals for the Phone Network Transition,” 2013. Accessed online at <https://www.publicknowledge.org/news-blog/blogs/five-fundamentals-for-the-phone-network-transition> April 25, 2015.

¹⁹ Sherry Lichtenberg, *Telecommunications Legislation 2014: Completing the Process* (Silver Spring, MD: National Regulatory Research Institute, 2014). Accessed online at <http://nrri.org/documents/317330/b72af483-4ac3-4cc8-9d1f-1871a9284c9a> April 25, 2015.

²⁰ Ted Gotsch, *The New Network Compact: Making the IP Transition Work for Vulnerable Communities* (Washington, DC: Benton Foundation, 2013). Accessed online at <https://www.benton.org/sites/benton.org/files/the-new-network-compact-ip-transition.pdf> April 25, 2015.

Broadband Data Collection and Mapping

States should put a high priority on gathering and updating information about the broadband assets they already have, and carrying out the work of the State Broadband Initiative.²¹ These federally funded initiatives have been collecting important data about broadband accessibility and making this data publicly available. Information is collected from ISPs (regarding their own infrastructure), the general public (through speed tests), and third-party sources. As a result of the federal grants, all 50 states (as well as five territories and the District of Columbia) currently have broadband datasets and maps—which are valuable assets for broadband planning and decision-making by states, localities, regional economic development organizations, and ISPs.²²



The Utah Broadband Nonadopters Demand Study was released August 27, 2014, detailing why people do not use the Internet in Utah, and the barriers they face in accessing the Internet. Leaders in other states would be wise to develop a similar understanding of their own populations. For more information, visit the Utah Broadband Project at <http://broadband.utah.gov/>.

Unfortunately, the grant cycle of the State Broadband Initiative concluded in 2015. Some states will continue updating data in their state-level datasets and maps after the federal grants end, and each of these states has the opportunity to consider what data it wants to collect and analyze in the future. To determine exactly what data should continue to be collected (and at what level), states should ask stakeholders how they are currently using the data. They may find, for instance, that stakeholders require more granular data, such as address-level broadband availability information.

Some state broadband initiatives have also examined factors that contribute to lower-than-ideal broadband adoption—including the cost of subscriptions and a lack of perceived relevance to an individual's life. Given all the benefits of broadband access, from greater economic and civic participation to better health and educational outcomes, the state has a strong stake in making sure that adoption rates are as high as possible throughout the population. States should strongly consider gathering data regarding the current obstacles to (and possible steps toward) universal adoption. For example, as part of its State Broadband Initiative award, the State of Utah asked Southern Utah University and Utah State University to conduct a survey of Utah Broadband

²¹ For more information about states that have implemented broadband initiatives, see <http://www2.ntia.doc.gov/SBDD>, accessed April 25, 2015.

²² This data gathered by states currently also populates the more comprehensive National Broadband Map, available at <http://www.broadbandmap.gov/>, accessed April 25, 2015. The Federal Communications Commission (FCC) takes over the gathering of broadband data for the National Broadband Map in 2015.

Nonadopters²³ to better understand who is not subscribing to home Internet access, why they are not, and what would convince them to subscribe.

Defining Broadband, Underserved, and Unserved

Since technology is continually evolving, defining the threshold for “broadband” service by the available number of megabits per second (Mbps) means that standards can quickly become out of date. In February 2015 the Federal Communications Commission (FCC) updated the definition of broadband to 25 Mbps (megabits per second) download (from the Internet to the user’s computer) and 4 Mbps upload (from the user’s computer to the Internet)—significantly higher than previous federal standards. According to FCC chairman Tom Wheeler:

It’s not uncommon for a U.S. Internet connected household to have six or more connected devices—including televisions, desktops, laptops, tablets, and smartphones. When these devices are used at the same time, as they often are in the evenings, it’s not hard to overwhelm 10 Mbps of bandwidth.²⁴

Regardless of federal standards, states can and should set their own standards. And given the pace of technology advancement, the wise strategy is to set the numerical bar high, as communities with “gigabit” networks are. State-level standards will help identify which areas are currently ‘unserved’ (such as a rural community whose only Internet service option is satellite) or ‘underserved’ (such as a community with only one service provider that meets a specified broadband standard)—and therefore require efforts to promote greater access.

To better understand where broadband standards are and where they should be, broadband decision-makers should initiate conversations with businesses, community anchor institutions, government, and residents. For example, the State of Maine has mandated the ConnectME Authority²⁵ to set the definitions of unserved and underserved. These definitions, in turn, determine which communities are eligible for the ConnectME Authority’s grant funding opportunities.

Direct Funding of Broadband Development

One proactive method for states to increase broadband access and affordability is to directly fund deployment in areas that lack broadband access or affordable broadband choices. There are many reasons to prioritize funding for broadband development, but the most universally compelling of these is economic development. According to Matt Schmit, Minnesota State Senator, “Broadband is a priority for the state’s business community, which sees high-speed Internet as key to economic competitiveness.” In one funding approach, a handful of states have set aside funding specifically for library broadband infrastructure and/or service.²⁶

²³ State of Utah, “Utah Broadband Nonadopters,” 2014. <http://broadband.utah.gov/wp-content/uploads/sites/2/2014/08/FINAL.pdf>.

²⁴ Federal Communications Commission, “Prepared Remarks of FCC Chairman Tom Wheeler, The Facts and Future of Broadband Competition,” September 14, 2014. Accessed online at https://apps.fcc.gov/edocs_public/attachmatch/DOC-329161A1.pdf April 25, 2015.

²⁵ <http://www.maine.gov/connectme/>, accessed April 25, 2015.

²⁶ A full description of those states’ efforts (plus more) is available in Chief Officers of State Library Agencies, *COSLA Planning Guide for Library Broadband Connectivity, 2014*. Accessed online at http://www.cosla.org/documents/Broadband_Guide_2014.pdf, April 25, 2015.

Table 1. States that Have Funded Broadband Deployment

California	Legislated: funding via Universal Service Fund
Illinois	Legislated in Illinois Jobs Now
Maine	Legislated: from assessments on in-state communication services
Minnesota	Legislated: funding via the General Fund
North Carolina	North Carolina's share of the national tobacco settlement
Vermont	Legislated: from the capital budget

For example, the Minnesota governor's Task Force on Broadband²⁷ recommended allocating \$100 million for broadband deployment in unserved and underserved areas. Through bipartisan discussions, outreach to constituents via listening tours, and meetings with local newspaper editorial boards, the Border to Border Broadband Fund passed in May 2014 with a one-time allocation of \$20 million.²⁸

As *The Washington Post* put it,

It's become an article of faith among politicians, investors and entrepreneurs that the Internet—and access to it—is an economic engine. It helps connect Americans to education and government services. It serves as a platform for new ideas and companies that wind up changing the world. And it reduces costs for consumers and businesses everywhere. ... According to a report by the Boston-based Analysis Group, cities that offer broadband at [significantly higher speeds] report higher per-capita GDP compared to cities that lack those Internet speeds.²⁹

Leveraging Previous Infrastructure Investments

High deployment costs slow down, and in some cases totally restrict, the expansion of broadband fiber. One strategy for reducing costs is to insert conduit (through which fiber can easily be pulled at that time or later) whenever a state right of way is being dug up for other purposes. This approach is referred to as “dig once.”

Another approach is to require that utility poles already running through a given locale must be available for broadband expansion. According to the Fiber to the Home Council, states can “assert jurisdiction [thanks to the federal pole attachments statute] and require all owners of poles, ducts, and conduits to make those facilities available to new entrants on a non-discriminatory basis and at reasonable (cost-based) rates, terms, and conditions.”³⁰

²⁷ State of Minnesota Executive Department, “Executive Order 11-27: Providing for the Establishment of the Governor's Task Force on Broadband.” Accessed online at <http://mn.gov/governor/multimedia/pdf/EO-11-27.pdf> April 25, 2015.

²⁸ For more detail, see 2014 Minnesota Session Laws, Chapter 312 – HF 3172, Article 2, Section 2 and Article 3, Section 3. The Office of the Reviser of Statutes, “2014 Minnesota Session Laws,” 2014. Accessed online at <https://www.revisor.mn.gov/laws/?id=312&year=2014&type=0> April 25, 2015.

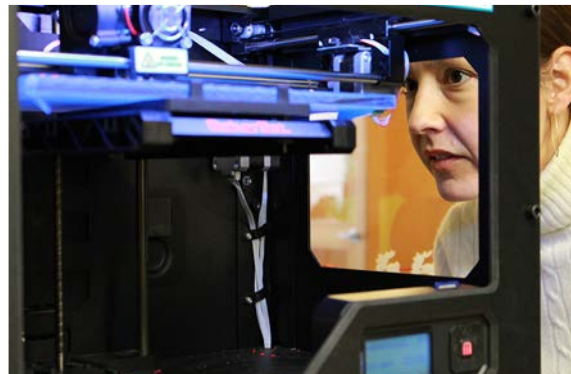
²⁹ Brian Fung, “Study: Cities with Super Fast Internet Speeds are More Productive,” *Washington Post*, September 18, 2014. Accessed online at <http://www.washingtonpost.com/blogs/the-switch/wp/2014/09/18/study-cities-with-super-fast-internet-speeds-are-more-productive/> April 25, 2015.

³⁰ Vermont, Massachusetts, and Oregon have mandated access to poles, ducts and/or conduits. See *Fiber to the Home Council, State and Local Government Role in Facilitating Access to Poles, Ducts and Conduits in Public Rights-of-Way*, August 2013. Accessed online at <http://www.ftthcouncil.org/d/do/1309> April 25, 2015.

Finally, by mandating that broadband fiber networks be open to use by anyone (at reasonable, cost-based rates), states can help lower the costs of build-out, whether by for-profit companies, non-profits, or governmental entities. For example, the 2012 Arizona SB 1402,³¹ the Digital Arizona Highways Bill, expanded the Arizona Department of Transportation’s state rights of way to include transportation of information as well as vehicles. Whenever funding is available, the Arizona Department of Transportation may install broadband conduit and lease it to providers at a cost-based rate.

In Public Act 13-247 (2013),³² the Connecticut General Assembly established that each town, city, borough, fire district, or the Department of Transportation has the right to use attachment points on public utility polls and underground communications ducts.³³

Additional examples and guidance are available in a white paper commissioned by the ConnectME Authority.³⁴ Under a mandate from the Maine Legislature, the ConnectME convened a working group to “identify technical, legal, funding and jurisdictional challenges” to broadband infrastructure deployment in Maine, and to “develop solutions necessary to achieve and facilitate the deployment of broadband infrastructure.”³⁵



Watching the 3D printer at the Johnson County MakerSpace in Overland Park, KS where they have two 3D printers working full-time.

*Photo courtesy of the Johnson County Library.
<http://jocolibrary.org/makerspace>*

Helping Educational Institutions Access Federal (E-Rate) Funding

E-rate is the largest federal education-technology funding program. It has been helping schools and libraries obtain affordable telecommunications and Internet access since 1997. E-rate was authorized under the Telecommunications Act of 1996 and is overseen by the Federal Communications Commission.

States can provide various kinds of support to help schools and libraries take advantage of this federal funding—including training in how to apply, one-on-one guidance, online support, and coordination of coalition applications. The more strategic and helpful the support offered by the state, the more likely local schools and libraries are to leverage these federal dollars.

³¹ State of Arizona, “Senate Bill 1402: Digital Arizona Highways Bill,” 2012. Accessed online at <http://www.azleg.gov/legtext/50leg/2r/bills/sb1402s.pdf> April 25, 2015.

³² Connecticut General Assembly, “2013 Public Act 13-247,” 2013. Accessed online at <http://www.cga.ct.gov/2013/ACT/PA/2013PA-00247-R00HB-06706-PA.htm> April 25, 2015.

³³ According to one report, “the incremental cost of placing the conduit during other construction processes is comparable to the cost of painting stripes on the highway.” CTC Technology and Energy, *Gigabit Communities: Technical Strategies for Facilitating Public or Private Broadband Construction in Your Community*, 2013. Accessed online at <http://www.ctcnet.us/wp-content/uploads/2014/01/GigabitCommunities.pdf> April 25, 2015.

³⁴ Tilson Fiber Technology, LLC, *Highway Broadband Utilization Study, Dig Once White Paper*, 2013. Accessed online at [http://www.maine.gov/connectme/digonce/docs/Highway Broadband Utilization Study.pdf](http://www.maine.gov/connectme/digonce/docs/Highway%20Broadband%20Utilization%20Study.pdf) April 25, 2015.

³⁵ ConnectME Authority, *Broadband Infrastructure Working Group Report*, 2014. Accessed online at [http://www.maine.gov/connectme/digonce/docs/Dig Once Workgroup Report 1-31-14 Final.pdf](http://www.maine.gov/connectme/digonce/docs/Dig%20Once%20Workgroup%20Report%201-31-14%20Final.pdf) April 25, 2015. The University of Wisconsin Extension and the Wisconsin Department of Transportation have also created a very helpful spreadsheet of the dig-once policies of 12 states, available online at <http://broadband.uwex.edu/wp-content/uploads/2014/05/005.015.2014-DigOnce-spreadsheet.docx>, accessed April 25, 2015.

Expanding “Research and Education Networks”

Research and Education (R&E) networks were originally created to connect higher-education campuses to high-speed broadband. Today, R&E networks come in a variety of ownership and management structures. State policy can encourage and support the extension of existing R&E networks beyond higher education to K-12, libraries, local government, and business. This expansion can drastically reduce the costs of access for these additional institutions.³⁶

Promoting Local Partnerships

U.S. broadband networks can be publicly owned, privately owned, or owned by a cooperative (usually an electric or telephone cooperative). States that avoid restricting which entities can own and operate a broadband network—but instead promote creative, cooperative arrangements—are more likely to encourage local entities to implement innovative solutions.

Arrangements involving a combination of public and private entities are often the best way to provide service to a given location. Broadband providers’ engineering teams sometimes work with city-owned conduit, or commercially leased fiber optics between cities, and may utilize public, cooperative, or third-party connections to reach a particular business park or neighborhood. The Internet services sold over these connections can be provided by still other companies, which have no direct control over the infrastructure. Public-private partnerships or shared infrastructure is especially important where low population density or low disposable income make it hard to break even on services.³⁷

Support for Local Broadband Planning

As noted previously, most broadband deployment initiatives and adoption programs happen at the local level. It is unrealistic for a state to amass a full understanding of the needs, assets, and challenges of every locale under its jurisdiction. However, it can provide funding and coordination for local broadband planning, which increases stakeholder engagement (resulting in a more cohesive plan with a greater chance of success), increases the likelihood of a well-thought-out strategy, and reduces overlap of activities (creating efficiencies).

For example, the California Rural and Urban Regional Broadband Consortia,³⁸ funded through the California Advanced Services Fund, is used to promote universal broadband deployment and to advance broadband adoption in unserved and underserved areas. The funds cover activities such as stakeholder engagement, local planning, data gathering, and knowledge sharing. In addition, New York State, in partnership with the Fiber to the Home Council, created a Broadband Strategy

³⁶ For example, the Bill & Melinda Gates Foundation created a report on R&E networks for libraries that can serve as a useful resource for all stakeholders. See Bill & Melinda Gates Foundation, *Connections, Capacity, Community: Exploring Potential Benefits of Research and Education Networks for Public Libraries*, 2011. Accessed online at <http://library.alaska.gov/pdf/anc/owl/CCCRENetworkPaper21Feb11.pdf> April 25, 2015.

³⁷ For additional resources, see Institute for Local Self Reliance, “Community Network Map,” <http://communitynets.org/communitymap>, accessed April 25, 2015. For a good description of the various broadband ownership and governance models, see New America Foundation and CTC Technology & Energy, *The Art of the Possible: An Overview of Public Broadband Options*, 2014. Accessed online at http://newamerica.net/sites/newamerica.net/files/policydocs/TheArtofthePossible-OverviewofPublicBroadbandOptions_NAFOTI-CTC.pdf April 25, 2015. Examples of municipal fiber-to-the-home networks are documented in Institute for Local Self Reliance and the Benton Foundation, “Broadband at the Speed of Light,” April 9, 2012. Accessed online at <http://www.ilsr.org/broadband-speed-light/> April 25, 2015.

³⁸ <http://www.cpuc.ca.gov/PUC/Telco/CASF+Consortia/>, accessed April 25, 2015.

Development Toolkit³⁹ to help guide community leaders looking to build a comprehensive local or regional broadband strategy.

Updating Broadband Procurement Contracts

States must continually update their broadband procurement policies in order to keep up with technological changes. State broadband procurement contracts affect the cost and quality of broadband service for state agencies as well as for local governments, libraries, and schools (if allowed).

Arizona, for instance, recently updated its state procurement contract process and provides a model for contract provision that other states should consider.⁴⁰ The Arizona contract:

- permits an increased number of qualified ISPs, including regional players (which in turn increases competition);
- harmonizes state contract terms with E-rate terms (to simplify applications for federal funding, where applicable);
- supports the creation of buying consortia involving diverse participants (e.g., schools, state and local agencies, non-profits, etc.) to achieve lower costs for all;
- extends contract terms up to 10 years for infrastructure expansion to give the ISPs time to recoup private infrastructure investments;
- standardizes service descriptions to allow for “apples-to-apples” price comparisons;
- requires providers to submit plans for infrastructure expansion; and
- allows providers to expand their territories and services offered.

Making the Most of Federal Public Safety Funds

Congress has mandated the development, build-out, and operation of the nation’s first nationwide, wireless public safety broadband network, FirstNet. Each state is currently receiving funds from the federal government to plan its own corresponding resilient, high-capacity network, leveraging its existing networks. (This example reinforces why each state should be continually identifying broadband assets: building FirstNet capacity most efficiently in the state requires being fully informed about the existing structures that are available to build on.) Importantly, a public safety network, once built, can have uses beyond public safety. So states should consider how they will leverage the new bandwidth made possible by the FirstNet funding.

Information about who is leading the creation of the public safety network in each state is available in the FirstNet state points of contact.⁴¹ For example, ConnectME was assigned FirstNet responsibilities in Maine, based on their past experience with the National Telecommunications & Information Administration broadband grant programs and their statutory duty to “identify and secure federal and other funding sources for broadband or wireless deployment and identify opportunities for coordination among providers, consumers and state and local governmental entities, including coordination with the statewide emergency radio network.”⁴²

³⁹ New York State Broadband Program Office and Fiber to the Home Council, “NYS Broadband Strategy Development Toolkit,” June 4, 2014. http://www.nysbroadband.ny.gov/sites/default/files/documents/ToolkitFINAL_6-4-14.pdf.

⁴⁰ Digital Arizona, “Arizona Education Broadband Assessments,” Powerpoint Presentation, October 2014. For additional information, see Center for Digital Government, “Best Practices Guide for Cloud and As-A-Service Procurements,” 2014. Accessed online at <http://www.govtech.com/library/papers/Best-Practice-Guide-for-Cloud-and-As-A-Service-Procurements.html> April 25, 2015.

⁴¹ <http://www.ntia.doc.gov/other-publication/2014/firstnet-stateterritory-single-points-contact>.

⁴² ConnectMe Authority Final Adopted Rule, 6-29-2007. Accessed online at <http://www.maine.gov/sos/cec/rules/90/99/639/639c101.doc> April 25, 2015.

Increasing Broadband Adoption

Creating robust and adequate broadband infrastructure is one important step toward creating technologically robust communities and economies, but another important goal is to ensure that as many people as possible are using this infrastructure. Internet access and technology skills are the ultimate bootstraps, allowing a state's residents to do more to help themselves and better their own lives—e.g., as they learn skills online, from how to fix a clogged sink to how to write code in a programming language.

The National Broadband Plan identifies the barriers to broadband adoption as cost, digital literacy, and relevance.⁴³ That is, the most important reasons why people do not use broadband are that they cannot afford the service, they lack the knowledge and skills to pursue online activity, and/or they see no benefit in using it.

States can address these barriers and increase broadband adoption—bringing the benefits of good Internet access to more of their residents—through targeted funding to libraries, schools, and community-based organizations, which provide public Internet access, technology training (see Increasing Digital Literacy below), and low-cost home Internet service.

California and Rhode Island have adopted two additional examples of strategies to increase broadband adoption. The California Emerging Technology Fund (CETF) was established as a non-profit corporation pursuant to orders from the California Public Utilities Commission during its approval of the mergers of SBC-AT&T and Verizon-MCI in 2005. As a condition of approval of the mergers, AT&T and Verizon were required to contribute a total of \$60 million over 5 years to CETF “for the purpose of achieving ubiquitous access to broadband and advanced services in California, particularly in underserved communities.” CETF’s goal is to reach 80% broadband adoption in California by 2017. The State of Rhode Island’s Minimum Standards and Regulations for Public Libraries⁴⁴ state that libraries receiving state funding must have staff trained in digital literacy available whenever the library is open.⁴⁵



The Smart Communities program worked to increase digital access and use by families, businesses and other institutions in five moderate and low income Chicago Neighborhoods. Created with input from residents and led by local organizations, the program built a culture of digital excellence that supported neighborhood goals – from education to economic development, from safety to youth programs.

*Photo courtesy of Smart Communities Chicago.
<http://www.smartcommunitieschicago.org/>*

Increasing Digital Literacy

Just as literacy has been deemed essential to Americans’ lives—and is supported through public schools and in other ways—basic digital literacy has now become a necessary skill set, both economically and socially. The American Library Association’s Digital Literacy Task Force defines digital literacy as “the ability

⁴³ See Federal Communications Commission, *Connecting America: National Broadband Plan*.

⁴⁴ State of Rhode Island, “Minimum Standards and Regulations for Public Libraries (2013),” 2013. Accessed online at <http://www.olis.ri.gov/pubs/plstandards/standards.php> April 25, 2015.

⁴⁵ To further explore the barriers to broadband adoption and the strategies that have been tested, see National Telecommunications & Information Infrastructure, “NTIA Broadband Adoption Toolkit Shares Best Practices Across U.S.,” May 2, 2013. Accessed online at <http://www.ntia.doc.gov/press-release/2013/ntia-broadband-adoption-toolkit-shares-best-practices-across-us> April 25, 2015.

Fostering Secure and Resilient Broadband Connectivity

As more people gain access to broadband and incorporate it into their daily lives, and as more applications—from education to health care to banking—are created to realize broadband's full potential, cybersecurity will have to become a key aspect of telecommunications policy. While states and local municipalities champion the benefits of home-grown, fast, reliable, and affordable broadband connections, they must also recognize the significant security risks associated with an 'always-on,' open, and fast connection. Broadband connections, in fact, can be vulnerable to cyber intrusions—from virus attacks to loss of data to hijacking connected devices to launch attacks—if security measures are not properly in place. Broadband's very characteristics—high speed and always on—make it attractive to hackers and cyber criminals.

Policy makers must recognize that increased Internet connectivity can lead to economic growth and improved public welfare, but only if that Internet connection and its underlying infrastructure are secure and resilient. Should states and municipalities implement broadband connectivity without an eye towards cybersecurity, they may create less resilient critical services, and allow room for increased e-crime, identity theft, fraud, and other malicious activities. In short, states should continue to support the broadband needs of their citizens, but they must also leverage policy, regulation, market incentives, and other measures to prevent and mitigate broadband security issues, lower the risk of cyber intrusions, and increase overall resilience. Solutions range from the simple (providing security packages and devising specific security software) to the far-reaching (establishing security standards for the companies that will be building and servicing the broadband infrastructure).

States and municipalities looking for guidance can look north to Canada. The Canadian government recognizes the importance of high-speed Internet access and is expanding its broadband program to further connect as many unserved and underserved households as possible. This effort, however, is backed by a commitment to increase citizens' confidence in online transactions, protecting privacy online, and safeguarding their families against cyber bullying and other online threats. Part of this plan includes new and updated cybersecurity laws, public awareness campaigns, the provision of authentication services, and additional efforts to secure the communication networks and devices that connect Canadians.

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to use information and communication technologies to find, evaluate, create, and communicate information; it requires both technical and cognitive skills.”⁴⁶

More than an infrastructure, the Internet has become a social institution that fosters the use of information, much like public education. For this reason, the United Nations has defined access to the Internet as a human right. Like education, broadband facilitates equality of opportunity for individuals and creates spillover benefits for the rest of society. These were the arguments for public education in the 19th century and they apply to the Internet today.⁴⁷

States can encourage the integration of digital literacy development into both formal education institutions (schools) and informal education institutions (libraries and community organizations). In many cases, these institutions—as well as workforce development centers and other government

⁴⁶ Digital Literacy Task Force of the American Library Association, “Digital Literacy Definition,” 2011. Accessed online at <http://connect.ala.org/node/181197> April 25, 2015.

⁴⁷ Karen Mossberger, Caroline Tolbert, and William Franko, “Digital Cities: The Internet and the Geography of Opportunity,” 2013.

agencies—are already teaching basic and advanced digital skills, but states can take steps to increase these offerings, for example by developing a state curriculum that offers best practices and sets standards for schools and other institutions around the state.

For example, the Rhode Island Department of Education has adopted a digital literacy training curriculum,⁴⁸ and has implemented use of the curriculum statewide in adult education programs. The digital literacy training curriculum was created by Broadband Rhode Island for libraries and non-profit organizations. Adoption of the curriculum by the Rhode Island Department of Education standardizes digital literacy training across the state.

Creating Increased Online Access to the Public Sector

For several reasons, states should work to increase the opportunities for two-way online interaction with government, including schools and other public institutions. This will increase residents' skills (as they practice handling online interactions) and employability, and create efficiencies for government.

State legislation requiring Internet use such as K-12 online testing, healthcare exchanges, online unemployment benefit applications, and other government interactions can increase convenience for both the government and individuals while also reducing costs for both staffing and physical space. Yet any plans for residents to interact with the public sector online should take into account people's opportunity to use these systems—which may be limited by users' skills or access to broadband networks.

For example, in 2011, the Michigan Legislature dedicated \$50 million annually to preparing the state's schools for statewide online student assessments through the 22i Technology Readiness Infrastructure Grant.⁴⁹ Their goals included building a statewide network to allow reliable access to assessments, establishing collective purchasing contracts for learning devices and online content, leveraging existing regional networks, and building the state's capacity to help educators take advantage of the new processes and technology.

CONCLUSIONS

This paper only begins the discussion of how states can help expand the use and benefits of broadband. Continuing, in-depth research on best practices would be helpful, so that decision-makers can better understand how to maximize the benefits to their states in areas such as civic engagement, education, health care, economic growth, workforce skills, open government, energy use, and public safety.

The following are a number of first steps leaders should consider as they try to move their states forward:

1. Determine what broadband access and use data is already available in the state; check the state's broadband access⁵⁰ or the national broadband map;⁵¹

⁴⁸ Rhode Island Department of Education and Broadband Rhode Island, "Press Release: R.I. Department of Education Recognizes Broadband Rhode Island Digital Literacy Training Curriculum for Adult Education Programming," March 4, 2014. Accessed online at http://broadband.ri.gov/Portals/0/Uploads/Documents/Public/RIDE_BBBRI_press_release - final - 3-4-14.pdf April 25, 2015.

⁴⁹ Michigan Legislature, "22i Technology Infrastructure Grant," 2011. Accessed online at <http://22itrig.org/> April 25, 2015.

⁵⁰ National Broadband Map, "About State Broadband Programs." Accessed online at <http://www.broadbandmap.gov/about/state-broadband-programs> April 25, 2015.

⁵¹ <http://www.broadbandmap.gov/>, accessed April 25, 2015.

use the American Community Survey⁵² to access data on Internet use in the state; find out if city or regional broadband adoption surveys have been conducted; and ask the business community and anchor institutions (schools, health organizations, libraries, community organizations) what their broadband needs are, and are projected to be, in coming years.

2. Determine what broadband infrastructure, home adoption, and digital literacy efforts already exist in the state; ask around, beginning with the state library and state broadband office (if there is one); check the Broadband Technology Opportunities Program⁵³ to find out who the grantees are in the state; check the U.S. Department of Agriculture Telecommunications Loans for 2014⁵⁴ for grantees in the state; check the FCC's Rural Broadband Experiments⁵⁵ for a list of successful applicants; and check the Community Network Map⁵⁶ to determine if (and where) communities in the state have created community broadband networks.
3. Find out who the broadband experts are in the state, and find structures for convening them in order to share information and perspectives. This is particularly important if the state has not created a state broadband commission/advisory council/task force.
4. Find out who the broadband providers are in the state. Look beyond the lead cable and telecommunications providers. Search the database of the Wireless Internet Service Providers Association⁵⁷ and Fiber to the Home Council members.⁵⁸
5. Consider who might care about broadband, healthcare, education (formal and informal), civic engagement, economic development, workforce development, and seniors. Reach out to them. The Connecticut Consumers Council held broadband forums for businesses, which discovered a clear need for affordable ultra high-speed broadband, plus invaluable real-life stories.
6. Find out what FirstNet activities are happening in the state, for example by checking the list of State and Local Implementation Grant Program grantees.⁵⁹ Find out how the excess capacity will be utilized when not being used for public safety.

While moving forward in the broadband arena requires dealing with a range of complex considerations, it also promises significant rewards for residents and stakeholders across the state. Creating an environment that is conducive to building capacity and innovation will benefit the state as a whole, and no state can afford to be left behind.

⁵² <http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>.

⁵³ <http://www2.ntia.doc.gov/>, accessed April 25, 2015.

⁵⁴ <http://www.rurdev.usda.gov/SupportDocuments/rdTelecomOct2014.pdf>, accessed April 25, 2015.

⁵⁵ <http://www.fcc.gov/encyclopedia/rural-broadband-experiments>, accessed April 25, 2015.

⁵⁶ <http://www.muninetworks.org/communitymap>, accessed April 25, 2015.

⁵⁷ <http://www.wispa.org/find-a-wisp>.

⁵⁸ <http://www.ftthcouncil.org/OurMembers>, accessed April 25, 2015.

⁵⁹ <http://www.ntia.doc.gov/slignp/slignp-awards>, accessed April 25, 2015.

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