



How States Are Expanding Broadband Access

New research identifies tactics for connecting unserved communities

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Acknowledgments

We would like to thank Catherine An, Louisa Barnes, Kimberly Burge, Richard Friend, Cindy Murphy-Tofig, Bernard Ohanian, Tricia Olszewski, Allie Tripp, Anne Usher, and Thad Vinson for their valuable editing and production assistance on this report.

We would also like to thank the internal and external researchers who served as editors, sounding boards, and advisers during the research process. Finally, we thank the state broadband programs and many other broadband stakeholders in the case study states who were so generous with their time and expertise.

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The Pew Charitable Trusts is driven by the power of knowledge to solve today's most challenging problems. Pew applies a rigorous, analytical approach to improve public policy, inform the public, and invigorate civic life.

Overview

Broadband is increasingly intertwined with the daily functions of modern life. It is transforming agriculture, supporting economic development initiatives, and is a critical piece of efforts to improve health care and modernize transportation. But the Federal Communications Commission (FCC) estimates that 21 million¹ Americans still lack broadband access. Other sources place this number as high as 162 million.²

Communities without reliable high-speed internet service cite a growing gap between the resources and opportunities available to their residents and those in communities that have a robust network.³ Recognizing the importance of broadband and responding to such frustrations, states are seeking to close this gap. Most have established programs to expand broadband to communities that lack it or are underserved.

The Pew Charitable Trusts examined state broadband programs nationwide and found that they have many similarities but also differences that reflect the political environment, the state's resource levels, the geography of the areas that remain unserved by broadband, and the entities that provide service.

While it is clear that there is no one-size-fits-all approach for state expansion efforts, some measures that many states have taken are proving effective. This report identifies and explores these promising practices through examples in nine states: California, Colorado, Maine, Minnesota, North Carolina, Tennessee, Virginia, West Virginia, and Wisconsin. Pew identified the practices through conversations with more than 300 broadband stakeholders, including representatives of state broadband programs, internet service providers (ISPs), local governments, and broadband coalitions.

These promising practices are:

- **Stakeholder outreach and engagement.** All states with broadband programs are working to engage stakeholders at both the state and local levels. At the state level, this includes broadband task forces and councils, as well as partnerships among state agencies. At the local level, it includes support for broadband committees and education of local stakeholders.
- **Policy framework.** Many states have created a policy framework for broadband deployment by setting well-defined goals and a clear policy direction in legislation and tasking agencies or setting up separate offices to lead statewide broadband programs. They are identifying and addressing barriers to facilitate broadband deployment in unserved and underserved areas. And they are connecting broadband to other policy priorities, including economic development, transportation, health care, and agriculture, to build partnerships and leverage more funding for expansion efforts.
- **Planning and capacity building.** Half of states have plans that define goals and objectives that provide a baseline against which to measure progress. Some also support local and regional planning efforts that help educate community members and build the local capacity necessary for successful broadband infrastructure projects. Local and regional planning efforts can help communities identify their needs and goals, start conversations with providers, evaluate options, and move toward implementing infrastructure projects.
- **Funding and operations.** Some states are providing funding to support broadband deployment in unserved and underserved areas through grant programs that fund a portion of the cost of deployment in these communities. They are also ensuring accountability by requiring that grantees demonstrate they are providing the service they were funded to deliver while also providing the state with the data needed to evaluate the program and progress toward defined goals.

- **Program evaluation and evolution.** States that are supporting planning efforts and funding infrastructure projects are evaluating the performance of these efforts and incorporating lessons learned. States continue to update program goals and activities as their programs mature, addressing broadband adoption and working to help communities make full use of their broadband infrastructure.

Policymakers can examine the practices these nine states have used to close gaps in broadband access and adapt them to fit their state's needs and contexts.

Definitions

- **Broadband.** Reliable high-speed internet, defined by the Federal Communications Commission as having download speeds of at least 25 megabits per second (Mbps) and upload speeds of at least 3 Mbps. It can be delivered via multiple technologies, including fiber, fixed wireless, digital subscriber line (DSL), or cable.⁴ Some states have different definitions of broadband.
- **Community anchor institutions.** Schools, libraries, medical and health care providers, public safety entities, institutes of higher education, and other community support organizations. These institutions may provide outreach, access, equipment, and support services to facilitate greater use of broadband service.
- **Internet backbone.** The primary data routes on the internet, including those that transport internet traffic between countries. It consists of high-capacity fiber-optic lines that carry large amounts of data. Local or regional networks can connect to the backbone for long-distance data transmission. These lines are owned by commercial, government, and academic centers.⁵
- **Internet service provider (ISP).** A company that provides individuals, businesses, anchor institutions, etc., with a connection to the internet. ISPs include telephone and cable companies, wireless ISPs, electric cooperatives, municipal utilities, and mobile wireless providers. They use different technologies, including fiber, cable, DSL, and fixed wireless, to deliver internet service to their customers.
- **Last mile.** The part of a telecommunications network that connects the local provider to the residential or small-business customer.
- **Middle mile.** A physical network that links the backbone to local internet networks, often called last-mile networks. In some communities, the middle mile may connect community anchor institutions to each other, enabling them to share applications, infrastructure, and other resources.
- **Open access network.** Networks that are owned by one entity and available for separate service providers to sell retail services. Networks that receive public funds, or that are operated by a public or nonprofit entity, are often required to provide open access.
- **Speed.** The rate at which a device can send or receive data. Speed is defined for both download (the rate at which data are sent from the internet to a device) and upload (the rate at which data are sent from a device to the internet). Speeds are conveyed in megabits per second.
- **Take rate.** The percentage of customers within an ISP's service area who subscribe to, or "take," the service.
- **Unserved area.** Areas that lack access to broadband service as defined by the state program.
- **Underserved area.** Areas that have internet service at speeds higher than those that are defined as unserved but lower than those that have broadband service as defined by the state program.

The broadband challenge

State efforts to expand broadband access are primarily focused on extending wired and fixed wireless infrastructure to the last mile: homes and small businesses. While providers have delivered reliable high-speed internet to doorsteps in most urban and suburban areas, many rural areas remain underserved or lack a connection. The challenge of closing the last-mile gap is compounded by geography, demographics, and the numbers and types of entities that provide service. In some states, these historic patterns have led to uneven deployment of broadband infrastructure. While one rural community may have “fiber to the home and to the farm and to the cabin”⁶ provided by a local telephone company or cooperative, another may lack broadband access.

For many states, areas without a broadband connection are the most difficult and expensive to serve. This may be because the population is sparsely distributed over a large area or geographic factors such as hills and hollows that make extending wired and wireless infrastructure more challenging. As Heather Johnson, commissioner of Maine’s Department of Economic and Community Development, noted, “The easy stuff, areas where the return on investment fits the current business model, I think, has been done.” Companies have completed the work, she said, when the business model was favorable or community engagement was high.⁷

For policymakers, the goal in areas that remain unserved is to create a business case that will encourage ISPs to build or extend service to areas where the costs of deployment are high. “I think the biggest challenge is simply the cost of infrastructure,” said Evan Feinman, Virginia’s chief broadband adviser. “While societally there is huge, very rapid return on investment from the deployment of this infrastructure, there is often just not going to be enough revenue to make spending millions of dollars on individual pieces of infrastructure a financially smart decision.”⁸

While states have set up funds to support expansion efforts, demand for funding from state grant programs often exceeds the amount that is available to connect areas that are underserved or lack service. The Tennessee Advisory Commission on Intergovernmental Relations estimated in a 2017 report that connecting the up to 160,000 unserved homes in areas of the state ineligible for funding through the FCC’s Connect America Fund would cost \$125 million to \$799 million.⁹ In the first two rounds of its grant-matching program, Tennessee was able to invest \$25 million and leverage \$30 million from the private sector, but it received more than \$128 million in grant requests.¹⁰

Defining success

State broadband programs are primarily defining success by the increase in the number of connected residents. But their benchmarks—based on speed, coverage, and timelines—differ. Wisconsin’s goal is for “every Wisconsinite to have affordable access to broadband service, if they so choose, by Jan. 1, 2025.”¹¹ Maine’s target, too, emphasizes universal availability to residents, businesses, and community anchor institutions, but it also addresses service quality and broadband use, specifying that it be secure, reliable, competitive, sustainable, and able to meet future needs—and that residents and businesses can take advantage of the economic opportunities provided by access.¹² Some states, including Minnesota¹³ and California,¹⁴ have formalized their goals in statute. Others, including Virginia and North Carolina, have outlined their goals in broadband plans.¹⁵

States are also looking at secondary measures of success, such as ensuring that broadband service is affordable and reliable and that communities have the knowledge and tools to use it to support their economic development or other goals. Danna MacKenzie, former executive director of Minnesota’s Office of Broadband Development, said she hopes that in addition to hitting access targets the state has set for 2022 and 2026, the state achieves a “softer” goal: evidence that communities are leveraging network investments to make their economies stronger.¹⁶

Jordan Beezley of Colorado's Department of Regulatory Agencies defined success more broadly as "when the end user doesn't think about it. ... It's like electricity. I don't have to think about whether or not the house I'm going to buy has electricity or whether or not that electricity will work," he said. "Once we are at that point [with broadband], I think we've won."¹⁷

Common components

Some commonalities contribute to the success of state broadband programs, in addition to the promising practices Pew identified. They are related to leadership and staffing rather than the broadband programs' design or core functions. Stakeholders consistently referenced these components as central to the success of broadband initiatives in their states.

- **Leadership.** Successful programs have strong leadership from governors, legislators, and agency heads. If the governor's office is focused on broadband, it will bring more attention to the issue. It can also help make broadband a priority within state agencies, ensuring that it is incorporated into state programs. "Having that leadership from the governor's office is imperative because it really energizes all of the state agencies around incorporating that thinking," said Angie Dickison, former director of the Wisconsin Broadband Office.¹⁸ And legislative champions can help keep the topic at the forefront in the Legislature, introduce measures, and educate their peers.
- **Dedicated broadband staff.** Having staff dedicated to broadband is important to avoid having work on the issue become "other duties as assigned." Staff who are focused on broadband can develop expertise. And assigning them to the issue creates accountability and responsibility, and provides stakeholders with a point of contact.
- **Visibility and responsiveness.** Having visible broadband directors and staff who attend meetings and events around the state, not just near the capital, is essential. These can include informational sessions about the state's grant program, broadband committee meetings, and ribbon cuttings or check presentations for grant projects. They are also responsive to questions from grantees and constituents.
- **Connectors.** Successful broadband programs build strong relationships with multiple stakeholder groups and are viewed by them as a trusted partner. They provide a neutral voice when educating policymakers and community leaders and become a reliable resource for information on broadband. As a result, they often play a central role in facilitating coordination and building partnerships to advance broadband projects and policy.

Important differences

While many similarities exist across state broadband programs and the activities that they are undertaking to close gaps in access, notable differences also are evident. These include the form and structure of the program, its life span, the resources the state has committed, and the provider landscape:

- **State programs take different forms.** Some states, including Minnesota and Colorado, have broadband offices established by statute or executive order. Others, including Tennessee, have staff within an agency dedicated to supporting broadband. Where these programs are located also differs and may include coordination across multiple departments or agencies. Minnesota's Office of Broadband Development is within the Department of Employment and Economic Development, while the Wisconsin Broadband Office is housed in the Public Service Commission of Wisconsin. And Colorado's Broadband Office is part of the Governor's Office of Information Technology and coordinates closely with the Department of Regulatory Agencies and the Department of Local Affairs, which administer broadband grant programs.
- **State programs are in different phases.** State broadband programs were established at different times.

Some states, including North Carolina and California, have made efforts to expand access for more than a decade. Others established programs to provide continuity following the State Broadband Initiative, which provided federal funding to support broadband activities in all 50 states from 2009-14.¹⁹ Many of these programs are still relatively new. For example, Minnesota's Border-to-Border Broadband Development Grant Program was established in 2014, and Tennessee's broadband program was created through the Tennessee Broadband Accessibility Act in 2017.

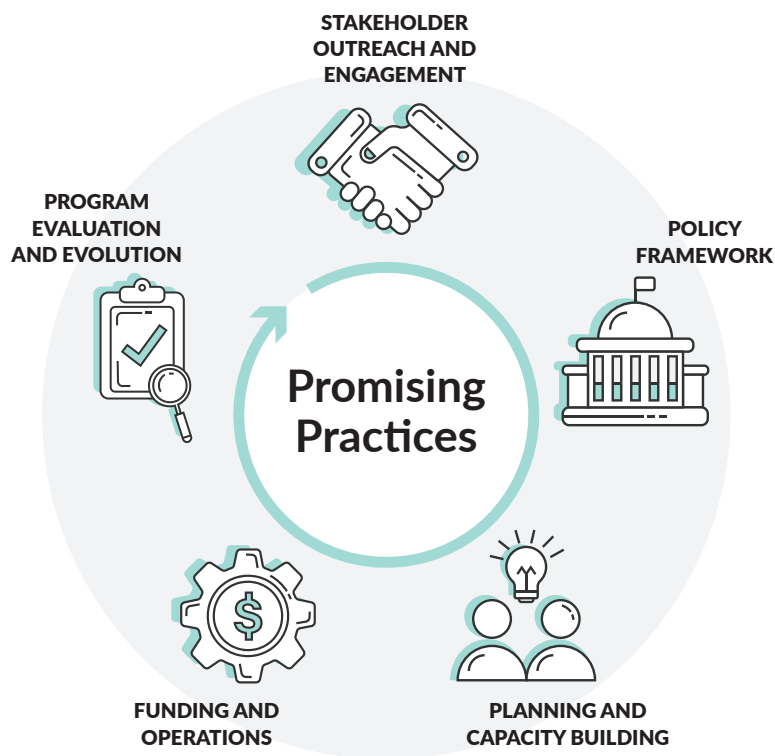
- **State programs have different resource levels.** State programs are making an impact with differing levels of grant funding and staff resources. Minnesota's Border-to-Border program has invested over \$85 million in broadband infrastructure projects since 2014,²⁰ while Wisconsin has funded more than \$20 million in Broadband Expansion Grant projects since 2013.²¹ Although higher funding levels allow states to pay for larger projects, state grant programs can still have an impact with more limited financial assets. Resource levels also extend to staffing, which may affect a program's scope. The Colorado Broadband Office, for example, has six full-time staff members, including people focused on broadband data, federal funding, and public-private partnerships, in addition to dedicated staff for the state's two broadband funds. Maine's ConnectME Authority, by contrast, has two staff members dedicated to broadband.
- **States have different provider landscapes.** States have different numbers and types of ISPs. This variation is the result of historic regulatory and investment decisions that still affect who provides service and where—including middle- and last-mile availability. Some, including Maine, have robust middle-mile networks, while access to the middle mile remains a challenge in other states. Having middle-mile networks in place can reduce costs associated with expanding last-mile broadband service to unserved areas. Provider footprints may also be influenced by state laws defining what entities can and cannot provide broadband service. Some states, such as California, are primarily served by several large national or regional providers. Others, such as Minnesota and Wisconsin, have many smaller providers, including independent telephone companies, telephone cooperatives, and fixed wireless providers that serve small and rural communities. Some states, including Tennessee, have multiple cooperatives that provide electric service in rural areas and may provide broadband service, while in other states, such as West Virginia, electric cooperatives do not have a significant presence.

Promising practices

The nine states featured as examples in this report are using similar practices to close gaps in broadband access but have tailored them to their policy landscapes and needs. These promising practices build on research in Pew's State Broadband Policy Explorer²² and are drawn from interviews with broadband stakeholders, including state broadband programs, other state agencies, ISPs, and local and regional organizations, in each of these states. No state has incorporated all of them, but all nine have implemented most of the practices, either through a formal state program or partnerships.

The practices are:

- Stakeholder outreach and engagement.
- Policy framework.
- Planning and capacity building.
- Funding and operations.
- Program evaluation and evolution.



They reflect activities that stakeholders in these states identified as central to the progress they have made toward achieving broadband deployment goals.

The promising practices are mutually reinforcing. While they may build on each other, they are in many cases being done simultaneously and do not have to be sequential.

As stakeholders in Maine noted, as states work to address broadband challenges there are “no silver bullets, just buckshot.”²³ Possibly “silver buckshot.”²³



Stakeholder outreach and engagement

States are actively engaging stakeholders in their broadband efforts to gain broad support and ensure that policy, planning, and funding are designed to serve all communities’ needs. These entities bring different perspectives on broadband challenges and resources to solve them. And they interact in multiple ways. For example, ISPs and local governments may receive funding to implement grant programs, and interest groups and lawmakers can be advocates for deployment efforts.

State officials are doing the following:

- **Working with a broad range of entities.** Recognizing that broadband underlies many aspects of modern life, state broadband programs are building relationships with a range of stakeholders at the state and local levels, including state agencies, county and municipal leagues, provider associations, rural advocacy groups, broadband coalitions, local government officials, local and regional economic development and planning organizations, business owners, health care organizations, and local broadband champions. For example, Virginia’s Commonwealth Connect Coalition, which is led by the state’s chief broadband adviser, engages a diverse set of stakeholders, including ISPs, professional associations, major employers, and technology companies, to advance the broadband policy. And the North Carolina Digital Equity and Inclusion Collaborative brings together nonprofits, universities, and state agencies to develop strategies for closing the state’s digital divide.

- **Collaborating with state-level partners.** State task forces and councils advise and evaluate efforts and may make policy recommendations. States also use interagency working groups and formal partnerships to implement programs. Interviewees noted that absent a mandate or funding to facilitate a collaborative project, meaningful coordination can be a challenge. State-level engagement can also be more informal, as when other agencies refer constituents to the broadband program or the program coordinates with organizations that have similar goals. For example, an interagency task force in North Carolina assesses progress on the state's broadband plan, prioritizes state efforts, and coordinates responses to federal funding opportunities.²⁴
- **Engaging local stakeholders.** Because state broadband programs are aimed at the local level, they engage with local stakeholders. This engagement educates local elected officials on why broadband investment is needed, builds awareness of state resources to support broadband and how to access them, supports local broadband planning committees, facilitates conversations between communities and ISPs, and celebrates local projects. Local stakeholders may also participate in state task forces, offering the perspective of unserved communities. As Bernadine Joselyn of the Blandin Foundation, a nonprofit organization that works to strengthen Minnesota's rural communities, said, "You can do harm ... if you have a task force that doesn't really represent the needs of communities."²⁵



Policy framework

State policy creates the framework for broadband deployment by setting goals, defining who is responsible for broadband and what those responsibilities are, and addressing how broadband intersects with other policy areas. "Unless there is a voice of power within government saying, 'This is where we're going,' it's going to take a lot longer to get there," said Sunne Wright McPeak, president and CEO of the California Emerging Technology Fund. "Having [specific goals] become the policy of a government entity is the difference between night and day."²⁶

Many states are doing the following to create a policy framework:

- **Defining a clear policy direction.** States are establishing specific goals for broadband access, setting timelines for achieving them, and creating broadband programs. These measures, often set in statute, create a framework for broadband expansion efforts, providing clarity to providers and communities as they make decisions about investing in broadband infrastructure. Minnesota, for example, established a goal of border-to-border broadband access at speeds of 25 Mbps/3 Mbps by 2022 and speeds of 100 Mbps/20 Mbps by 2026.
- **Addressing identified policy barriers.** States are identifying and addressing potential barriers to connectivity to facilitate investment in broadband infrastructure. This includes clarifying which entities can provide broadband and access the infrastructure or rights of way needed to deploy broadband infrastructure. Tennessee²⁷ enacted legislation allowing electric cooperatives to provide internet service. Colorado approved a measure allowing existing electric utility easements on private land to be used for commercial broadband service as long as the utilities notify the property owner.²⁸ And Maine enacted a law exempting municipalities in unserved or underserved areas from the "make-ready costs" of preparing a utility pole for a new attachment.²⁹

- **Connecting broadband to other policy priorities.** Connecting broadband to other policy issues—including economic development, transportation, and agriculture—underscores its importance and can help build partnerships to improve connectivity. It can also allow states to use funds that are not specifically directed to broadband expansion. These include federal funds for economic and community development, such as the Community Development Block Grant program, the Commerce Department’s Economic Development Administration, and—for states in the Appalachian Regional Commission’s area—the Partnerships for Opportunity and Workforce and Economic Revitalization program.



Planning and capacity building

State broadband plans define goals and objectives, identify steps to achieve them, help guide state investments, provide a baseline against which to measure progress, and provide a framework for local planning efforts. Local plans, in turn, help educate community leaders and residents, putting them in a better position to carry out infrastructure projects—and apply for state grant funds when available. At both levels, planning processes ensure a systematic approach and depend on stakeholder outreach and engagement to develop robust goals and recommendations that may inform policy and program decisions. Planning processes do more than chart a path; they help educate stakeholders and build the consensus, buy-in, and relationships that are necessary to achieving goals.

States are engaging in the following planning activities:

- **Adopting state broadband plans.** Broadband plans may focus exclusively on broadband availability, or they may address broadband adoption and include other policy areas such as economic development, education, public safety, health care, and agriculture. Some states have statutory requirements to develop a state broadband plan.³⁰ Others, including Virginia, have plans that define the governor’s vision and contain policy recommendations. Statewide planning can also be initiated by federal requirements. For example, having an adopted state broadband plan provides additional points on scoring for the U.S. Department of Agriculture’s ReConnect Loan and Grant Program.³¹
- **Supporting local and regional planning efforts.** Planning helps communities define broadband goals and needs and identify projects for funding. Conversely, funding also can help give communities the capacity necessary to undertake a focused broadband planning effort. Some state grants require or incentivize planning. Maine’s ConnectME Authority, for instance, provides grants to help municipalities and local and regional nonprofit organizations define community needs, understand existing assets in the community (such as poles and wireless towers that can support broadband deployment), and evaluate options for broadband service before initiating infrastructure projects. In states that do not provide planning support, a nonprofit or foundation partner may fill this role.

“ A challenge for all of our local partners is that the more likely you are to have a big connectivity problem ... the less likely you are to have excess resources or staffing capacity to actually address it. Trying to pull ... some of that work up to our level so that we can support them is going to be a big part of what we’re doing.”

Evan Feinman, *Virginia’s chief broadband adviser*



Funding and operations

States often support broadband deployment through grants and loans to ISPs, nonprofit utility cooperatives, and local governments to help make projects economically viable. These programs and their requirements are defined in state statutes, which may outline eligible grant recipients, scoring criteria, and challenge procedures to help ensure accountability. Stakeholder engagement and planning processes help inform which grants are funded.

States have different definitions in their funding programs for unserved areas—those without access to broadband service. For example, California defines an unserved household, for the purpose of California Advanced Services Fund broadband grants, as one in which no facility-based broadband provider offers service at speeds of at least 6 Mbps/1 Mbps.³² West Virginia defines an unserved area as a community that lacks broadband access.³³ States that define underserved areas prioritize investment in unserved areas but are also able to fund projects that cover or include underserved areas.

States fund and structure their broadband grant programs in different ways:

- **Provide state funding to support broadband deployment in unserved and underserved areas.** States are providing support, primarily through grants, to facilitate broadband deployment in unserved and underserved areas. Several, including Minnesota and Tennessee, are funded through appropriations,³⁴ while others, including California and Colorado, have repurposed funds that have traditionally supported universal telephone service.³⁵
- **Address accountability for investments.** States put grant reporting, data collection, and other accountability measures in place to ensure that funded projects deliver the promised service and provide data necessary for the state to evaluate progress toward its goals. “What I’m focused in on with our grants is essentially ensuring that grantees are following through with what they said they’re going to do, ensuring that the access is actually provided to those communities,” said Beezley, Colorado’s broadband deployment director.³⁶



Program evaluation and evolution

States are evaluating the performance of their broadband programs against stated or legislated goals, such as the number of new locations connected. These evaluations can inform next steps, such as addressing broadband adoption and digital literacy, or expanding the focus of a broadband program to applications (for example, precision agriculture, the use of technology, such as GPS guidance on tractors and soil monitors, to better calibrate production; distance learning; and telemedicine). Lessons learned can prompt changes to a state's broadband policy and activities, including how and which stakeholders it engages, the types of planning and technical assistance it offers, and the design and administration of grants.

As states work to understand the impacts of their programs and consider next steps, they are doing the following:

- **Evaluating program performance.** States conduct formal and informal evaluations of their programs. For grant programs, an annual report to the Legislature is a common requirement. States also informally evaluate their programs, using success stories, customer testimonials, and other anecdotal evidence that demonstrate the impacts of their investments. The level of evaluation differs across states, with more highly funded programs often having more requirements. Although states gather significant data through monitoring and reporting of their grant programs, they may lack the staff to conduct additional analysis. In addition, many programs are still in early stages, and their impacts are just beginning to be realized. For example, the California Public Utilities Commission evaluates the impact of projects it funds by measuring the level of broadband adoption, the number of previously unserved households that now subscribe to broadband, and other metrics.

- **Updating program goals and activities.** As state programs mature, they are seeking to ensure that residents can take full advantage of the benefits of broadband, such as telecommuting, precision agriculture, and distance learning. Tennessee’s program has partnered with the State Library and Archives, and Minnesota and Wisconsin have implemented Telecommuter Forward! programs. Efforts at this stage include digital literacy training and programs aimed at boosting the subscription rates for broadband services and improving residents’ ability to use broadband applications.

When evaluating how their programs should evolve, states are also considering how the amount and types of broadband services may change.³⁷ Robert Tse, senior policy adviser for the USDA’s Telecommunications Program, said policy discussions about broadband “should be future-oriented and figure out what are the uses of broadband we’re going to have at that higher speed.”³⁸

Promising practices in action

This section provides examples of how the nine states are engaging stakeholders, creating and adapting their policy frameworks, planning and building capacity, funding and operationalizing their grant programs, and evaluating and improving these programs.

Stakeholder outreach and engagement

California

California actively engages with state and local stakeholders through mechanisms that are defined in legislation. Lawmakers established the California Broadband Council (CBC) in 2010 to create a forum in which state agencies could share information and identify ways to work together to improve broadband access.³⁹ The council includes representatives from many state agencies engaged in broadband—including the California Public Utilities Commission, the California State Transportation Agency, the California Office of Emergency Services, the Governor’s Tribal Advisor, and the California State Library— and is staffed by the Broadband and Digital Literacy Office within the state Department of Technology. It also has an advisory council that includes representatives from the USDA and the Southern California Tribal Chairmen’s Association.

The CBC has five task forces that engage a broad range of stakeholders, including nonprofit organizations and federal agencies:

- The Long-Term Goals Task Force focuses on the future of broadband in California.
- The Tribal Task Force works to ensure that tribal communities are engaged in the broadband conversation, emphasizing adoption and digital literacy.
- The Surplus Equipment Task Force focuses on finding ways to shrink the digital divide using refurbished surplus equipment from state agencies.⁴⁰
- The Strategic Corridors Task Force focuses on prioritizing highways for broadband deployment.
- The Digital Equity for All Task Force works to develop guiding principles on Californians’ rights to broadband access and adoption.⁴¹

While the CBC has served as a convener for state agencies and other partners, it has lacked a clear mandate; as a result, agencies have sometimes not prioritized participation. However, leadership for the CBC recently transitioned to the California Department of Technology, and there has been renewed focus on the council’s mission and accountability from member agencies.⁴² Stephanie Tom, deputy director of broadband and digital literacy, said council members’ participation is important, not only as representatives of their department or agency at meetings, but as advocates within their agencies to integrate and prioritize broadband initiatives. “Ultimately, the collective efforts of all council members is necessary to lead the state to digital equity.”⁴³

One of the most engaged members of the council is the California Emerging Technology Fund (CETF), a quasi-governmental nonprofit founded in 2005 as a condition for the California Public Utilities Commission's (CPUC) approval of the SBC-AT&T and Verizon-MCI mergers. The fund provides annual reports to the Legislature through the commission, but the CPUC does not oversee CETF operations or programs, making CETF a rare example of a nonprofit entity established by a state regulatory entity with the aim of closing the digital divide. With an initial \$60 million, the fund has worked to address broadband access and adoption challenges in California by advocating in the Legislature, educating local government leaders, making grants supporting technology adoption and digital literacy, creating public awareness, and forging partnerships among stakeholders.⁴⁴ In short, the fund uses its membership on the CBC to advocate for the public interest.

Having the fund as a champion in the ear of lawmakers and other decision-makers as large corporate acquisitions occur is beneficial, said Eileen Harris, development director of the nonprofit human-I-T, a California Advanced Services Fund (CASF) grantee. "It trickles down to be able to make sure that underrepresented folks are being seen and heard in those conversations," she said.⁴⁵


Regional broadband consortia provide another important forum for engaging stakeholders. Eleven of these associations receive funding through CASF, administered by the California Public Utilities Commission, and bring stakeholders together to develop broadband plans and help applicants develop projects for CASF grants.⁴⁶ Some consortia also provide technical assistance, educate elected leadership and the public about broadband, and conduct market research to attract providers.⁴⁷ "The consortia are a mechanism to build a bottom-up strategy and have a way to connect with the state and create a state-regional partnership or a state and federal partnership," said Trish Kelly, managing director of Valley Vision, a regional broadband consortium based in the Central Valley.⁴⁸

Key takeaway: Coordinated engagement across multiple stakeholder groups helps advance broadband goals.

Minnesota

Strong, collaborative relationships between stakeholders are the cornerstone of Minnesota's efforts to expand broadband access. "It is talking to people and understanding what they need ... and trying to reflect their voice in the policy and programs," said MacKenzie, the former executive director of the Office of Broadband Development.⁴⁹ Minnesota has built these relationships through formal and informal engagement.





The Governor's Task Force on Broadband, formed in 2011, provides a forum for stakeholders to study and discuss issues related to broadband.⁵⁰ Its 15 members represent communities, businesses, local governments, educational institutions, health care facilities, tribes, and ISPs.⁵¹ As former Chairwoman Margaret Anderson Kelliher noted, "There is value in having an outside group that is not exclusively elected and appointed officials but has more of a perspective of a public view."⁵² The task force releases an annual report outlining policy recommendations for the governor and Legislature, and its work has helped to advance the state's broadband policy. (For more on Minnesota's broadband policy, see the "Policy framework" section below.)

The nonprofit Blandin Foundation has been an important partner for Minnesota's broadband program. The group has worked on broadband efforts since 2007,⁵³ including engaging communities across the state on connectivity issues. It also provides grants and technical assistance to support broadband planning and adoption efforts, including helping communities write successful applications for the Border-to-Border Broadband Development Grant Program.⁵⁴ (For more on Minnesota's grant program, see the "Funding and operations" section below.)

Blandin also amplifies the voice of rural communities through the Minnesota Rural Broadband Coalition, which it formed with the Office of Broadband Development in 2015 to "strengthen rural people's capacity to be their own voice."⁵⁵ The coalition brings together local governments and community groups, business and philanthropic partners, and others from rural areas across the state that are interested in broadband development.⁵⁶ And it lobbies the Legislature to support broadband expansion efforts, including funding for the Office of Broadband Development and the Border-to-Border grant program.

Key takeaway: Partners can be valuable advocates and sources of support for broadband programs.

Policy framework

California

Since it began focusing on broadband in the 1990s, California's state government has shown a commitment to universal service and an increasing connection between broadband and other policy issues, including transportation, education, agriculture, and the environment. These ties are reflected in legislation and regulatory decisions by the California Public Utilities Commission.

More recently, in 2007, the commission created the CASF to facilitate broadband deployment in unserved and underserved parts of the state, reflecting its growing importance as an engine for economic growth. The commission said at the time, "While we believe that solutions to the digital divide are best driven by market forces within the telecommunications and internet industry, the public sector has a role to play as well, particularly where in some places in California, the market has failed to bring advanced communications to it."⁵⁷ A year later, California's Legislature passed a bill reaffirming the CASF, which is funded by a surcharge on intrastate telecommunications services.⁵⁸

Over the past decade, California has passed several major pieces of legislation focused on facilitating broadband deployment and adoption. In 2017, a measure sponsored by the California Emerging Technology Fund created the CASF Broadband Adoption Account, which provides \$20 million for digital literacy programs. The legislation also revised the state's goal for broadband coverage, which had been 98 percent statewide, to 98 percent access for each of the regions receiving funding for regional planning activities.⁵⁹ This recognized that meeting a statewide goal could still leave significant disparities among regions, resulting in households that were unserved in 2007 remaining unserved.⁶⁰ The measure also reduced the upload speed that defined unserved areas. The figures remain controversial and have led to concerns that parts of the state would be ineligible for grants or be left with obsolete technology.⁶¹

California has also connected broadband to its transportation policy. Legislation passed in 2016 created a “dig once” policy, which requires the California Department of Transportation to notify ISPs of planned roadwork projects and develop clear procedures for allowing providers to access state rights of way.⁶² Its aim was to streamline the process for these providers to deploy infrastructure along state highways by identifying opportunities to bury fiber-optic cables in ground that has already been opened for roadwork. A measure passed in 2019 also highlights California’s efforts to connect broadband to other policy areas. The legislation added representatives from the Department of Food and Agriculture, the State Library, and the Governor’s Tribal Adviser to the California Broadband Council.⁶³ These additions underscore that broadband access is tied to many of the state’s priorities. For example, it is an important tool for farmers to submit the data necessary to comply with environmental regulations and deploy new technologies to manage their operations.⁶⁴

Key takeaway: A broadband policy framework includes multiple elements that can span policy areas.

Minnesota

Minnesota has placed most of its broadband program in statute, including clear goals for broadband expansion, a state broadband office, and a fund to support broadband infrastructure.

The state’s broadband goals serve as the “North Star” for its broadband activities, said MacKenzie, the former executive director of the Office of Broadband Development.⁶⁵ Through measures passed in 2010 and updated in 2013, Minnesota aims to connect all homes and businesses at speeds of at least 25 Mbps/3 Mbps by 2022 and 100 Mbps/20 Mbps by 2026 and become a national and international leader.⁶⁶

Based on a recommendation by a broadband task force appointed by the governor, the Legislature created the Office of Broadband Development in 2013 to facilitate broadband expansion and help the state make progress toward these goals. The office is designed to sunset when the commissioner of the Department of Employment and Economic Development (DEED), where the office is located, determines that the targets have been met. In 2014, the Legislature followed through on another task force recommendation and created the Border-to-Border grant program to extend broadband service in unserved and underserved areas.⁶⁷ (For more on the grant program, see “Funding and operations” below.)

Managing the grant program is a central function of the development office, which also produces broadband coverage maps and provides technical assistance to communities looking to improve connectivity. MacKenzie said the office provides a single entity that is responsible for broadband policy and to which people can turn with questions.⁶⁸ It’s seen as a neutral source of information, a trusted partner, and a vital resource for communities trying to navigate broadband projects.⁶⁹

The Office of Broadband Development is within the Department of Employment and Economic Development⁷⁰ because DEED is a nonregulatory agency that could be seen as a trusted partner for ISPs and had experience in making grants.⁷¹ In hindsight, stakeholders say this pairing has also helped demonstrate the connection between broadband and economic development.⁷²

Key takeaway: Setting a forward-looking goal and rallying everyone around it brings focus to a program and ensures that all stakeholders are working toward the same target.

West Virginia

West Virginia has promoted broadband expansion by examining and eliminating barriers to deployment. The Legislature also established the West Virginia Broadband Enhancement Council to provide policy guidance and technical assistance to communities looking to expand broadband access.

The state has passed several bills to encourage broadband expansion. In 2017, the Legislature passed a measure that established a goal of providing broadband access statewide, allowed the formation of cooperatives to provide the service, created a loan guarantee program to reduce risk for commercial lenders, and allowed ISPs to use microtrenching technology to install infrastructure.⁷³

The Broadband Enhancement Council's members include state legislators; broadband users, including businesses and residents; local government officials; and state agencies. The council develops recommendations for policymakers and helps communities identify and apply for federal and other sources of funding.⁷⁴ The council is staffed by the West Virginia Development Office, an agency within the state Department of Commerce.

Stakeholders say the council's makeup is a key to its success. Most members are private citizens or representatives of local communities, which has helped ensure that the council's recommendations are focused on the interests of unserved and underserved communities. Having state lawmakers as nonvoting members also contributes to its effectiveness, because it means that the council's proposals have strong champions within the Legislature. "The council is kind of that drum that continually beats, that gets support, that rallies the troops," said Robert Hinton, the council's chairman. "I think the council has been a catalyst that has encouraged the Legislature to really be aggressive."⁷⁵

The Broadband Enhancement Council has identified broadband as critical to the economic future of West Virginia communities, including revitalizing parts of the state that have been affected by mine closures.⁷⁶ (These programs will be discussed further in the "Planning and capacity building" section below.) Focusing on broadband's economic development potential has allowed the council to use federal funding sources that support economic and community development efforts for broadband. These include the Community Development Block Grant program, the Appalachian Regional Commission's Partnerships for Opportunity and Workforce and Economic Revitalization, and the Abandoned Mine Land grant program operated by the Office of Surface Mining Reclamation and Enforcement, which funds economic development projects in places that have been affected by the decline of the coal industry.⁷⁷

The Broadband Enhancement Council continues to evaluate the state of broadband deployment in West Virginia and identify barriers that need to be addressed. And the Legislature has continued to make policy changes. In 2018, it passed legislation that allows the Division of Highways to lease access to rights of way to ISPs and created a "dig once" process in which the division notifies utilities, including broadband providers, of upcoming roadwork projects.⁷⁸ And a 2019 law gives the state Public Service Commission the power to regulate the terms under which the owners of utility poles can negotiate pole attachment agreements.⁷⁹

Kelly Workman, administrative director for the broadband initiative within the West Virginia Development Office, said lawmakers are taking a methodical approach each year to addressing any identified barriers to increasing connectivity. "There are already some discussions on what remains to be addressed in 2020 to make West Virginia a more welcoming place for broadband deployment, because we realize broadband's significance to our economic future," Workman said.⁸⁰

Key takeaway: States can use multiple policy levers to expand broadband access, and these do not have to be dependent on available funding.



Planning and capacity building

Colorado

Colorado has made a significant investment in broadband planning at the regional level. In addition to supporting the development of regional broadband strategies, the planning process has helped to educate community leaders about the importance of broadband and develop local broadband champions who have been instrumental in moving projects forward.

The Colorado Department of Local Affairs (DOLA), which centralizes the state's financial and technical assistance to local governments, funds regional broadband planning grants in two phases. The first phase requires grantees—generally regions—to complete a strategic plan for broadband deployment. This phase helps communities define goals, understand their existing assets, aggregate demand across the region, and examine potential solutions, including private ownership and public-private partnerships. DOLA requires that grantees invite providers to participate in the planning process, providing opportunities for communities to explore partnerships or learn where providers might be planning or willing to extend their service.

A challenge for regions during this initial phase has been a Colorado law that limits the ability of local governments to own and operate broadband networks or provide internet service, though communities are able to opt out through a referendum.⁸¹ For communities that are still subject to the measure, DOLA can provide grant funding for middle-mile infrastructure, but it can be used only for governmental purposes, such as connecting community anchor institutions. Funding for infrastructure that supports nongovernmental uses can be used only for “dark fiber,”⁸² fiber that is in place but is not being used for broadband services.

Once the phase one plans have been completed, communities can apply for additional funding for a second planning phase. During this period, counties or regions create more detailed plans to help them submit successful infrastructure grant applications. Greg Winkler, regional manager and broadband coordinator for DOLA, said 21 counties or regions have completed plans, and some are starting to install fiber. “I would tell you that the best practice that we did was we had everybody do a plan, and then we made them follow the plan.”⁸³

DOLA also funds two regional broadband coordinators in partnership with the Northwest Colorado Council of Governments and Region 10. The coordinator provides technical support to the department and the other regions, as well as assistance to communities.⁸⁴ Support from DOLA, through the planning process and the regional broadband coordinators, helps educate local leaders and build the political will necessary to address broadband challenges. This is essential for generating support for contributing the required matching funds toward grant applications. Communities “where you’ve got local engagement, where there is a person on the ground that says ‘No matter what, we’re going to figure out how to get broadband into this community’ ... that’s where we have the most success,” said Tony Neal-Graves, executive director of the Colorado Broadband Office. “And in fairness to a lot of communities, they don’t always have the expertise ... to even know how to do this.”⁸⁵

After broadband plans are completed, counties and regions are eligible for DOLA infrastructure funding for middle-mile infrastructure (discussed in more detail in the “Funding and operations” section below). Proposed projects must be consistent with the approved regional plans. Funding for middle-mile infrastructure has helped facilitate last-mile builds to unserved areas of the state by extending fiber infrastructure into communities.⁸⁶

Key takeaway: Supporting broadband planning on the regional level helps facilitate middle-mile projects that meet each region’s needs and opportunities.



Shift From Coal to Fiber Brings Jobs Back to Western Colorado

In Delta County, Colorado, a rural county about a five-hour drive west of Denver, two coal mining companies closed between 2014 and 2016. Nearly 1,000 jobs were lost, a devastating blow for a close-knit community of 31,000 residents. “A thousand jobs in Delta County is like losing 30,000 jobs in the Denver metro area, if you compare it population-wise,” said Michelle Haynes, executive director of local economic development agency Region 10.⁸⁷

Jobs, and people, had already been leaving Delta County before the mines closed: Between 2010 and 2014, the county experienced the largest population decrease in western Colorado as people left to find work elsewhere. Meanwhile, lack of access to reliable, fast internet kept new businesses from establishing themselves in the county—and forced some existing businesses to abandon the county, just as the coal companies did.

In 2015, Region 10 received a grant from the Colorado Department of Local Affairs to prepare a broadband implementation plan for Delta County.

The effort to improve and expand high-speed internet access caught the attention of a local couple, Eric and Teresa Neal, who with son Dakota Coats had formed Lightworks Fiber & Consulting a few years earlier.

Once Region 10 decided to move forward with the broadband project, it partnered with Delta-Montrose Electric Association (DMEA), a local electric cooperative that connects fiber to members’ homes. Lightworks won a contract with DMEA to build the network—emphasizing its role as a locally owned and operated company. To underscore the point, Lightworks hired and trained former coal miners to lay fiber-optic cable. As Eric Neal told the *Delta County Independent* newspaper: “[Miners] are hardworking. They have a good work ethic.” And for the miners themselves, Neal added, “it’s a good job.”⁸⁸

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It's also in an industry with growth potential. Lightworks has become the largest private employer in Delta County, with about 100 workers—more than 80 percent of whom had been employed by coal companies.

Now, with robust broadband access, Delta County finds its population growing instead of shrinking. People from urban areas seeking a quieter lifestyle can move to Delta County and work from home or from a coworking site. Maybe best of all, said Virgil Turner, Region 10's broadband project director, some people who left the county are returning. "The kids who left to find a job are coming back home now," he said. "And they're bringing their friends."⁸⁹

Maine

Maine's ConnectME Authority, established in 2006 through the Advanced Technology Infrastructure Act,⁹⁰ provides planning and infrastructure grants to facilitate broadband deployment to unserved and underserved communities. Supporting a planning process helps them build the necessary capacity before undertaking an infrastructure project. It also helps to simply start the conversation around broadband, which is important for building partnerships and educating local decision-makers and residents on the topic.

Before communities can apply for planning grants, they must complete a precertification checklist, which includes creating a broadband team; holding at least one broadband meeting; identifying existing efforts, such as economic development plans that could include broadband or existing cable franchise agreements; identifying community anchor institutions, including schools and libraries; and developing a broadband vision statement.⁹¹

During the planning process, communities work to identify broadband needs and existing resources, and any gaps between the two. This phase often includes a survey and review of data that ConnectME provides to help stakeholders better understand what areas are unserved and underserved. Communities also talk with providers about their service offerings and plans in the area and identify funding sources for potential projects.⁹² The planning process can also help communities develop a strategy for addressing digital literacy or digital inclusion.

Through the process, planning teams may evaluate scenarios for different network ownership and operation models, including municipal ownership or public-private partnerships, and examine which would best fit their goals. Maine allows municipalities to form a regional municipal utility district to provide broadband service.⁹³ As communities weigh these models, one consideration is their proximity to the Three Ring Binder, a federally funded middle-mile network⁹⁴ that has helped facilitate projects in unserved communities. It has also made the broadband challenge for rural Maine primarily a last-mile issue, reducing the overall cost of providing service in unserved and underserved areas.

In 2019, noting that communities often have difficulty moving from completing their plan to implementing it, which can result in lost momentum and stalled projects, ConnectME divided the planning grants into two phases.⁹⁵ This will allow ConnectME to support them as they move from the network-design and request-for-proposal phases through implementation.

Between 2016 and 2018, ConnectME funded 14 planning grants totaling \$451,000.⁹⁶ Communities may also receive planning support or matching funds from two Maine nonprofits, the Island Institute or Maine Community Foundation. The Island Institute provides funding and technical assistance to support broadband planning efforts in island and coastal cities and towns.⁹⁷ The Maine Community Foundation provides up to \$15,000 for the second planning phase, which can be used to hire a consultant, conduct education and outreach, and offer digital literacy classes.⁹⁸ These partners help amplify ConnectME's efforts.

Planning grants also help prepare applicants for ConnectME infrastructure grants. Between 2006 and 2018, ConnectME funded 144 infrastructure projects, providing more than \$12 million to bring broadband infrastructure to nearly 40,000 households.⁹⁹ These grants have helped extend broadband into unserved areas. “ConnectME is absolutely vital to getting to the countryside that we serve,” Don Flewelling, director of public and government relations with telecommunications company Pioneer Broadband, said of this funding.¹⁰⁰

Key takeaway: The planning process engages local communities and builds the capacity needed to apply for support for infrastructure projects that meet community needs.



Rival Towns in Maine Partner for Better Broadband Service

Mainers take their high school basketball very seriously, and in the part of the state known as Downeast, the Calais Blue Devils and the Woodland Dragons of Baileyville have a fierce rivalry on the court. But athletic competition hasn't stopped these two Washington County communities from working together to bring better internet to their region.

Calais (pop. 3,123, pronounced KAL-iss) and Baileyville (pop. 1,521) sit 13 miles apart, “about as far north and east as you can go in Maine before you hit Canada,” said Dan Sullivan, the recently retired information technology manager at Woodland Pulp. The Baileyville mill is the county's largest employer and has been a town cornerstone for more than 100 years. Sullivan began lobbying for better broadband access in Maine in 2009, arguing that improvements would benefit the mill, its employees, and all residents.

But it's not easy bringing better internet service to underserved rural areas. In 2015, working with the Downeast Economic Development Corp., community leaders from Calais and Baileyville banded together—and soon learned that large internet providers weren't interested in investing in the needed

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infrastructure to provide faster broadband. “We got a resounding no, which is why we then decided, OK, well, we’re going to do this ourselves.”

In October 2016, the group hired Maine telecommunications company Pioneer Broadband to conduct a feasibility study. After examining the area’s needs and the potential customer base, the company concluded that improved broadband access might pay for itself. Community leaders took the case to each town’s council, proposing to build a fiber-optic network. Both councils voted unanimously to fund construction of the \$3.1 million network.

The two towns formed a nonprofit organization, Downeast Broadband Utility, in August 2017, with a board of directors consisting of three people from each town along with Sullivan as its elected president. Multiple local banks wanted to provide loans for the project. And with homes and businesses expressing intense interest—“Demand has been very high,” Sullivan said—the towns’ investment is expected to be paid back by consumers in provider fees rather than through tax hikes to residents.

Crews worked for more than a year around the towns to build the fiber network, and customer installations began in October 2019. The project has a focus on the last mile, the part of the network that connects individual homes and businesses to the broader network.

“Up here, like everywhere, we have more and more people who are cloud computing,” Sullivan said. “And this area draws very talented individuals—artists, writers, creators—who need to be able to upload large amounts of data.” Plus, he added, “our lobster, blueberry, and potato industries need to be able to market their products and bring them to the world, and only a true fiber network can accomplish that.”

There are other benefits: Maine has the highest median age in the country, and the long, harsh winters can be brutal for older people traveling to doctor’s appointments. Better internet access opens up opportunities for telemedicine services, allowing more people to stay home.

And while their high schools still compete on the basketball court, the unity that Calais and Baileyville found has inspired their neighbors. “Numerous surrounding towns have already contacted me,” Sullivan said, “wanting to join our network.”

North Carolina

In 2015, North Carolina’s Legislature tasked its Broadband Infrastructure Office (BIO), within the North Carolina Department of Information Technology, with developing a state broadband plan.¹⁰¹ It did so after surveying more than 3,500 local government leaders, holding focus groups, and meeting stakeholders from different sectors and parts of the state.¹⁰² The result, “Connecting North Carolina,” incorporates a variety of perspectives on North Carolina’s broadband challenges and includes recommendations for how the state can encourage broadband deployment and adoption, and leverage broadband in other policy areas.¹⁰³ Recommendations in the plan have played a key role in guiding the state’s broadband activities, including the focus on the “homework gap,” creation of the Growing Rural Economies with Access to Technology (GREAT) grant program, and provision of technical assistance activities.

Following a recommendation in the plan, BIO conducted a survey in 2016 to better understand the homework gap across North Carolina’s school districts between students with home internet access and those without.¹⁰⁴ Responding to a 2019 executive order, it recommended that a grant program be created to close the gap.¹⁰⁵ Additionally, through an Institute of Museum and Library Services grant, BIO and the North Carolina State Library

are partnering with public libraries to lend Wi-Fi hot spots to students who lack internet service at home and provide digital literacy training to students and their parents.¹⁰⁶

Responding to another recommendation in the plan, the Legislature established the GREAT broadband grant program in 2018 to expand access to broadband infrastructure to places that lack it, allocating \$10 million for its first year and \$15 million for its second year. The program makes grants to broadband providers to build last-mile infrastructure to unserved areas in counties lacking access at speeds of 10 Mbps/1 Mbps.¹⁰⁷

And finally, the state broadband plan recommended “assistance to communities, counties, and regions to support public-private partnerships.”¹⁰⁸ To achieve this, BIO has a team of four technical assistance experts who work across North Carolina to help communities prepare for broadband projects, assisting them with planning and deployment. The program’s mission “is to work with all counties in our region, particularly rural counties, to help them position themselves in the best way they can to attract growth from current providers and from new providers,” said Jim Corrin, one of BIO’s technical assistance staff members.¹⁰⁹

The technical assistance team provides counties, municipalities, and citizen groups a variety of services, which include helping communities conduct surveys, gather speed test data, engage and educate stakeholders, facilitate conversations with providers, and inventory existing assets available to help providers bring broadband access. The technical assistance efforts make use of a “Community Broadband Planning Playbook,” developed in partnership with the Appalachian Regional Commission,¹¹⁰ that includes practical information to guide communities through the process of improving broadband service.¹¹¹ Communities have found the technical assistance teams to be an important resource that is responsive to community needs and provides necessary and neutral expertise.¹¹² “You can call him on his cellphone,” Sarah Thompson, executive director of the Southwestern Commission, a regional council of governments, said of her region’s technical assistance representative. “We’re not alone. We have a friend and a colleague who’s at the state helping us every step of the way.”¹¹³

Key takeaway: State broadband plans should articulate a vision and clear, actionable recommendations to achieve goals.

West Virginia

West Virginia has emphasized both state and local planning in its broadband efforts. Statewide broadband plans have guided activities, while West Virginia’s support for local broadband plans has helped to build communities’ capacity and put localities in a better position to obtain federal infrastructure funding.

The state produced a five-year broadband strategic plan in 2014 with funding from the National Telecommunications and Information Administration as part of the State Broadband Initiative (SBI)¹¹⁴ and released an updated five-year plan in 2020.¹¹⁵ The plan, which the Broadband Enhancement Council produced with feedback from stakeholders, outlines the council’s goals and offers strategies for improving broadband infrastructure and boosting its use.¹¹⁶ Broadband has also been incorporated into West Virginia Forward,¹¹⁷ an economic development strategy resulting from an effort by universities and philanthropic partners in the state.

In the absence of a state-funded broadband grant program, the West Virginia Development Office directs some of its federal Community Development Block Grant (CDBG) funds to support broadband planning and infrastructure projects.¹¹⁸ Though the state has historically used most of its CDBG funds for water and sewer projects, the state decided in 2016 to allocate a portion to broadband planning and infrastructure. The state development office has drawn on its expertise with sewer and water projects and structured its broadband efforts similarly.¹¹⁹ Workman, its administrative director, said, “If we can run waterlines through West Virginia, we can run fiber.”

In addition to funding infrastructure, the CDBG program is helpful because local governments often lack the resources for broadband planning. The grants provide localities with necessary resources to prepare projects for funding opportunities, including the USDA's ReConnect program.¹²⁰

West Virginia has also focused on mapping broadband availability as part of its planning efforts. The Broadband Enhancement Council has been collecting speed-test data submitted by users on its website.¹²¹ The data collected through the mapping initiatives can help to ensure that unserved communities are not deemed ineligible for federal programs, and it is used to inform the state's policy and planning.¹²²

The Appalachian Regional Commission's (ARC's) Partnerships for Opportunity and Workforce and Economic Revitalization program is funding a project by the West Virginia Geological and Economic Survey office to map broadband availability in 10 counties using state highway permitting data. The maps are part of the state's Broadband Development Hub project, which will also include a broadband planning playbook developed in partnership with the ARC. Modeled on a similar project in North Carolina, it aims to give communities critical information they need to develop a broadband plan¹²³ and centralize the state's broadband resources.¹²⁴

Key takeaway: States can provide tools to help communities with planning efforts and improve their capacity to take advantage of opportunities for connectivity, identify private sector partners, and implement successful projects.

Funding and operations

Colorado

Colorado provides funding for middle- and last-mile projects to support broadband deployment in unserved areas. Middle-mile projects are funded through DOLA's middle-mile infrastructure grant program, and last-mile projects are funded through the Department of Regulatory Agencies' (DORA's) broadband deployment grants.

DOLA's middle-mile infrastructure grants are supported by the Energy/Mineral Impact Assistance Fund Grant, which assists localities affected by energy development and mineral extraction.¹²⁵ The middle-mile grants are made to municipalities, counties, and other political subdivisions and must be consistent with regional broadband strategic plans and subplans (see "Planning and capacity building" above). Grantees must contribute a 50 percent match, and networks must be open access and competitively neutral.¹²⁶ The grants have helped bring fiber to rural communities, said Neal-Graves of the Colorado Broadband Office. "It's not last mile, but at least it gets it closer to the community so that when we started doing some of our last-mile investment programs, we had infrastructure to leverage in a lot of cases."¹²⁷

For last-mile broadband infrastructure, DORA provides grants through its Broadband Fund. Lawmakers created the fund in 2014 to support broadband expansion by repurposing money from an assessment placed on all telecommunications service providers operating in Colorado. It aims to ensure that every household in the state has access to broadband from at least one nonsatellite provider.¹²⁸ Since 2016, the DORA Broadband Fund has awarded nearly \$20 million to 29 projects in rural areas, bringing broadband access to 17,000 households.¹²⁹

Broadband Fund applications, and challenges to them, are independently evaluated by a 16-member board consisting of six gubernatorial appointees and 10 members appointed by legislators. Half of the board members represent the broadband industry, and the rest are local government, state government, or public representatives.¹³⁰

The Colorado Broadband Office (CBO), within the Governor's Office of Information Technology (OIT), provides mapping and data support to identify areas that are eligible for the grant. The CBO works with providers in the state on a semiannual data-collection cycle and maps wired broadband data on the Public Land Survey

System's quarter-quarter-section (or 40-acre) format, providing more granular analysis than the FCC's Form 477 data, which is collected at the census block level.¹³¹ This data helps the board evaluate challenges to grant applications.

Colorado has worked to ensure accountability for investments made through its grant programs with reporting requirements and broader changes to state policy. The DORA program requires grantees to demonstrate that they will be able to operate the broadband network for at least five years and report on network operations and take rates. Grant recipients for both the DOLA and DORA funds must share geographic information system data on the location of broadband infrastructure.¹³²

In 2019, Colorado added net neutrality requirements for Broadband Fund grant recipients.¹³³ The requirements preclude ISPs that do not follow the principles of net neutrality from receiving funding from a state broadband fund. The legislation further requires that if a provider is found to have violated these standards, it must refund money it received.

With broadband funds focused on different goals and located in different agencies, projects funded through the two grant programs are not always aligned.¹³⁴ Part of this is because the DORA funds go directly to for-profit providers¹³⁵ and the department does not work directly with communities on planning, while DOLA grants are awarded to political subdivisions. However, connection to and consistency with DOLA's regional broadband plans is one of the requirements on which the Broadband Deployment Board evaluates grant applications.¹³⁶ DOLA policies also encourage grant applicants to work with private sector ISPs to secure funding through the Broadband Fund.¹³⁷

Coordination between the programs is facilitated by biweekly interagency meetings that include DOLA, DORA, OIT, the Office of Economic Development and International Trade, and the Colorado Department of Transportation (CDOT).¹³⁸ Each of these agencies has at least one point person for broadband, which further facilitates coordination. Bob Fifer, manager of CDOT's Intelligent Transportation Systems and Network Services Branch, said the meetings give officials a chance to share what project they are working on and what their priorities are. "If DORA, DOLA, CDOT, and OIT are all working together and understanding each other's programs, then ... we become cheerleaders with everybody," he said.¹³⁹

Key takeaway: Investment in middle-mile infrastructure facilitates last-mile deployment.

Minnesota

Minnesota's Border-to-Border Broadband Development Grant Program, established in 2014, is the state's primary vehicle for promoting broadband expansion in unserved and underserved areas. Minnesota has invested \$85.2 million and leveraged \$110.6 million in matching funds through the program, connecting over 34,000 households, 5,200 businesses, and 300 community anchor institutions. The state has made substantial progress toward its universal access goal: that 91 percent of Minnesota households have broadband access at speeds of 25 Mbps/3 Mbps (up from 86 percent in 2015) and 74 percent of households have access at speeds of 100 Mbps/20 Mbps (up from 39 percent in 2015). However, a substantial urban-rural divide remains.¹⁴⁰

Border-to-Border grants fund middle- and last-mile infrastructure projects, which must be scalable to provide symmetrical speeds of at least 100 Mbps.¹⁴¹ This means that while these speeds may not currently be delivered over the infrastructure, it must be possible to upgrade it in the future so that it can provide both download and upload speeds of at least 100 Mbps. Stakeholders have identified this as an important requirement, because "it's keeping an eye on the higher bar," as technology consultant Bill Coleman put it,¹⁴² and the grant program avoids supporting projects only to see them become obsolete shortly thereafter.



According to statute, the state Office of Broadband Development (OBD) can provide up to \$5 million for as much as half of the cost of a project to build broadband infrastructure¹⁴³ and must prioritize areas that are unserved, or lacking wired broadband access. It can also make grants to projects in areas that are underserved, defined as lacking access to broadband at speeds of 100 Mbps/20 Mbps.¹⁴⁴ Grant applicants must submit evidence, such as a map produced with state data on broadband availability¹⁴⁵ or a community survey,¹⁴⁶ to show that the area they wish to serve is either unserved or underserved. OBD prioritizes projects that have strong community support.¹⁴⁷ Grant projects often stem from efforts by local governments and community groups to bring broadband connectivity to their area in partnership with a local provider. Local governments may also contribute matching funds to the project to demonstrate community buy-in.¹⁴⁸ By requiring projects to show that they have the support of the local community, OBD ensures that the projects serve the public interest.

Through a statute, Minnesota designed a challenge process to prevent the state from funding infrastructure that is duplicative or serves an area that does not need state assistance.¹⁴⁹ ISPs can challenge applications by demonstrating that they provide service or have begun construction on broadband infrastructure at speeds equal to or greater than the proposed project. To submit challenges, Minnesota requires that providers participate in the state's mapping efforts, which provides OBD with information necessary to substantiate challenges and improves the overall quality of the data on broadband deployment.¹⁵⁰ Despite such safeguards, stakeholders say the process may deny funding to grant applicants and communities even though their areas are unserved or may discourage some from submitting applications that they feel will be unfairly challenged.¹⁵¹

Key takeaway: Setting a forward-looking goal focuses state investment on infrastructure that will continue to meet future needs.

Tennessee

The Tennessee Legislature passed a measure in 2017 creating the Tennessee Broadband Accessibility Grant Program to support broadband deployment in unserved areas of the state.¹⁵² The program is within the state Department of Economic and Community Development (TNECD) due to that department's strong relationship with the Legislature and experience administering grant programs.¹⁵³

The program provides grants to ISPs that can receive up to half the cost—with a ceiling of \$2 million—to build fixed last-mile broadband infrastructure to unserved parts of the state.¹⁵⁴ The program invested \$10 million in its first year, \$15 million in its second year, and was appropriated \$20 million for its third year.¹⁵⁵ The TNECD has focused on building strong partnerships with ISPs that apply for the grants. "They are the ones with their boots on the ground pulling the infrastructure," said Crystal Ivey, its broadband director. She said it is important to have "a good relationship with them, making sure that the grant program works for them."

To determine areas that are eligible for grant funding, the TNECD starts with the FCC's Form 477 data—which is gathered from ISPs about where they provide service and is widely considered to be at best incomplete and at worst inaccurate.¹⁵⁶ Applicants can then submit supplemental evidence, such as surveys of community members, to demonstrate that the proposed area lacks service.¹⁵⁷ If there is still doubt about whether an area is eligible to be served through a grant, the state will send a contractor to visit the site and collect data about available infrastructure.

Grant applications are scored on multiple factors, including the speed and scalability of technology, sustainability and implementation readiness, the ability of the project to leverage grant funds to support additional investment from the provider, and community support.¹⁵⁸ Including community support—which can take the form of documented support from the local government, as well as expressions of support from community members—encourages providers to conduct community outreach.¹⁵⁹ "We send out letters to let residents know we're going to be in the area, and then we do a tremendous amount of door-knocking,"¹⁶⁰ said Lisa Cope, CEO and general manager of Ben Lomand Connect, a telephone cooperative and TNECD grant recipient. The cooperative also organizes town hall meetings.

Providers can also receive additional points on their grant application for a project that includes a city or county designated as a broadband-ready community. Created through the 2017 measure, the designation requires communities to pass an ordinance creating a single point of contact for broadband providers to interface with local government, sets a time limit of 30 days for permitting of broadband equipment, and allows permitting to be done electronically. The goal of the designation is to remove potential barriers at the local level and facilitate broadband deployment.¹⁶¹

As Tennessee invests in expanding access to broadband infrastructure, it is also addressing the challenge of low adoption rates. A report by the Tennessee Advisory Commission on Intergovernmental Relations that was the foundation for the 2017 law noted that only 40 percent of Tennesseans with access to broadband actually subscribed to the service.¹⁶² This fact prompted adoption efforts to become a component of TNECD's grant program.¹⁶³ Its grant scoring process incentivizes applicants to develop plans to increase adoption. Providers receive additional points on their applications by coupling their infrastructure build-out with digital literacy programs, low-income assistance programs, and awareness campaigns.¹⁶⁴ These efforts maximize the effectiveness of infrastructure investments, as they are essential to ensuring that the infrastructure projects TNECD funds have the take rates they need to be successful.

TNECD also partners with the Tennessee State Library and Archives to administer the Training Opportunities for the Public program, which makes grants of up to \$20,000 to local libraries with the goal of improving digital

literacy through training and access to technology.¹⁶⁵ The program is “providing a foundation for the people and their communities to learn more about what you can do with computers and software. This opportunity allows them to overcome that fear and want to have more of a connection,” said Jennifer Cowan-Henderson, director of planning and development at the Tennessee State Library and Archives and manager of the program. “And I really think that that drives them—the ones who don’t have internet in their home—to potentially get it themselves.”¹⁶⁶

Key takeaway: Investment in infrastructure access and adoption go hand in hand; investing in programs that increase adoption makes infrastructure investments more successful.

“Some states are lucky enough to have grant programs, like us. Some are not. Some that have grant programs, it’s not nearly enough to meet the need—which we know is billions of dollars. But I think there are other things that we can be doing on a state level to encourage deployment that’s not just grant dollars, whether it’s policies or trying to remove some of those administrative barriers locally. I think there are some things we can do that don’t necessarily cost any money to try to help move the needle.”

Crystal Ivey, broadband director, Tennessee Department of Economic and Community Development

Virginia

Virginia has two primary mechanisms for supporting broadband deployment in unserved areas: grants from the Virginia Telecommunications Initiative (VATI) and the Tobacco Region Revitalization Commission (TRRC). Lawmakers are increasingly backing expansion efforts, as evidenced by VATI’s funding, which grew from \$1 million in 2017 and 2018 to \$4 million in 2019, with \$19 million appropriated for 2020. These increases came after grant applicants consistently applied for more money than was available.¹⁶⁷

Lawmakers created the VATI in 2016 to provide grants for last-mile broadband infrastructure projects, housing it within the Department of Housing and Community Development (DHCD).¹⁶⁸ It works closely with the TRRC, which the General Assembly created in 1999 to administer grants to help tobacco-producing counties recover from the decline of the industry, using money from the state’s tobacco settlement.¹⁶⁹ The TRRC has granted \$130 million to broadband projects. While the agency has historically funded middle-mile and backbone infrastructure projects, the commission set aside \$10 million for grants to support last-mile projects in 2017.¹⁷⁰

The TRRC and VATI programs are designed to operate similarly.¹⁷¹ They use the same application and require funded projects to be public-private partnerships, with a local government partnering with a private sector ISP to bring service to their community, something stakeholders identify as key to Virginia’s success. The programs also use the same challenge process for grant applications, which allows a provider that claims to serve an area for which a grant application has been submitted to file an affidavit with evidence of the service that they provide. After reviewing that submission and allowing the grant applicant to provide a rebuttal, the state may determine that the challenge is valid, which would result in the served areas of the proposed project being considered ineligible for funding.¹⁷²

Feinman, Virginia’s chief broadband adviser, coordinates the two programs’ activities and other broadband efforts across state government.¹⁷³ His office is in that of the secretary of commerce and trade.

Together, the TRRC and VATI programs seek to achieve “functionally universal” broadband coverage in Virginia.

This means that they will consider broadband problems to be solved “when local governments and citizens are no longer approaching the commonwealth describing serious deficiencies in broadband availability.”¹⁷⁴ Lacking sound data on broadband coverage, the state has chosen not to invest heavily in mapping unserved and underserved areas, relying instead on communities to identify where service is lacking. As Feinman put it, communities are “saying, ‘OK, you don’t know literally every one of us that doesn’t have service, but we’re telling you we don’t have it.’ And so we’re just going to start hooking them up. And we want to be cautious that we do that in a way that remains sensible, but that doesn’t mean that an absence of complete information should hamstring our efforts.”¹⁷⁵

In addition to operating the VATI program, DHCD also administers Virginia’s Community Development Block Grant funding, which supports local broadband planning efforts.¹⁷⁶ In 2019, Virginia established an Office of Broadband within the department that oversees the VATI grant program and works with communities to help them achieve local broadband goals through planning support and education about available resources. The office uses a “Broadband Toolkit,” which includes information on assessing local assets, holding meetings with providers, and preparing requests for proposals, to guide local planning.¹⁷⁷ This local outreach, together with the CDBG planning grants, helps put communities in a strong position to apply for grants from VATI and TRRC.¹⁷⁸

Key takeaway: When broadband funds live in multiple agencies, aligning requirements for these programs can facilitate participation by grant applicants.

Wisconsin

The Wisconsin Broadband Office (WBO) makes grants to support the deployment of broadband infrastructure in unserved and underserved areas of the state.¹⁷⁹ The Legislature created the Broadband Expansion Grant Program in 2013 and awarded just over \$20 million to 138 projects across the state in the following six fiscal years.¹⁸⁰ The state budget for the 2019-21 biennium includes a substantial increase: \$24 million per year,¹⁸¹ reflecting growing support for broadband expansion efforts.¹⁸²

The WBO, which is within the state’s Public Service Commission, makes grants to multiple entities, including for-profit broadband providers, nonprofit cooperative providers, and local governments. The office adds its own data to that compiled by the FCC to create maps identifying areas that are eligible for grant funding.¹⁸³ The maps are also useful for helping communities understand the local broadband landscape and where investment is needed.

Grant applications are prioritized if they involve a close partnership between a provider and a community, provide matching funds, would bring broadband to areas that are completely unserved, can be scaled to provide services to more people or at a faster speed, support economic development, or serve a greater number of people.¹⁸⁴ WBO staff review the applications and prepare briefing materials for the commissioners. Following a public comment period that allows the public, providers, and other stakeholders to support or oppose grant applications, the commissioners vote in an open meeting on which ones to fund.¹⁸⁵

Small, independent broadband providers and telephone cooperatives have been active participants in Wisconsin’s grant program. These providers, which are often locally owned, are trusted community partners for expanding broadband access.¹⁸⁶ The grant program’s straightforward application process and reporting requirements also make it accessible to small providers.¹⁸⁷

The WBO also serves as a “central point of contact for folks who are looking for information or resources on broadband expansion projects,” says Dickison, its former director.¹⁸⁸ WBO staff hold informational sessions about the grant program, often attend meetings around the state, and connect stakeholders with office resources and potential partners.¹⁸⁹ Forging those relationships among stakeholders within a community, she said, is key to the long-term success of broadband projects.

Key takeaway: Small providers can be important partners and community collaborators in grant programs focused on unserved and underserved areas.

“ Those partnerships, in my mind, help the community to come together around not just putting the infrastructure in place, but making sure that the network is successful and that people are using it.”

Angie Dickison, *former director of the Wisconsin Broadband Office*

Program evaluation and evolution

California

California’s broadband policies and programs are also notable for an increasing focus on broadband adoption and digital literacy. The state began prioritizing these issues when its Public Utilities Commission approved the SBC-AT&T merger. The California Emerging Technology Fund required the consolidated company to offer service packages that are affordable for low-income consumers, and it has negotiated similar public benefits with additional mergers and acquisitions. The fund partners with community organizations to ensure that people are aware of and can take advantage of these low-income offers.¹⁹⁰

The Broadband Adoption Account, one of five subaccounts within the California Advanced Services Fund and added by the 2017 Internet for All Now Act, established a more formalized program to encourage broadband adoption and digital literacy by funding digital inclusion efforts in communities with low broadband adoption rates.¹⁹¹ The account has \$20 million, and the program issued its first round of grants, totaling \$2.7 million, in December 2018.¹⁹² Lawmakers have since approved an additional \$3.9 million in grants.¹⁹³

The other subaccounts aimed at closing California’s broadband gap are the Broadband Infrastructure Grant Account, the Public Housing Account, the Rural and Urban Regional Broadband Consortia Grant Account, and the Line Extension Pilot Program.¹⁹⁴ The last of these subaccounts was added because lines are sometimes not extended to a household due to its distance from existing broadband facilities. The program will provide funding to extend the line to the customer’s home.¹⁹⁵

In the 2017 measure, lawmakers also updated the Public Housing Account, which aims to connect public housing units, to allow eligible communities to apply for funding through the Infrastructure and Adoption accounts once funds in the Public Housing Account have been spent.¹⁹⁶ This \$20 million subaccount has allocated \$5 million to broadband adoption-related expenses, including instructors for digital literacy training, devices, and technical support for residents.¹⁹⁷ “By putting in digital literacy money, California is announcing through the state’s policy that this is important too, that it sees ... that these two things are inextricably bound,” said Anne Neville-Bonilla, director of the State Library’s California Research Bureau.¹⁹⁸

Key takeaway: Broadband connectivity is a multifaceted challenge, and states can support efforts to address components of this challenge, including broadband adoption and digital literacy.

Tennessee

Tennessee’s Economic and Community Development Department evaluates the progress and performance of the Tennessee Broadband Accessibility Act grant program at several points throughout the grant cycle. The program requires grantees to submit quarterly progress reports and invoices for reimbursement of costs incurred.¹⁹⁹ These reports include an update on work that has been completed, information about any problems or delays during

construction, and other data that gives the department a regular opportunity to evaluate progress and ensure that projects are proceeding as planned.²⁰⁰

In addition to quarterly reports, TNECD requires grantees to submit project closeout reports that detail infrastructure and service that have been provided through the grant funding. This includes the number of homes and businesses that the infrastructure passes, the number of drops (connections to the home) installed, the take rate, what prices the grantee charges for service, and the speeds they deliver at those price points.²⁰¹ Providers are also required to describe the digital literacy activities available for customers in the grant area.²⁰² TNECD also evaluates the number of homes that were not connected as a direct result of a grant but where the grant funding led to a provider building out other areas of its network.

The State Library and Archives collects data on the training conducted through the Training Opportunities for the Public grant program. Digital literacy class participants fill out surveys about their satisfaction with the class and how much they learned, and program staff also visit all grantees to observe how the classes are progressing. They have used this information to adjust the program—for example, by allowing libraries to offer a wider array of classes and use grant money to advertise their classes.²⁰³

Tennessee's Legislature requires TNECD to submit an annual report on the status of grant-funded projects and progress made toward increasing broadband access and adoption.²⁰⁴ The agency includes grantee data from the progress reports and the closeout report. This helps the department demonstrate that the program is building infrastructure in needed areas and making progress on the dual challenges of broadband access and adoption. And it helps the Legislature evaluate the effectiveness of and demand for the state's broadband programs when they come up for renewal every legislative session. Ivey, TNECD's broadband director, said the additional funding the grant program has received shows that the Legislature "has been really open" to it. "Even though we're still early in the process—and we're just really two years into this grant—I think they are seeing good things happening from it and know that this is a very expensive, but worthwhile venture."

Key takeaway: Collecting data from grantees throughout the project life cycle allows programs to evaluate progress at different phases.

Wisconsin

Wisconsin has expanded its broadband program to include helping rural communities benefit from the state's infrastructure investments, such as creating certifications to help them foster greater connectivity.

In 2016, Wisconsin created the Broadband Forward! program²⁰⁵ to give communities a way to demonstrate their commitment to expanding broadband and their willingness to work with providers to remove barriers to deployment. The Wisconsin Broadband Office (WBO) certifies communities as Broadband Forward! if they pass an ordinance that designates a single point of contact within the local government for broadband issues, allows permit applications to be submitted electronically, sets a predictable timetable for application review, and limits permitting fees for broadband infrastructure.²⁰⁶

Broadband Forward!-certified communities receive a proclamation from the governor's office, and the WBO facilitates community meetings to present the certification and stimulate conversations between communities and providers.²⁰⁷ Obtaining the certification, which is not tied to scoring for the grant program, helps communities improve broadband coverage because it signals to the private sector that "not only are you interested in their investment, but you are going to be more than a willing partner to create that streamlined process," says Bill Esbeck, executive director of the Wisconsin State Telecommunications Association.

Wisconsin made another major addition to its broadband program when it created Telecommuter Forward! in

2017.²⁰⁸ Like the Broadband Forward! program, Telecommuter Forward! was designed to showcase communities' commitment to broadband access and help them use the service to boost their economies. Both programs have helped facilitate relationships between communities and providers.

Key takeaway: Certifications programs can help build partnerships between communities and providers and make connections between investment in infrastructure and communitywide uses.



Broadband's Arrival Means More Opportunities in Rural Wisconsin

On a Monday morning in October, Frank Pearson woke at 6 a.m., poured himself some coffee, and helped his wife, Erika, prepare breakfast for their large family. Outside, two cattle stood in a paddock near a big red barn, and a dozen chickens roamed the 20-acre property.

It was time for Frank to go to work. But instead of getting in his car and turning on the ignition, he went upstairs to his office and turned on his computer.

It's a lifestyle that he's not going to trade in and that only recently became possible. Seven years ago, the Pearsons began to scout houses in Oulu, a small (pop. 528) northern Wisconsin town in an area surrounded by forests, less than 20 miles from Lake Superior. "We wanted to raise our kids in this environment," Frank said. But a move hinged on one thing: connectivity. "I needed," said the software engineer, who develops websites, "to be able to work from home."

Until less than a decade ago, that would have been difficult in Oulu. Broadband was nonexistent in the Bayfield County town, one of several areas in Wisconsin that were largely unserved by cable or wireless carriers.

Continued on next page

That started to change in 2013, when the state launched the Broadband Expansion Grant Program, which incentivizes providers to bring reliable high-speed internet service to rural parts of the state that lacked it or are underserved. Since then, the Wisconsin Broadband Office (WBO) has awarded about \$20.1 million to 138 grant projects.

Norvado, a telephone cooperative that primarily serves Bayfield County, had gotten a head start in 2007 by beginning to lay fiber after receiving funds from a federal stimulus measure. But it wasn't until 2015 when Norvado, using its own capital and an initial \$19,282 grant from the WBO, was able to begin building out into very rural areas, bringing fiber from roadside underground lines to people's homes.

Scottie Sandstrom, then Bayfield's economic development executive director, saw broadband's transformative potential. In 2017, after learning that people in a small city in neighboring Minnesota were telecommuting, he asked Angie Dickison, the WBO's then-director, if he could declare Bayfield the telecommuter capital of Wisconsin.

She replied that the office lacked a way to do so but added that the Wisconsin State Telecommunications Association was also interested in promoting telecommuting. The association helped draft legislation to create Telecommuter Forward!—a statewide program to certify communities with broadband infrastructure in place and offer support for this activity. The state Legislature passed the measure in 2017, and Bayfield County became the first Telecommuter Forward!-certified community in the nation.

The WBO has since approved an additional 30 such communities. The certification requires them to task someone with building relationships with the broadband provider or providers and connecting them with businesses that may support telecommuters. The program also helps Telecommuter Forward! communities share best practices with other locales.

Norvado, which received three more state grants totaling \$928,000, now offers telecommuter packages with speeds of up to 1 Gb per second download and 100 Mb per second upload that can be billed directly to employers. Because it's a cooperative, Norvado's net income goes back to customers over time, said CEO Chad Young. Based on the applications his customers use, Young estimates that about 30 percent of Norvado's customers now work remotely in some form.

Dickison said the arrival of broadband has meant fewer people leaving the county for urban areas.

Said Sandstrom, "It's helping the economy."

It certainly helped Frank and Erika Pearson. Once they identified a property in Oulu, they learned that their new neighbors either had broadband or were getting it. "When we were told that fiber was going to be installed at the property we liked," Frank remembered, "we said OK."

Having a lightning-fast connection has also enabled the Pearson children—eight of them, with another on the way—to follow an online curriculum set by a public charter school in Hayward, Wisconsin, an option the couple prefers over sending them to the school—a 45-minute drive. For years, studying at home also allowed the Pearson kids to help raise dairy cows and other livestock.

"We feel blessed," Frank said. Broadband "has allowed us to be in this area where we wanted to be and contribute to this small community. It's essential to our life here."

Conclusion

States are taking steps to spur investment in middle- and last-mile infrastructure and close gaps in adoption. Whether they have focused on broadband for many years or have started their programs more recently, states are connecting areas where traditional models for broadband deployment have not worked.

The promising practices highlighted in this report show that states are addressing this challenge in similar ways, despite differences in funding and program activities. While no silver bullet will ensure better broadband connectivity, officials at all levels of government can gain insights from these examples on how to bring this critical service to areas that remain unserved.

Beyond the practices themselves, the research findings underscore that state policy matters. While most of the conversation about broadband deployment may focus on the federal and local levels, states play a critical role in deploying broadband, and their efforts are making a significant difference in expanding access.

Pew's research also found that technology is just one part of the solution. Addressing this challenge takes time and investment, but working with stakeholders, drafting policy frameworks, planning across and within the state, managing effective programs, and continuously improving efforts yield the results that policymakers across the country are seeking.

Methodology

Pew researchers compiled an inventory of state policies and programs, and conducted interviews with broadband stakeholders.

1. **Policy inventory and state program review.** The first phase of this research was reviewing state statutes and executive orders based on a search for “broadband” and related terms (e.g., “high-speed internet”) and collecting information on state broadband programs from state websites. This information helped provide an overview of broadband activity in all 50 states and highlighted similarities and differences in state policy and program structures. The information compiled through this phase of research can be found in the State Broadband Policy Explorer.²⁰⁹
2. **Informal stakeholder discussions.** The second phase was holding semi-structured conversations with representatives of state broadband programs and other broadband stakeholders to develop a better understanding of how states are defining and approaching broadband challenges, what successful outcomes look like, and what steps they are taking to achieve those outcomes, as well as to understand the perspectives of multiple stakeholders engaged in broadband policy.
3. **Selection of case study states.** The third phase was selecting case study states. Researchers selected them based on a set of criteria, including:
 - The state broadband program was established before Jan. 1, 2018.
 - The program is active.
 - The programs are in different phases.
 - The states represent different geographic areas of the country.Researchers reviewed additional documents, including broadband plans, task force reports, and annual reports, for the case study states.
4. **Field interviews.** The final phase of this research and primary method of data collection was field interviews, conducted between March and June 2019. For all nine case study states, researchers conducted 93 interviews with more than 300 stakeholders, including broadband program staff, ISPs, advocacy and community organizations, and local governments.

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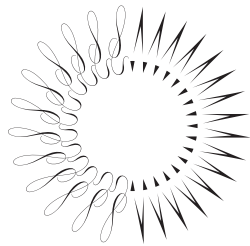
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