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LEGISLATIVE
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COMMITTEE

Program
Evaluation
Unit

Program Evaluation: Funding, Oversight,
and Coordination of Broadband Programs

November 1, 2019

Report #19-05

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November 1, 2019

Mr. Vincent Martinez, Secretary
New Mexico Department of Information Technology
P.O. Box 22550
Santa Fe, New Mexico 87502-2550

Dear Secretary Martinez:

On behalf of the Legislative Finance Committee, I am pleased to transmit the program evaluation, *Funding, Oversight, and Coordination of Broadband Programs*. The evaluation provided a review of state efforts in expanding and improving broadband infrastructure and services, including the role of DoIT in planning and coordinating with other agencies.

The report will be presented to the Legislative Finance Committee and public on November 1, 2019. An exit conference was held on October 28, 2019 with you and other Department of Information Technology staff to discuss the contents of this report. The Committee would like a plan to address recommendations in this report within 30 days of the release of the report.

I believe this report addresses issues the Committee asked us to review and hope your organization will benefit from our efforts. We appreciate the cooperation and assistance we received from your staff.

Sincerely,

A handwritten signature in blue ink that reads "David Abbey".

David Abbey, Director

Cc: Senator John Arthur Smith, Chair, Legislative Finance Committee
Representative Patricia Lundstrom, Vice-Chair, Legislative Finance Committee
Olivia Padilla-Jackson, Secretary, Department of Finance and Administration
John Bingaman, Chief of Staff, Office of the Governor

Table of Contents



Executive Summary	1
Background	4
Findings and Recommendations	11
New Mexico Lacks Coordination and Oversight of Broadband Development.....	11
The State's Broadband Efforts Have Yielded Successes, but Piecemeal Implementation Has Led to Inconsistent Outcomes and Persistent Obstacles.....	22
Agency Response	38
Appendices	39
Appendix A: Evaluation Scope and Methodology	39
Appendix B: Ranking of State Broadband Subscription Rates	40
Appendix C: Details of Selected Other State Broadband Oversight and Coordination Models.....	42
Appendix D: Healthcare Connect Fund Disbursements by County Since FFY12	44
Appendix E: New Mexico Higher Education Network Map	45



Coordination is Essential to Improving Broadband Access Statewide

Access to a high-speed internet connection is increasingly necessary to communicate, conduct business, and provide education and healthcare services, yet New Mexico lags behind the rest of the nation in broadband connectivity. State and federal investments totaling over \$300 million have succeeded in connecting schools, hospitals, and other institutions, but the costs of infrastructure are high and many rural areas remain unserved. The state's efforts at coordinating among a wide array of stakeholders have lacked a strong structure, continuity, and accountability. This evaluation includes recommendations to generate and strengthen accountability in the state's approach to broadband development.

Key Findings

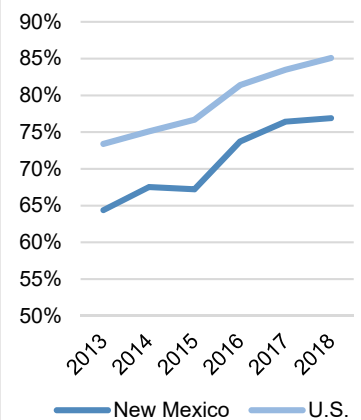
- New Mexico has seen over \$300 million in federal and state broadband investment since FY15, but no single agency is in charge of tracking funds, coordinating with stakeholders, or ensuring accountability.
 - No fewer than four state agencies implement different parts of the state's broadband system.
 - Concerted state-level efforts can help identify and fill gaps in service and funding.
 - The Department of Information Technology's Office of Broadband has not been adequately staffed or resourced for effective statewide coordination, and past efforts at coordination have not survived across administrations.
 - Other states have passed legislation demonstrating emerging best practices in creating more robust and accountable broadband oversight structures.
- Despite some successes, piecemeal implementation of broadband initiatives has led to inconsistent outcomes and persistent obstacles.
 - New Mexico has allocated \$1 million for broadband studies and plans since FY13, but has made only modest progress toward its goals.
 - All school districts now have broadband connections, but certain goals in healthcare and rural business connectivity remain unfulfilled.
 - Right-of-way remains a substantial obstacle to broadband infrastructure deployment.
 - New Mexico should target its limited resources toward supporting the most cost-effective solutions rather than large-scale fiber construction.

Evaluation Objectives

Review and analyze the impact of state spending on the development and implementation of broadband infrastructure in New Mexico.

Evaluate the management, oversight, and planning of broadband development in New Mexico.

Percentage of Households with a Broadband Subscription, 2013-2018



Source: ACS 2013-2018 1-Year Estimates

Key Recommendations

The Legislature should consider

- Designating in statute a single entity to be the state's broadband lead and central point of contact, with a director appointed by the governor and duties including (1) coordinating all statewide and intergovernmental broadband policies and initiatives, (2) defining unserved and underserved areas, (3) assisting with identifying and coordinating sources of funding, (4) assisting with navigating regulatory and permitting issues, and (5) setting goals and targets for broadband deployment and performance, collecting data on progress, and reporting regularly to the governor and relevant legislative committees on the state's progress in meeting these outcomes
 - If the existing DoIT Office of Broadband is the designated entity, the Legislature should consider elevating it to its own program in the budget with associated Accountability in Government Act performance measures to ensure it meets statewide broadband goals.
- Requiring PRC to track and report all funding set aside for broadband under the state rural universal service fund, with protections for proprietary information.

The Department of Information Technology should

- Develop a detailed plan for elevating the Office of Broadband to full program status by FY22, including plans for hiring staff to provide statewide, regional, and sector-specific coordination and technical assistance services.
- Begin immediate planning and development of criteria for use of the \$10 million rural broadband appropriation in FY20, including requirements to ensure the program:
 - Does not duplicate the state rural universal service fund;
 - Targets middle-mile or last-mile networks in unserved or underserved locations that may be ineligible for federal funds;
 - Requires a minimum nonstate match;
 - Requires minimum speeds of at least 25/3 Mbps, and;
 - Ensures compliance with New Mexico's constitutional anti-donation clause;
- Ensure the maps and assessment produced for the Rural Broadband Program inventory unserved and underserved locations ineligible for federal funds but which may be suitable for state-funded projects;
- Work with the Department of Finance and Administration and the Legislative Finance Committee to develop Accountability in Government Act performance measures around statewide broadband goals, including minimum data speeds and connectivity of rural residents, businesses, and community anchor institutions; and
- Work with school districts, higher education institutions, and other community anchor institutions to identify opportunities for demand aggregation using existing infrastructure.



Access to Reliable High-Speed Internet is a Necessity for Full Participation in Society

Broadband and technology are constantly changing how people live their daily lives – from where and how they work, to how they interact with friends and family. Broadband has fundamentally changed how students learn in the classroom and research information at home. Tech sector companies view broadband as the core infrastructure need for developing tomorrow’s software solutions, while nontech businesses increasingly require broadband to reach customers, use business intelligence tools, and access online human resource materials. Telemedicine enables rural patients to receive specialized care they would otherwise forgo or have to travel significant distances to receive, and public safety departments are better equipped to respond to emergencies due to real-time resource mapping. Emerging technologies, such as autonomous vehicles and the “internet of things” (automated farming, energy management, environmental monitoring, etc.) will require even faster and more reliable broadband connections.

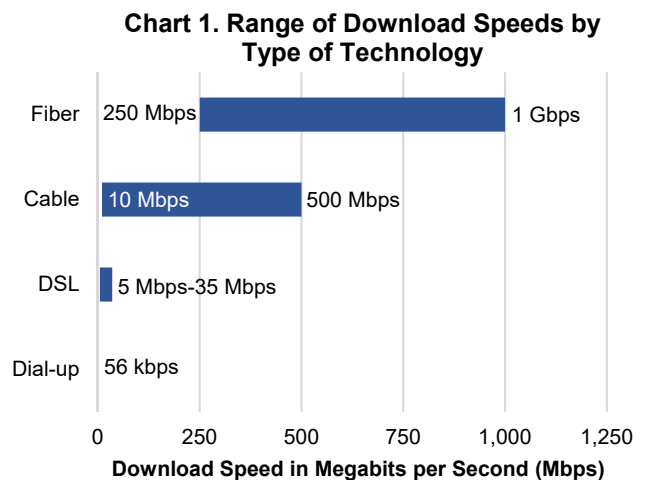
Table 1. Examples of Broadband Uses

Residential	High-speed internet access
	Video calls (Skype, Facetime)
	High-definition video on demand (e.g., Netflix)
	High-definition streaming video (e.g., live sports)
	Smart homes (e.g., electric meters, appliances)
	Work from home
Business	Online marketing
	Videoconferencing
	Cloud computing services
	Virtual collaboration (e.g., virtual meetings, webinars)
Education	Internet access at home for homework
	Distance learning
	Virtual classrooms
	Digital libraries
	Virtual laboratories
Healthcare	Teleconsultations
	Telesurgery
	Remote diagnosis
	Remote medical imaging
	Remote patient monitoring
	Electronic health records
Public Safety	Public safety and first responder networks
	Emergency dispatch and resource coordination
	Smart road systems
	Online training for first responders, fire, and rescue

Source: Design Nine Broadband Impact Assessment

Broadband Encompasses a Range of Technologies.

The term “broadband” can have numerous definitions, depending on the program or entity. Generally speaking, however, broadband refers to a connection to the internet allowing for the transmission of data at speeds faster than dial-up connections that use telephone lines. Where dial-up connections had speeds measured in kilobits of data per second (kbps), broadband is generally measured in megabits per second (Mbps). For example, a typical dial-up download speed is 56 kbps, or 56 thousand bits per second, while typical broadband speeds, depending on who is defining it and the type of technology used, tend to range from 4 Mbps (4 million bits per second) to over 100 Mbps. The fastest commercially available networks can reach a gigabit per second (1 Gbps, or 1 billion bits per second).



Source: BroadbandNow

Speeds available to end users depend on the type of technology used to transmit data to and from their homes or places of business. These can be **wireline networks** that use wires or cables laid underground or strung aerially on poles alongside power or telephone lines, or **wireless networks** that transmit data through the air to and from antennas using radio waves. Many networks, especially in rural areas, rely on a combination of the two to connect businesses and households to the internet. This is because wireless technologies often still require a connection to a ground-based fiber network for their “backhaul,” the transmission of data between outlying networks and the aggregation point where they access the internet itself.

In the wireline category, **digital subscriber lines (DSL)** transmit data over copper telephone lines and have the slowest speeds of all technology types within the commonly accepted definition of broadband. **Cable internet** uses the same coaxial cables that transmit cable television signals and is capable of greater speeds than DSL. **Fiber-optic** networks offer the highest speeds using cables composed of tiny glass filaments, or fibers, which transmit data using pulses of light.

Among wireless technologies, **fixed wireless** broadband connections use antennas mounted on poles or towers to transmit data through the air to individual homes and businesses at speeds comparable to DSL and some cable services. This is different from **mobile wireless** internet service (such as 4G) in that it uses a different portion of the radio spectrum and directly serves the data needs of residential and business customers rather than mobile phone users. Fixed wireless service tends to be more common in rural areas where the costs of building out physical infrastructure are higher. **Satellite internet** service, using data transmission between antennas on the ground and orbital satellites at comparable speeds to cable, is also a common option in rural areas.

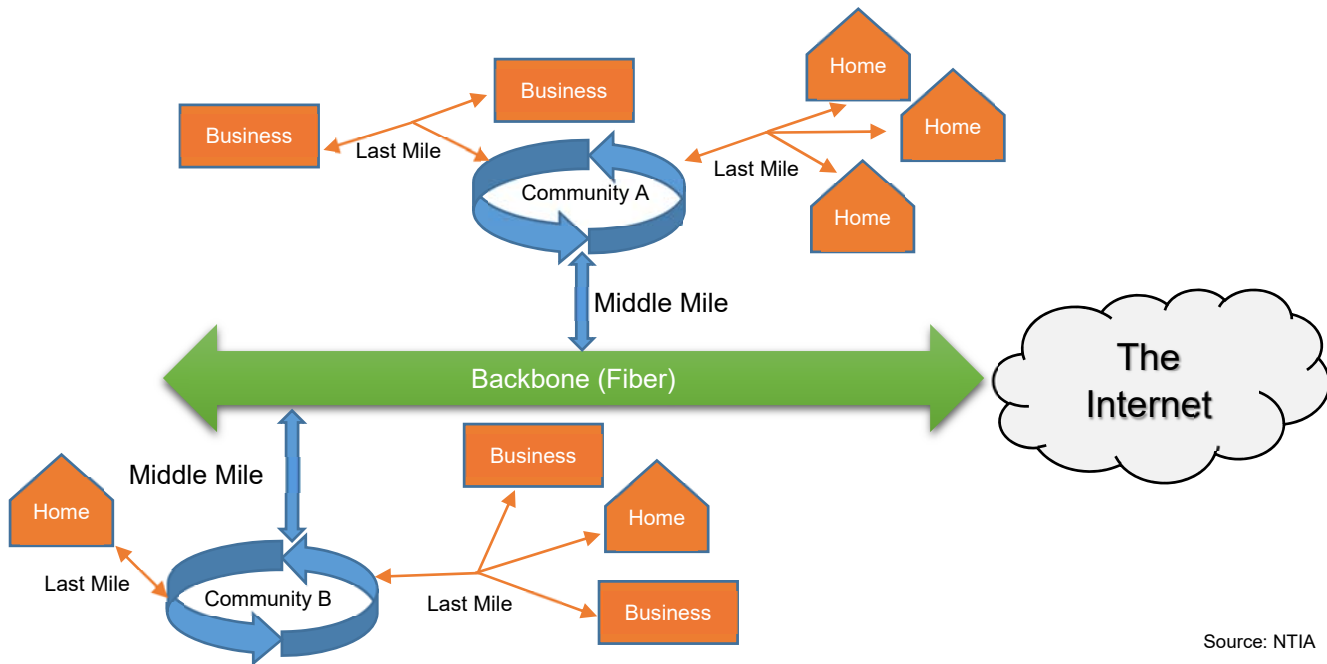
Broadband speeds may be **symmetrical**, meaning they have the same download and upload speed, or **asymmetrical**, usually meaning faster download speeds but slower upload speeds. An example of a symmetrical broadband speed would be a connection with 10 Mbps download and 10 Mbps upload, expressed as 10/10 Mbps. A common asymmetrical speed—and the minimum threshold the Federal Communications Commission (FCC) uses to define broadband—is 25/3 Mbps, or 25 Mbps download and 3 Mbps upload.

Even though a certain technology may be capable of speeds in a certain range, actual speeds depend on the service plans offered by internet service providers (ISPs) and the electronics used to control access and transmit data.

Different Levels of Broadband Infrastructure Serve Different Needs.

Broadband networks connect end users to the global internet through three basic levels of infrastructure. The **backbone**, or **first-mile**, connects ISPs' major data centers and regional transmission hubs to each other and to the greater internet, mostly through high-speed, high-capacity fiber lines. Some public backbone networks may also connect universities, government institutions, and other "community anchor institutions" such as schools and hospitals. However, in many places, **middle-mile** networks connect these anchor institutions within their communities and to the larger backbone, with **last-mile** networks built off that local core. Last-mile networks are highly localized, serving individual homes and businesses and allowing these end users to ultimately connect to the internet through the larger middle-mile and backbone networks.

Figure 1. Hierarchy of Network Infrastructure



Source: NTIA

Currently, New Mexico's fiber backbone largely runs through Albuquerque, where the largest private ISPs and the University of New Mexico house their major networking facilities serving the state. This provides significant capacity to handle a large portion of the state's internet traffic, especially for users in urban areas who subscribe to services through the major providers. Smaller, rural providers, however, often must connect to infrastructure owned by larger companies for their backhaul, the transmission of data to and from a middle-mile or last-mile network through the fiber backbone to the internet at large. This creates a problem of redundancy, whereby if a large ISP experiences an equipment failure or interruption in service at its core facility or on its backbone, the smaller ISPs that lease backhaul capacity on its network will also be affected.

Building out capacity in middle-mile and last-mile networks using a mix of technologies increases the ability of residents and businesses in unserved and underserved areas to access the internet, but also requires a reliable connection to the core fiber network to guarantee uninterrupted service. Rural areas face additional challenges in building broadband infrastructure due to their geographic isolation and sparse populations.

ISPs rely on economies of scale to ensure a financial return on infrastructure investment. Networks that can serve a greater number of customers at the lowest possible cost are the most likely to be built. Rural last-mile networks may require extending infrastructure over several miles at a high cost to serve very few customers, making such efforts unattractive for many private providers.

Technologies such as microwave fixed wireless and TV white space, the latter of which relies on unused parts of the over-the-air television spectrum, are becoming more widely deployed in rural areas due to their lower infrastructure costs. Extending fiber to the premises, on the other hand, is likely to remain prohibitively expensive for most rural ISPs.

Private Expansion of Rural Broadband Requires High Infrastructure Costs for Small Returns.

A major impediment to the growth of broadband service in rural areas is the high cost of extending infrastructure into areas where it does not exist. While New Mexico has a considerable fiber-optic backbone that reaches all of the state's urban population centers and many rural ones, it can be costly to build the middle-mile and last-mile networks necessary to connect it with homes and businesses. Often, such networks require extending infrastructure across long stretches of unpopulated territory to reach what may be a cluster of a few homes, or may require connecting a small number of homes spread across a large area and separated by several miles.

Sparsely populated areas such as those that exist in New Mexico present impediments for private investment in broadband infrastructure. With high capital costs to reach these locations, where only small populations would be served, private internet service providers (ISPs) will likely be unable to recover the costs required to build out infrastructure in these places.

The cost to lay a single mile of fiber-optic cable, the generally preferred medium for transmitting data at high speeds across large distances, can vary widely depending on the topographical characteristics of the land and the permits and right-of-way costs involved. Often, cable is laid along existing roads and highways and during highway construction projects.

National estimates for the cost of fiber-optic cable range from \$1 to \$6 per linear foot, or roughly \$5,000 to \$32 thousand per mile, depending on the number of fiber strands. Including the costs of conduit, but excluding the costs of excavation, labor, right-of-way acquisition, and other associated costs, fiber-optic costs may range anywhere from approximately \$32 thousand to \$66 thousand per mile, with even higher costs expected in particularly challenging terrain.

Two neighboring states, Texas and Colorado, include fiber-optic cable among published average bid prices for common items in road construction projects. The most recent unit cost reports for these states show ranges between \$11

Figure 2. Factors Impacting Broadband Infrastructure Costs

- Terrain
- Proximity to nearby infrastructure
- Number of fiber strands
- Size of conduit required
- Quantity of fiber and conduit needed (economies of scale)
- Number of splices or connections required

thousand and \$69 thousand per mile in Colorado and between \$9,000 and \$89 thousand per mile in Texas for fiber only, not including conduit or other costs. Weighted average costs per mile were almost \$20 thousand in Colorado and approximately \$19 thousand in Texas.

Table 2. Cost of Fiber-Optic Cable in Neighboring States

	Low End Cost per Mile	High End Cost per Mile	Weighted Average Cost per Mile
Colorado	\$11,352	\$68,640	\$19,747
Texas	\$8,923.00	\$88,862.00	\$18,585

Note: Cost of fiber-optic cable only; excludes conduit, splices, and other associated costs

Sources: LFC analysis of CDOT and TxDOT data

This wide range of cost uncertainty aligns with anecdotal information from broadband service providers that suggest costs can easily run into the tens of thousands of dollars per mile. One provider estimated a cost of laying fiber in “ideal conditions” of roughly \$25 thousand per mile. In a brief survey of New Mexico Exchange Carrier Group (NMECG) members, cooperatives’ average cost to deploy broadband infrastructure ranges from \$28 thousand per mile to \$100 thousand per mile.

Further contributing to the lack of economic viability for private broadband projects is the likelihood of a low “take rate.” That is, the percentage of potential customers who will actually subscribe to a service. For higher-speed internet services, the take rate is regularly under 50 percent and often lower, although it is growing as service expands to more areas. According to the NTCA Rural Broadband Association, the rate of potential customers of rural broadband providers who actually subscribed to services with download speeds of 25 Mbps or more, the FCC’s definition of broadband, grew from 24 percent in 2016 to 40 percent in 2018.

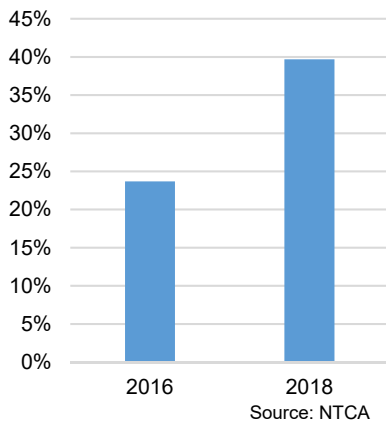
In New Mexico, rural broadband providers applying for broadband grant funding from the Public Regulation Commission through the state rural universal service fund are required to estimate the take rate of the new services being funded. In their applications for FY20, the four applying providers estimated take rates for their projects between 20 percent and 40 percent.

If fewer than half of potential customers in a sparsely populated area subscribe to service even when it is available, an ISP will be unlikely to recoup its capital investment in extending infrastructure to reach them. For example, laying just five miles of new fiber to connect 10 rural households could cost \$100 thousand or more. Even assuming a 50 percent take rate among these customers, receiving service at a subscription cost of \$50 per month, these subscribers would only contribute \$3,000 in revenue annually to the ISP.

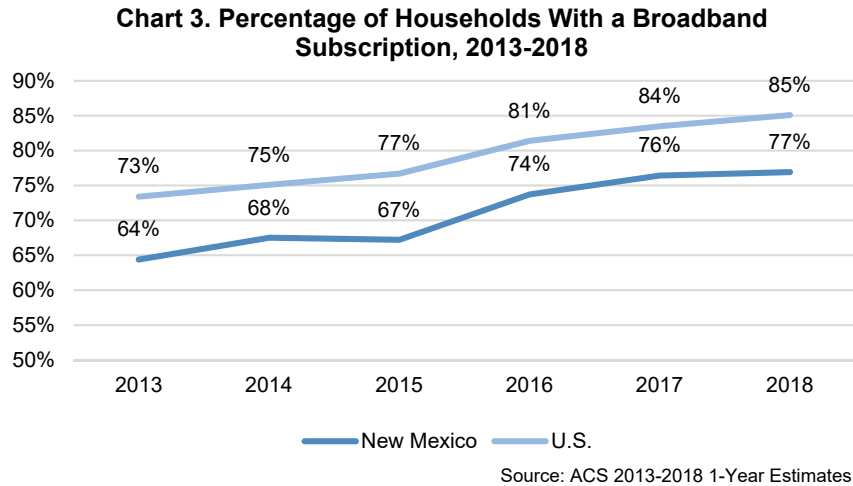
Despite Substantial Growth, New Mexico Ranks 49th in the Nation in Household Broadband Subscription Rates.

In 2018, nearly 614 thousand households in New Mexico had a broadband internet subscription, according to the U.S. Census Bureau’s American Community Survey (ACS). This represents 77 percent of all households in the state and 99.5 percent of households with an internet subscription. The number of New Mexican households with broadband service grew by 26 percent between 2013 and 2018. Despite this improvement, New Mexico still lags

Chart 2. National Rural Broadband Subscription Rates (≥25 Mbps Download)



behind the nation by 8 percentage points; 85 percent of all American households had broadband subscriptions in 2018.



New Mexico trails every other state and territory except Mississippi and Puerto Rico in household broadband penetration. Its household broadband subscription rate of 77 percent is tied with Arkansas and is 5 percentage points behind its next closest neighboring state, Oklahoma, where 82 percent of households subscribe to broadband. Two of New Mexico’s neighbors, Utah and Colorado, rank in the top five most connected states in the nation by this measure, with Utah tied for first with Washington State with 90 percent of households subscribed to a broadband connection. Appendix B contains the full listing of all 50 states plus the District of Columbia and Puerto Rico.

Table 3. 2018 Household Broadband Subscription Rates in New Mexico and Neighboring States

State	2018 Percentage of Households with a Broadband Subscription	Rank (out of 52)*
Utah	90%	1 (tied with Washington)
Colorado	89%	3
Arizona	86%	14 (tied with Idaho)
Texas	85%	26 (tied with Ohio)
Oklahoma	82%	42
New Mexico	77%	49 (tied with Arkansas)

*Note: Rankings include all 50 states, plus the District of Columbia and Puerto Rico

Source: ACS 2018 1-Year Estimates

Several Agencies in New Mexico Play a Role in the Broadband System.

Developing broadband networks requires the involvement of numerous sectors and stakeholders, often necessitating action by one or more government agencies on issues such as obtaining funding, permits, and right-of-way. To smooth these processes as much as possible, many states nationwide are moving toward increased coordination and oversight of their broadband

systems, including creating mechanisms for strong executive action with clear goals and policy objectives.

Currently, New Mexico does not have formalized goals or a clear, unified broadband policy with respect to oversight of programs, funding, and infrastructure. Rather, multiple agencies each have a claim of responsibility for part of the overall system, and not all responsibilities are formalized in statute. This fragmented and uncoordinated status quo is a common theme underlying this evaluation’s findings.

Table 4. State Agency Roles in Broadband Infrastructure Development

Agency	Role in Broadband
Department of Information Technology (DoIT)	Planning, mapping, fiscal agent for library broadband infrastructure fund
Public School Facilities Authority (PSFA)	Administer Broadband Deficiencies Correction Program for schools; provide technical assistance with E-Rate
Public Education Department (PED)	Statewide E-Rate coordination, including addressing gaps in tribal schools
Department of Cultural Affairs (DCA)	Through the State Library, assist public libraries with accessing E-Rate funds and state broadband support
Public Regulation Commission (PRC)	Administer the state rural universal service fund (SRUSF) and its Rural Broadband Program
Department of Transportation (DOT)	Administer utility and broadband right-of-way alongside and intersecting with state roads and transportation infrastructure
Indian Affairs Department (IAD)	Coordinate relationships with tribal governments; administer certain funds for tribal broadband projects

Source: LFC Files



New Mexico Lacks Coordination and Oversight of Broadband Development

No Single Entity is in Charge of Coordinating the State's Broadband Policy, Resulting in No Fewer Than Four State Agencies Implementing Different Parts of the System.

Broadband access and infrastructure rely on an interconnected array of services and sectors, from schools and government agencies to home and business connections. Links between the different parts of this system form the networks that allow users at all levels to transmit data between each other and the larger, worldwide internet. Public institutions and commercial providers must navigate a complex system of laws, rules, and funding mechanisms to ensure reliable infrastructure and services are in place to meet the increasing demand for data throughout the state.

In New Mexico, a patchwork of entities shares responsibility for different parts of the statewide network, each focused on serving the needs of a different constituency.

- The Department of Information Technology (DoIT) houses the Office of Broadband, which develops statewide broadband plans and maps and has authority to oversee certain funds;
- The Public School Facilities Authority (PSFA) assists schools with implementing network infrastructure and equipment by leveraging federal E-Rate funds through its Broadband Deficiencies Correction Program (BDCP);
- The New Mexico State Library, part of the Department of Cultural Affairs (DCA), works with both PSFA and DoIT to assist broadband development at public libraries;
- The Public Regulation Commission (PRC) operates the state rural universal service fund (SRUSF), providing funds to eligible telecommunications providers for projects in rural areas.

The state's broadband oversight and coordination responsibilities are weak, disjointed, and spread across different sections of statute.

Broadband-related statutes are scattered throughout codified law, with different responsibilities falling to different agencies depending on their purpose. Some agencies working in the broadband sphere do so without statutory guidance, instead relying on formal or informal agreements with other agencies. Considering the wide array of disparate funding sources spread across numerous agencies and stakeholders, a unified policy and designated single point of contact can act to facilitate targeted, coordinated efforts at enhancing connectivity and eliminating roadblocks to effective broadband service.

Table 5. New Mexico Broadband Responsibilities in Statute

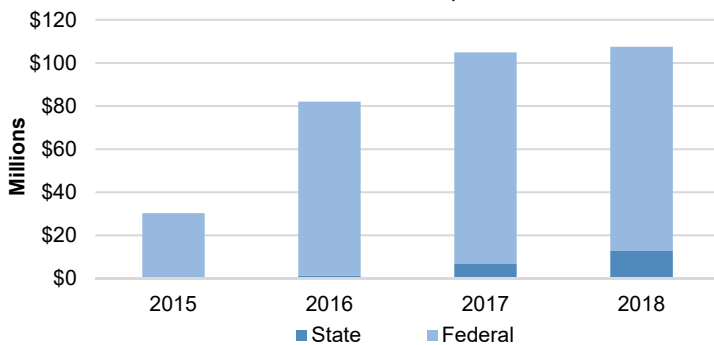
Section (NMSA 1978)	Agency	Purpose
9-27-6	DoIT	Requires the state information technology strategic plan to provide for the development of a state broadband network plan in conjunction with certain other state, local, and tribal agencies and institutions.
9-27-20	DoIT	Prohibits DoIT from providing broadband services to any entity other than statutorily authorized state government agencies and educational institutions except as is necessary to facilitate a state-mandated program.
9-27-26	DoIT	Permits Indian nations, tribes, and pueblos to connect to the statewide broadband network in exchange for a right-of-way agreement with the chief information officer, and requires the CIO to apply for federal universal service fund reimbursements on behalf of tribal entities that execute such an agreement.
9-27-27	DoIT	Creates the library broadband infrastructure fund to provide matching funds for grants to bring broadband infrastructure to public, tribal, and school libraries and requires DoIT to administer the fund.
22-24-4.5	PSCOC/PSFA	Establishes the Educational Technology Deficiency Corrections Program (also known as the Broadband Deficiency Corrections Program) to define and develop adequacy standards for educational technology infrastructure and methodologies for prioritizing projects and determining the share of costs borne by school districts, and provides for allocations from the Public School Capital Outlay Fund for the program.
63-9H-6	PRC	Establishes the state rural universal service fund, including a minimum \$5 million set-aside for broadband projects in rural areas, on a technology-neutral basis consistent with federal universal service programs.

Source: New Mexico Statutes

State and Federal Broadband Funding Totaled Nearly \$325 Million Between 2015 and 2018, Encompassing Multiple Agencies and Programs.

Federal sources make up most public funding for broadband development in New Mexico, contributing over \$303 million between 2015 and 2018 by LFC staff estimates. Largely, these federal funds consist of universal service fund programs designed to provide discounts on the costs of deployment and equipment to certain sectors. E-Rate serves schools and libraries, the Healthcare Connect Fund (HCF) targets rural hospitals and clinics, and the Connect America Fund (CAF) assist internet service providers with deploying service in rural areas. The U.S. Department of Agriculture (USDA) also provides funding through the Rural Utilities Service, but data for projects using these funds in New Mexico are not readily available.

Chart 4. State and Federal Funding for Broadband in New Mexico, 2015-2018



Note: Federal amounts reflect Universal Service Fund programs only
Source: LFC analysis of state and federal agency data

Each of these programs requires a guarantee of local funding to make up a certain portion of the cost, with the federal funds providing a “discount” in the form of a subsidy for the remainder. Note that this does not include the Lifeline program, which provides discounts to low-income and other eligible households on their phone and internet service bills, but does not fund broadband infrastructure, equipment, or maintenance.

State investments, including appropriations for planning and capital projects, and allocations from the state rural universal service fund, have been modest by comparison, totaling \$21 million between 2015 and 2018.

New Mexico has appropriated \$21 million across four agencies for broadband-related projects since FY15. In recent years, the Legislature has increasingly recognized a role for the state in promoting and supporting broadband development. To this end, it appropriated nearly \$21.1 million for

various projects either exclusively or partially devoted to improving broadband access and infrastructure since FY15. A significant portion of these appropriations, \$8.5 million, went to the Department of Cultural Affairs (DCA) for library improvements statewide, including the costs of broadband equipment and infrastructure. Most recently, DoIT received an appropriation of \$10 million for a project to expand broadband in rural areas between FY20 and FY23. This appropriation served as part of the motivation for this evaluation, and later sections of this report include further discussion of DoIT’s plans for the use of these funds.

Table 6. Appropriations and Authorization for Broadband Projects, FY15-FY20

Fiscal Year	Agency	Amount	Source	Purpose
FY15	DoIT	\$50,000	Severance Tax Bonds	To DoIT for planning, design, and construction of a high-speed broadband infrastructure network into Bernalillo and Sandoval counties and rural northern NM to integrate w/ existing regional economic development initiative net open access network.
FY17	DoIT	\$400,000	General Fund	Special appropriation to DoIT for a statewide broadband study and plan
FY17	DCA	\$3,000,000	General Obligation Bonds	For library furniture, equipment, acquisitions, etc., including purchase and installation of broadband equipment and infrastructure at non-tribal public libraries statewide.
FY17	DCA	\$750,000	General Obligation Bonds	For library furniture, equipment, acquisitions, etc., including purchase and installation of broadband equipment and infrastructure at tribal public libraries statewide.
FY19	DCA	\$4,000,000	General Obligation Bonds	For library furniture, equipment, acquisitions, etc., including purchase and installation of broadband equipment and infrastructure at non-tribal public libraries statewide.
FY19	DCA	\$750,000	General Obligation Bonds	For library furniture, equipment, acquisitions, etc., including purchase and installation of broadband equipment and infrastructure at tribal public libraries statewide.
FY20	DoIT	\$1,000,000	General Fund	DoIT library broadband expansion/improvements
FY20	IAD	\$845,000	General Fund	Communications tower/broadband for Jicarilla Apache Nation
FY20	DoIT	\$259,684	General Fund	Rural broadband for North Central New Mexico Economic Development District in Rio Arriba and Santa Fe counties
FY20	DoIT	\$10,000,000	General Fund	Broadband in rural areas statewide (to be expended between FY20 and FY23)
Total		\$21,054,684		

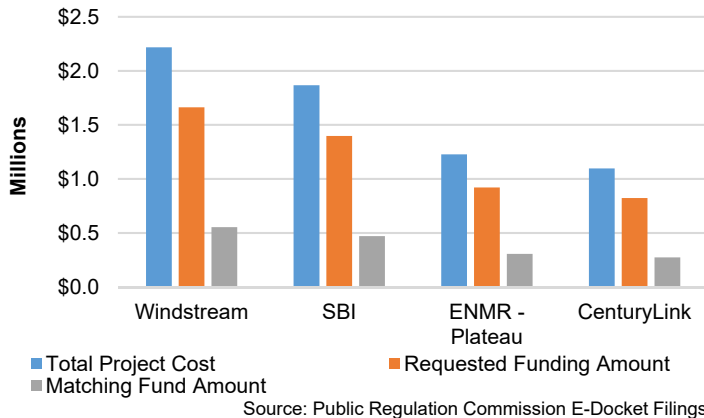
Note: Does not include approximately \$5.5 million funded through the Public School Facilities Authority’s Broadband Deficiencies Correction Program
Source: LFC files

The Public Regulation Commission (PRC) administers over \$17 million in nonappropriated rural universal service funding for broadband, including \$12 million for which few public details are known. PRC administers the state rural universal service fund (SRUSF) to provide support for telecommunications service in rural areas of New Mexico. The fund is financed by a surcharge on intrastate retail public telecommunications services, typically collected by telecommunications providers and passed on to PRC through a small portion of customers’ phone bills (\$1.24 per connection per month in 2019).

During the 2017 session, the Legislature, through Senate Bill 308, amended the New Mexico Rural Telecommunications Act (RTA) to create two avenues for funding broadband through the SRUSF. First, the act requires a minimum of \$5 million annually be dedicated to a program to support the construction and maintenance of broadband facilities consistent with federal universal service programs. Second, the act requires eligible telecommunications

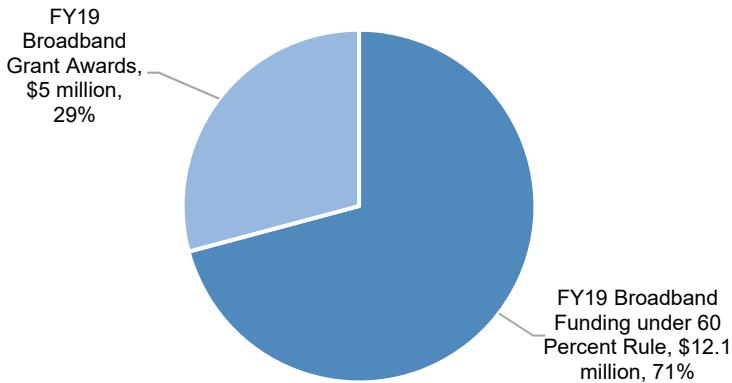
carriers (ETCs) – a designation granted by PRC for carriers typically demonstrating commitment and ability to serve rural areas – receiving access reduction support or need-based support through the SRUSF to spend at least 60 percent of this funding on rural broadband deployment and maintenance. Access reduction support essentially represents hold-harmless payments to carriers to make up for past reductions in intrastate connection rates.

Chart 5. FY20 SRUSF Broadband Program Requests by Applicant



In FY19, PRC awarded \$5 million to four ISPs for projects in rural parts of the state under the broadband grant program, representing about 82 percent of funds requested and 61 percent of total project costs. The recipients intend to use the funds for DSL, fiber, and mobile wireless projects serving nearly 20 thousand residents in rural parts of the state. In FY20, the same four ISPs requested \$4.8 million, below the \$5 million statutory minimum amount for the grant program and 75 percent of proposed project costs.

Chart 6. FY19 SRUSF Funding Allocated to Broadband (Total: \$17.1 million)



Based on publicly available PRC filings, 12 of the 26 FY19 broadband grant projects, which account for around 90 percent of FY19 broadband grant funds, are either in the construction phase or have been completed. The fund recipients’ project areas include Cuba, Española, Anton Chico, Clayton, Logan, McKinley County, San Juan County, among others. PRC staff have diligently monitored the projects’ progress and have required progress documentation prior to disbursement of funds. For example, the commission has requested “a satisfactory explanation” regarding permitting for two of Windstream’s Española projects prior to authorizing initial payments.

Under the second funding mechanism, in calendar year 2019, the SRUSF will disburse an estimated \$18.8 million to ETCs for access reduction support and another \$1.4 million for need-based support. Of these amounts, statute requires 60 percent, or \$12.1 million in total, to go to broadband (section 63-9H-6 NMSA 1978). Together with the \$5 million set aside for

broadband in statute, these two funding mechanisms total \$17.1 million in SRUSF funding for broadband in 2019.

In a review by LFC staff of publicly available 2018 SRUSF filings, it appears many of the ETCs are using 100 percent of their SRUSF funding for broadband deployment and maintenance, meaning an additional \$7.5 million may be going to broadband projects. However, unlike the broadband grant program portion of the SRUSF which requires an application and proposed project details, disbursements under the 60-percent requirement receive minimal oversight beyond these self-reported filings, which include redacted proprietary information, limiting public knowledge of how these funds are used.

While New Mexico’s percentage of broadband SRUSF funding is on the higher end when comparing all states, some states have taken further steps in their prioritization of funding broadband through rural universal service funds. In 2018, Colorado passed legislation aimed at modernizing its SRUSF by requiring that 60 percent of the total fund amount go towards broadband and increase by 10 percent annually until 100 percent of the fund, which will be reached in 2023, supports broadband infrastructure. Colorado decided to cap the total fund amount at \$25 million beginning in 2023.

The Substantial Investment in Broadband Requires Concerted State-Level Efforts to Maximize Funding and Fill Gaps Where Needed.

Because of the disparate nature of state and federal broadband funding, stakeholders seeking to develop networks or improve service must navigate a complex array of agencies, applications, and regulations. For example, Public School Facilities Authority (PSFA) employees provide some technical assistance for schools applying for E-Rate, but in general applicants rely on private consultants to help them deal with the complex and voluminous paperwork and overlapping timelines required to obtain and maintain funding. The E-Rate cycle, for example, may require recipients to complete forms certifying federal reimbursement for costs incurred the previous year while simultaneously preparing to submit forms applying for the next year.

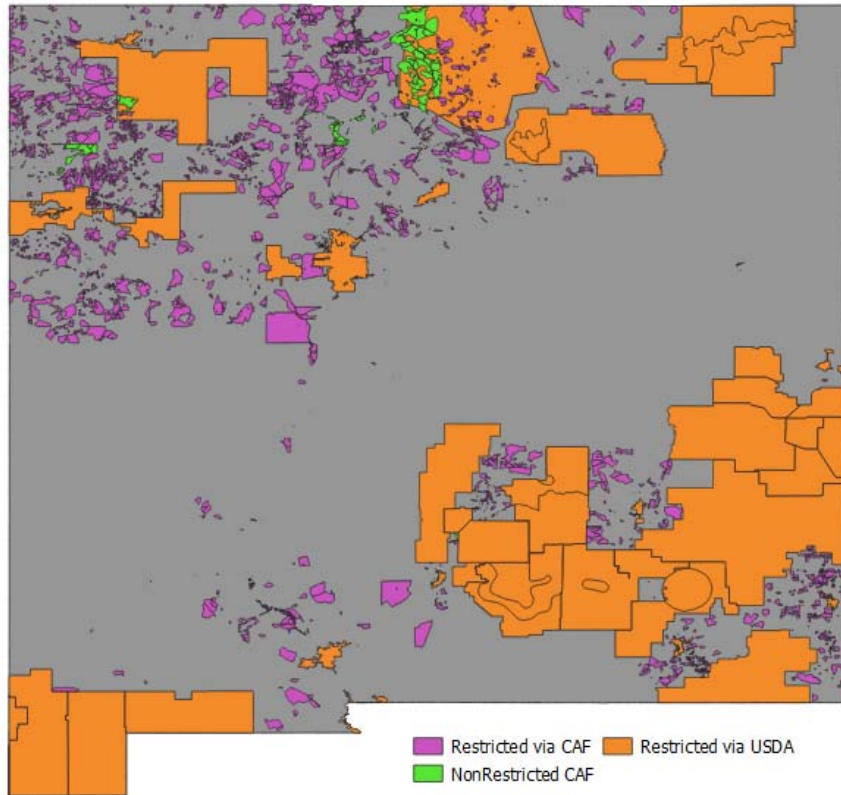
Because providers and other broadband project sponsors and stakeholders may be involved with multiple projects that draw on a variety of both federal and state funding sources, having a single, designated point of contact to help applicants negotiate these opportunities and the complicated requirements associated with them could make it easier to access funds and leverage state resources where appropriate.

The state can play a role in filling gaps in areas where federal regulations around prior funding for broadband projects limits future broadband deployment. Across the country, ISPs have been largely unwilling to deploy broadband infrastructure to rural regions because such projects generally do not yield adequate profit margins for private sector ISPs. To date, the primary strategy to overcoming this market failure is public financial assistance to offset the large capital investment required to serve a limited number of broadband subscribers.

A complication to this strategy is that federal programs targeting rural areas, particularly the Connect America Fund and the U.S. Department of Agriculture’s ReConnect Program, place complex requirements on how projects can be funded if other projects in the same geographic area have also received support. For these programs, once a project in a service area receives federal funds, no other project in that service area is eligible for future federal funds or, in some cases, state funds, even if a need for service persists.

Understanding the “gap zones” within federally funded restricted areas would be helpful to DoIT, PRC, and other agencies and stakeholders in coordinating efforts and strategically identifying rural areas within the state that may still benefit from state support.

Figure 3. Areas With Restrictions on Broadband Development Due to Federal Awards



This map shows locations that have previously received federal funding for broadband. The orange areas are USDA Re-Connect recipient areas and the purple areas are Connect America Fund (CAF) recipient areas. The green areas are areas eligible for CAF funding but where previous CAF or USDA awardees could petition for denial of any new awards if they can demonstrate they already provide broadband access in those areas.

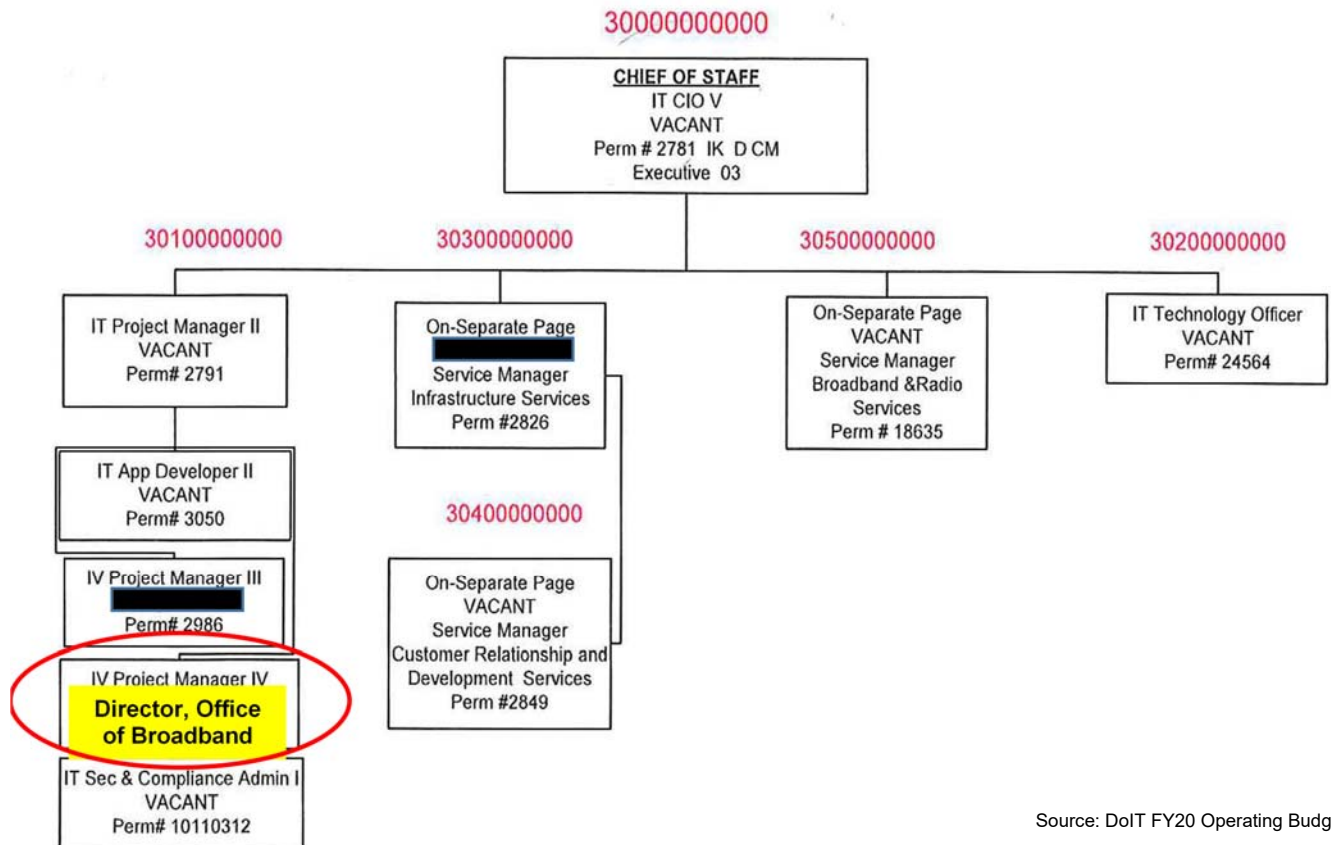
Source: LFC analysis of FCC and USDA data

DoIT's Office of Broadband has Not Been Adequately Staffed or Resourced to Handle the responsibilities Necessary for Effective Coordination.

Agencies with responsibility for funding broadband projects, including PSFA and PRC, have at least some program staff to review applications, approve grants, and conduct some degree of oversight. DoIT's Office of Broadband, meanwhile, operates with a single full-time equivalent (FTE) position. Prior to 2019, the office existed as the Office of Broadband and Geospatial Initiatives (OBGI) with a staff of 2 FTE, but recent internal reorganizations resulted in the separation of geospatial mapping services from broadband oversight, although the offices continue to work closely together.

With these resource constraints, the office has little capacity to collect data and conduct regular analysis of statewide broadband networks or facilitate effective coordination between stakeholders. It has not effectively monitored progress toward meeting the goals of the 2014 strategic plan, leading to further spending on a new plan with few guarantees it will result in more concrete action.

Figure 4. Current Location of the Office of Broadband in DoIT Enterprise Services Program Structure



Source: DoIT FY20 Operating Budget

Currently, the Office of Broadband is funded under DoIT’s Enterprise Services budget. Because the office does not exist as its own line item, it is difficult to ascertain its true costs of operation. With just 1 FTE at a salary of around \$100 thousand and unknown further administrative costs borne by the overall budget of the Enterprise Services Program, it is not possible to determine the actual costs of all its activities from reports available to LFC staff through SHARE, the state human resources and accounting system.

Because the office’s mission is distinct from most of DoIT’s enterprise-related services on behalf of state government, its administrative location and funding should be reconsidered. DoIT’s FY21 budget request proposes moving the office to the Compliance and Project Management Program and reconstituting it as the Bureau of Broadband, but still funding it out of the existing IT rate structure. Given the ideal functions of the office extend beyond internal services to state agencies to the coordination and oversight of statewide broadband projects and initiatives in support of industry, local and tribal governments, and other stakeholders, it may be appropriate to reassess how it is funded.

Minnesota spent \$455 thousand on personnel and administrative costs (including 3 FTE) to operate its broadband office in FY19 using appropriations from its general fund and a portion of other state funds. Washington appropriated \$264 thousand for the first year of operation of its broadband office in FY20. Administrative costs in this range are likely similar to what would be required for a similarly robust office in New Mexico.

New Mexico turned away \$479 thousand in federal funds that would have supported state-level coordination of a national public safety broadband network. In 2017, New Mexico opted into the national public safety broadband network, known as FirstNet. This initiative is a nationwide effort by the federal government and AT&T to deploy a broadband network specifically for first responders. To support the state in planning for the infrastructure, equipment, and implementation needs of the project, the National Telecommunications and Information Administration (NTIA) awarded DoIT a \$700 thousand State and Local Implementation Grant Program (SLIGP) grant. These funds reimburse states for the costs of developing a governance structure for their networks, conducting education and outreach to local and tribal governments, and other planning and staffing needs of the project.

DoIT spent roughly \$221 thousand from its own funds on eligible activities, which was then reimbursed by SLIGP funds. In April 2019, the state elected not to pursue reimbursement for the remainder of the grant, totaling about \$479 thousand, essentially leaving that amount on the table with the federal government. In its explanation to the federal government for terminating the grant, DoIT cited a lack of knowledgeable staff as the primary reason for not drawing down the remaining funds.

Table 7. DoIT Reversion of Federal Funding for FirstNet

	Amount
Amount Expended and Reimbursed from SLIGP Funds	\$220,588
Amount Reverted to Federal Government	\$479,412
Total SLIGP Grant	\$700,000

Source: DoIT

DoIT's new leadership is reengaging with other agencies and stakeholders for its rural broadband project, but should work to maintain continuity and momentum after its completion. In the interest of fostering collaboration for the new rural broadband project, DoIT and the Office of the Governor are convening an interagency working group consisting of cabinet-level officials from DoIT, the Department of Transportation, the Economic Development Department, the Indian Affairs Department, and the General Services Department. DoIT has also convened a new enterprise broadband advisory committee consisting of stakeholders from various parts of state government, the education and healthcare sectors, and tribal governments to coordinate future broadband efforts. In recent months, the Public Regulation Commission has also held broadband related meetings with providers, industry groups, and government entities. Given the disparate and complex nature of broadband development, this kind of collaborative communication is a crucial element of any plan. However, New Mexico's previous experience with similar groups should serve as a cautionary example of well-intentioned plans that suffer from a lack of follow-through.

Previous broadband working groups and committees were never formalized and have not survived across administrations.

In 2013, DoIT convened a Broadband Working Group to coordinate development of the statewide strategic plan among sectors and agencies. The group consisted of representatives from state government, private industry, and other stakeholders to provide input into the sector-specific strategic plans in the targeted areas of education, healthcare, and economic development.

However, this group appears to have ceased meeting after the publication of the plan and has not continued monitoring progress toward meeting its goals.

Likewise, DoIT convened a Broadband Executive Committee to facilitate communication and coordination between DoIT leadership, the telecom industry, tribal governments, the healthcare sector, the Public Regulation Commission, and other stakeholders. However, there is no evidence this committee remained active after the previous strategic plan was issued, and public materials related to its existence are outdated.

Without any meaningful statutory framework for broadband leadership and coordination that persists between and beyond individual gubernatorial administrations, New Mexico risks continuing to see a myriad of such groups phase in and out of existence, with little overarching consistency in implementation.

Legislation in other states highlights emerging best practices in creating more robust and accountable broadband oversight structures than exist in New Mexico. While DoIT's FY21 proposal recognizes the distinct role the Office of Broadband has to play, experiences in other states suggest a few other possible models the Legislature may wish to consider.

1. Establish the office independently of any other agency;
2. Keep the office within DoIT, but elevate it to its own program within the department's budget, with a distinct and well-defined mission and dedicated performance measures;
3. Create a new type of entity, such as a quasi-governmental authority or independent commission, to oversee broadband; or
4. Relocate the office to a different agency, such as the Economic Development Department or Public Regulation Commission.

Across the country, states are recognizing the importance and complexity of building out, upgrading, and maintaining broadband infrastructure. Since 2014, when New Mexico issued its most recent strategic plan, a number of states have moved toward centralizing responsibility for broadband policy in a single entity, even though funding may be distributed through several different channels. The forms and structures of these state agencies vary, but a common theme is legislative vesting of responsibility in a single authority to act as a point of contact and coordinating entity for all broadband-related activities in a state.

The states of Maine, Minnesota, Virginia, and Washington have all created central authorities with strong directives to oversee statewide broadband activities, including creating statewide plans using up-to-date data, coordinating among different sectors and stakeholders, and keeping their respective governors and legislatures apprised of progress through annual reports. Three of these states took the additional step of codifying state broadband goals in statute, including targets and timelines for broadband speeds and penetration rates. Three of these states also require the director of their broadband authorities to be appointed by the governor, vesting them with a level of visibility in the executive branch reflecting the high priority of broadband issues.

These entities differ in some respects in structure and scope. For example, Maine's ConnectME Authority is a quasi-governmental agency governed by a

seven-member board. Minnesota and Washington both have offices housed within state departments, but with their own independent authority over broadband matters and directors appointed by the governor. Virginia has a chief broadband advisor, appointed by the governor, with administrative support from other agencies and no direct oversight over funding.

Appendix C includes more detailed descriptions of these states' statutes, goals, and agency roles and responsibilities.

Table 8. Selected Model State Broadband Authorities vs. New Mexico

	Maine	Minnesota	Virginia	Washington	New Mexico
2018 Percentage of Households with Broadband	84.0%	86.8%	85.6%	90.0%	76.9%
Goals Codified in Statute	Yes	Yes	No	Yes	No
Lead Agency Established in Statute	Yes	Yes	Yes	Yes	No
Lead Agency Director Appointed by Governor	See Note	Yes	Yes	Yes	No
Lead Agency's Statutory Duties Include:					
Planning and Data Collection	Yes	Yes	Yes	Yes	Yes
Interagency/Intergovernmental Coordination	Yes	Yes	Yes	Yes	No
Administer Funding	Yes	Yes	No	Yes	Limited – See Note
Reporting to Governor and/or Legislature	Yes	Yes	Yes	Yes	No

Notes: Maine's Governor appoints four out of seven members to the ConnectME Authority Board and names one of those four as the chair. New Mexico's Office of Broadband within DoIT administers the Library Broadband Infrastructure Fund per statute, and a \$10 million capital appropriation for rural broadband development per Laws 2019, Chapter 277.
Source: Individual state statutes; Pew Charitable Trusts

Model states have also developed dedicated, recurring sources of funding for broadband projects. Between FY15 and FY18, Minnesota's Border-to-Border Broadband Grant Program has received appropriations of \$85.5 million to fund 110 separate broadband projects throughout the state. These grants helped increase the share of Minnesota households with broadband speeds of at least 25/3 Mbps from 86 percent in 2014 to 91 percent in 2017. While the program received no new appropriations in FY19, the Legislature appropriated another \$40 million for the FY20-FY21 biennium (\$20 million annually) to continue these grants, bringing the overall total to \$125.5 million.

Washington established its broadband office and grant program in legislation passed during its 2019 session. This included an appropriation of \$21.5 million in FY20 for a new broadband loan and grant program to be capitalized initially from bond proceeds, with authority for additional funding from loan repayments, special revenues, and other appropriations.

Maine's ConnectME Authority oversees two funds that may be used for broadband projects. The ConnectME Fund supports projects from revenues from an assessment of 0.25 percent on telecommunications companies, while the Municipal Gigabit Broadband Network Access Fund uses bond proceeds and other funds to assist local governments and public-private partnerships in developing ultra high-speed internet services and infrastructure. Since the ConnectME Fund's inception in 2005 through the end of 2018, the authority has issued \$24.4 million in grants for planning and infrastructure development.

Recommendations

The Legislature should consider:

- Designating in statute a single entity to be the state’s broadband lead and central point of contact, with a director appointed by the governor and duties including (1) coordinating all statewide and intergovernmental broadband policies and initiatives, (2) defining unserved and underserved areas, (3) assisting with identifying and coordinating sources of funding, (4) assisting with navigating regulatory and permitting issues, and (5) setting goals and targets for broadband deployment and performance, collecting data on progress, and reporting regularly to the governor and relevant legislative committees on the state’s progress in meeting these outcomes.
 - If the existing DoIT Office of Broadband is the designated entity, the Legislature should consider elevating it to its own program in the budget with associated Accountability in Government Act performance measures to ensure it meets statewide broadband goals.
- Requiring PRC to track and report all funding set aside for broadband under the state rural universal service fund, with protections for proprietary information.

DoIT should:

- Develop a detailed plan for elevating the Office of Broadband to full program status by FY22, including plans for hiring staff to provide statewide, regional, and sector-specific coordination and technical assistance services.

The State's Broadband Efforts Have Yielded Successes, but Piecemeal Implementation Has Led to Inconsistent Outcomes and Persistent Obstacles

New Mexico Has Allocated \$1 Million for Broadband Studies and Plans Since FY13, but Has Made Only Modest Progress Toward Achieving Stated Goals.

In FY12 and FY13, DoIT contracted for a statewide study and strategic plan to assess the areas of greatest need for broadband, identify actionable goals, and develop plans for achieving them. The plan established broad goals in the areas of education, healthcare, and economic development, but in general these goals lacked specific targets and timelines for achievement. Not having either makes progress difficult to measure and fails to hold responsible parties accountable for achieving results in a timely manner.

With the exception of those for educational broadband deployment, the state has had limited success in taking action to meet these goals. Apart from an initiative placing PSFA in a key role overseeing broadband for education (BB4E) activities, the plan did not result in assignment of responsibility to specific state-level entities to ensure their achievement. No agency was tasked with monitoring progress, and moreover, some measures lack a reliable source of readily available data to verify them. Table 9 on the next page presents a report card on the status of each of the plan's goals.

DoIT received \$10 million in appropriations for rural broadband assistance in the 2019 legislative session and is developing a plan for a grant program using these funds. The appropriation is from general fund revenues authorized for capital outlay from FY20 through FY23 in Laws 2019, Chapter 277 (Senate Bill 280). The language in the act only states the funding is to be used “for broadband expansion, including assessments and contracts, in rural areas statewide.” It does not specify what entities may receive funding, what areas are considered “rural” for purposes of receiving funding, or any other criteria for expenditure of the appropriation. DoIT will make these determinations upon completion of an updated broadband assessment and plan, also funded out of this appropriation.

DoIT created a timeline for the use of the \$10 million and included it in the charter for the Rural Broadband Project presented to the department's Project Certification Committee (PCC) in July 2019. Under the department's current plan, the assessment will be completed in March 2020, including the development of criteria for issuing funds for broadband projects, likely in the form of a grant program.

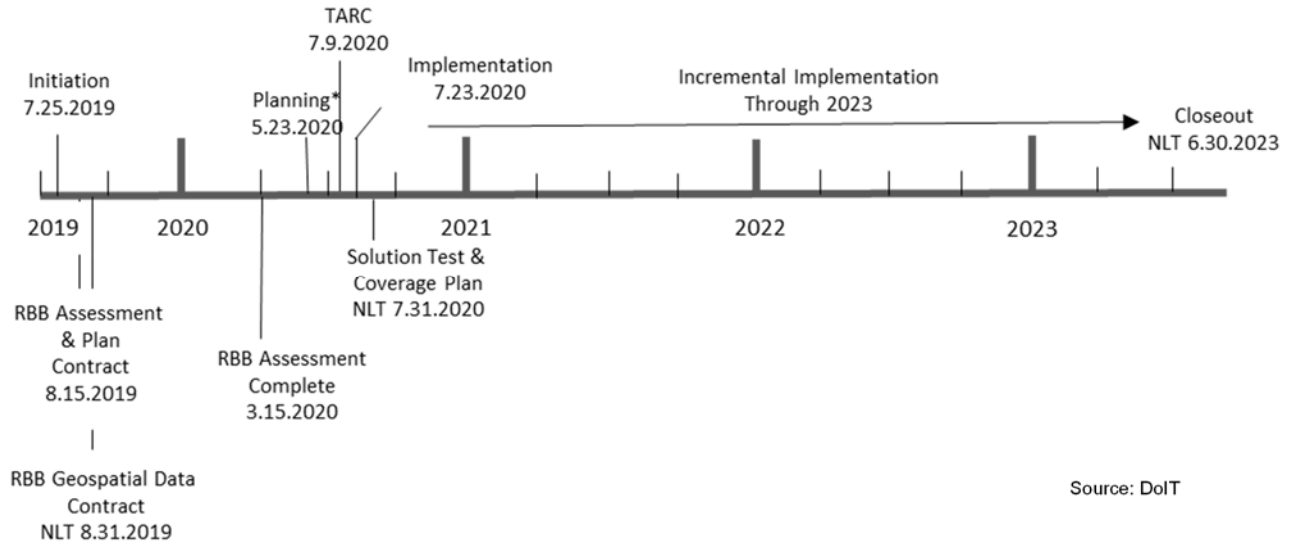
Table 9. "Actionable Goals" Identified in 2014 Statewide Strategic Plan for Broadband

Sector	Goal	Status	Explanation
Education	Increase availability of higher-capacity broadband to schools, particularly in rural areas.	Green	PSFA's Broadband Deficiencies Correction Program has leveraged federal E-Rate funding to support broadband connections in all 89 school districts and 65 charter schools.
Education	Provide greater technical and other support to school districts to maximize funding from the federal E-Rate program.	Green	PSFA project managers and contract consultants provide support to schools on the E-Rate application process.
Education	Increase the number of qualified personnel to fill technical positions at school districts.	Red	New Mexico has a shortage of qualified personnel for network and systems administrator jobs, especially in rural areas. However, data specific to the educational sector needs for these positions is unavailable, and there are no targeted state initiatives for workforce development in educational technology.
Healthcare	Increase availability of higher-capacity broadband to hospitals, particularly last-mile connections and overall infrastructure in rural areas.	Yellow	The state does not offer funding or assistance specifically for hospital broadband, but programs such as the Rural Universal Service Fund may assist with overall rural infrastructure.
Healthcare	Increase telehealth coordination to improve clinical and technical coordination, broadband connectivity, health information technology, and administrative services.	Yellow	HSD is pursuing federal HITECH funding to assist with connectivity in support of a Health Information Exchange.
Healthcare	Provide greater assistance to healthcare institutions to maximize funding from federal government sources including the universal service fund's Healthcare Connect Program.	Red	The state does not offer funding or assistance to healthcare providers in accessing the Healthcare Connect Fund.
Economic Development	Increase the availability of broadband for business in rural areas and increase the development of 100 Mbps+ broadband throughout the state to retain and attract businesses.	Yellow	Despite increased availability of 100 Mbps+ speeds for residential customers, availability for businesses remains stagnant.
Economic Development	Reduce the cost of deployment of fiber and other broadband infrastructure in rural and other geographically difficult to serve areas.	Yellow	SRUSF funds support broadband infrastructure in rural and underserved areas and may be able to leverage some federal funding to reduce deployment costs.
Economic Development	Support coordination and planning activities in rural areas to increase the capacity of organizations and community leaders to address their broadband needs.	Yellow	Previously established coordinating bodies (NM Broadband Executive Committee and NM Broadband Working Group) are defunct. DoIT has recently convened a new enterprise broadband advisory committee consisting of stakeholders from various parts of state and tribal governments, as well as the private sector, to coordinate future broadband efforts.

Status Legend	
Goal substantially achieved	Green
Goal partially achieved or progressing toward achievement	Yellow
Goal not achieved; little or no progress made	Red

Source: DoIT 2014 broadband plan; PSFA; PRC; WSD; HSD; FCC

Figure 5. DoIT Rural Broadband Project Timeline



Source: DoIT

According to the executed contract, the final design of the rural broadband project will be contingent on the findings of the assessment and plan. However, the department is exploring the possibility of using the state funds to leverage federal funding sources, such as U.S. Department of Agriculture (USDA) ReConnect awards, for projects in rural areas.

The new broadband assessment will included a series of rural broadband analyses, culminating in the development of a New Mexico Rural Broadband Assessment and Strategic Plan. DoIT spent \$450 thousand for the first statewide assessment and plan, conducted by CTC, between FY13 and FY15, including amendments and change orders. In FY17, DoIT spent \$160 thousand on contractual services from the same vendor, which resulted in the production of the broadband for business (BB4B) study. In FY20, DoIT again contracted with the same vendor for \$400 thousand for another new assessment under a statewide price agreement. Funding for the latest contract is from the \$10 million in general fund revenues appropriated for rural broadband assistance. In all, DoIT has contracted with this vendor for just over \$1 million for broadband planning and assessment services since FY13.

Table 10. DoIT Spending on Broadband Planning Contracts, FY13-FY20

Fiscal Year	Amount	Purpose
FY13 Actual	\$59,985	Statewide broadband assessment and strategic plan, including amendments and change orders
FY14 Actual	\$160,000	
FY15 Actual	\$230,400	
FY17 Actual	\$160,000	BB4B study
FY20 Contracted	\$400,000	Rural broadband assessment and plan
Total	\$1,010,385	

Source: SHARE

The new assessment is to draw on updated maps and data produced by DoIT and the University of New Mexico's Earth Data Analysis Center (EDAC) to identify the areas of greatest broadband need in the state and plan for the spending of the remainder of the \$10 million. According to the contract, the plan will also include a high-level candidate design and cost estimate for new infrastructure to address rural broadband needs, a business strategy for operating broadband infrastructure, and a grant program template and strategy. In addition, DoIT expects the updated plan will assist New Mexico in obtaining federal funds from the USDA ReConnect program, which includes scoring criteria that offers additional points if a state's broadband plan has been updated within the past five years.

Mixed Outcomes In Targeted Sectors Offer Opportunities To Appropriately Tailor Future Initiatives.

Some of the goals outlined in the 2014 state broadband plan have been achieved while others remain in progress or have seen little action. Education initiatives, for example, have largely been successful, improving technical staffing for school-based networks. On the other hand, broadband goals in the areas of telehealth and economic development remain works in progress.

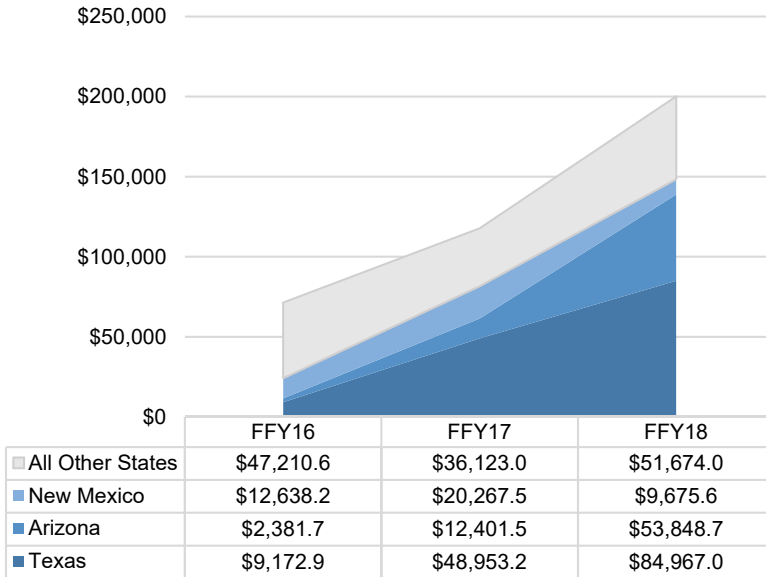
All school districts in New Mexico now have broadband connections. In 2015, Governor Martinez launched the Governor's Broadband for Education Initiative with the stated goals of increasing broadband accessibility, making broadband affordable, leveraging funding sources, and investing resources to benefit future students. According to data from EducationSuperHighway, a nonprofit focused on upgrading internet access in public schools, 65 percent of New Mexico school districts in 2015 had broadband connectivity at the minimum broadband speed goal (100 kbps/student). Over the past five years, the percentage of public schools with broadband connectivity meeting the speed goal has increased to 99 percent. Additionally, the cost of broadband for public schools has decreased by 75 percent, falling from \$14.50 per Mbps in 2015 to \$3.60 per Mbps in 2019. New Mexico has achieved these improvements in public education broadband connectivity by leveraging state and federal funding and a well-coordinated effort involving the Public School Facilities Authority (PSFA), Public Education Department (PED), and DoIT.

PSFA supports public schools pursuing federal E-Rate funding through its Broadband Deficiencies Correction Program (BDCP). The federal E-Rate program provides discounts, with a required funding match by the applicant, to expand and upgrade internet connectivity at eligible schools and libraries. E-rate classifies eligible projects into two broad categories. Category 1 projects are those that build or extend fiber infrastructure to schools, while Category 2 projects are for the purchase and installation of internal network equipment to facilitate high-speed internet access within schools. E-Rate funds subsidize these projects so school districts receive discounts of as high as 95

Case Study: Albuquerque and Santa Fe Public Schools

Albuquerque Public Schools' (APS) project to connect 159 schools via fiber, currently under construction, has received the largest BDCP award (\$1.4 million) and total award amount (\$14.3 million). APS has expended \$4.2 million of the total award amount, leaving a balance of \$10.1 million. The next largest project is Santa Fe Public Schools' (SFPS) project to connect 31 schools and facilities via fiber. This project, also currently under construction, received a BDCP award of \$437 thousand, along with an additional \$4.1 million from E-rate funding.

Chart 7. Top States for Federal E-Rate Fiber Funding, FFY16-FFY18

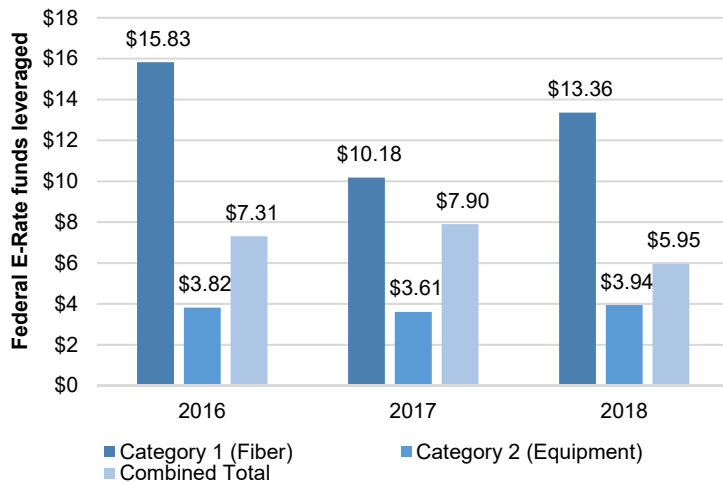


Source: PSFA, USAC E-Rate data

percent on Category 1 projects, with lower discounts for Category 2. The BDCP uses PSFA’s own funds to provide some or all of the required local match for districts to receive federal E-Rate funding for eligible broadband projects. PSFA also provides technical and project management assistance to entities applying for and receiving E-Rate funding.

Between federal fiscal years 2016 and 2018, E-Rate awarded a total of \$42.6 million for broadband projects in New Mexico, ranking third in the nation behind only Texas and Arizona, and accounting for about 11 percent of all approved broadband funding nationwide. This translates to PSFA’s BDCP leveraging between \$6 and \$8 in federal funds for every state and school district dollar spent since FY16. Category 1 projects leveraged between \$10 and \$16 in federal funds for every dollar awarded, while Category 2 equipment projects leveraged under \$4.

Chart 8. Federal E-Rate Funds Leveraged for Every \$1 in State and District BDCP Funds Awarded



Source: PSFA

While all New Mexico schools are connected to high-speed internet, broadband needs are constantly changing and keeping up-to-date requires continued work and investment. Over the past three years, median broadband bandwidth speeds in public schools have increased from 136 kpbs/student to 528 kpbs/student, which has allowed technology to be more regularly used for teaching and learning in the classroom. However, the newest bandwidth goal outlined by EducationSuperHighway is 1 Mbps per student, which enables a more encompassing digital learning environment. Understanding this, PSFA expected to add an additional 50 broadband projects in 2019, in addition to the existing project list upwards of 120 projects.

The Broadband for Libraries (BB4L) Pilot Project is using approximately \$80 thousand in state and local funding to upgrade library internet service by 77 percent. The New Mexico State Library (NMSL) worked with PSFA on a pilot project to improve broadband service at public and tribal libraries. The pilot used 2016 general obligation bond proceeds to provide the local match for federal E-Rate funding to provide discounts on higher-speed internet access and associated broadband equipment at 10 libraries statewide. According to cost data provided by NMSL, about \$80 thousand in state funds were used to leverage about \$267 thousand in federal E-Rate funds, or about \$3.30 in federal funds for each \$1 in state and local funds.

Table 11. BB4L Pilot Project Costs, Speed Improvements, and Estimated Savings

Library	Total Project Cost	Federal (E-Rate) Funds per \$1 in State/Local Funds Spent	Internet Speed Improvement	% Change in Monthly Costs	Dollar Change in Monthly Costs	Dollar Change in Annual Costs
Columbus Village Library	\$12,425	\$4.69	80%	-33%	-\$60	-\$720
Carnegie Public Library (Las Vegas)	\$10,378	\$5.74	98%	-63%	-\$60	-\$717
Española Public Library	\$15,806	\$5.73	65%	Not provided	Not provided	Not provided
Embudo Valley Library	\$7,575	\$5.67	50%	Not provided	Not provided	Not provided
Questa Public Library	\$11,422	\$2.62	9%	-95%	-\$280	-\$3,360
Reserve Public Library (WCC)*	\$10,343	\$5.07	98%	-37%	-\$32	-\$384
Magdalena Public Library (WCC)*	\$8,202	\$5.10	90%	-81%	-\$235	-\$2,820
Glenwood Community Library (WCC)*	\$10,051	\$5.79	99%	-55%	-\$68	-\$821
Santa Clara Pueblo Community Library	\$11,098	\$4.20	95%	-56%	-\$114	-\$1,366
Thomas Branigan Memorial Library (Las Cruces)**	\$385,469	\$2.92	90%	-64%	-\$640	-\$7,680
Total, All Libraries	\$482,770	\$3.30	77%	-61%	-\$1,489	-\$17,867

* WCC = West Central Consortium Member

** Total project cost exceeds E-Rate eligible budget; no state funding being provided in excess of required federal match
Source: New Mexico State Library

Overall savings amount to roughly \$17.9 thousand per year, excluding two libraries for which savings data were not supplied. These represent internet service cost savings to the libraries of 61 percent, on average, compared with previous costs, with average speed improvements of 77 percent due to improved equipment. These costs also do not include any additional personnel required to operate and maintain the new equipment, which presumably are paid from libraries' own funds.

Currently, the BB4L program is transitioning from under PSFA's planning and execution support to NMSL, and DoIT will act as the fiscal agent and provide some technical support (DoIT was appropriated \$1 million for library broadband expansion and improvements in FY20). PSFA, DoIT, and NMSL staff have held multiple meetings regarding the BB4L transition and future direction of the program.

A shortage of qualified systems administrators hampers schools' and libraries' ability to support improved broadband networks. While school districts and pilot project libraries have successfully used a combination of E-Rate and PSFA funds to expand and improve their broadband connections, they need qualified technical staff to provide support for the networking equipment and other systems components to ensure those networks continue to operate smoothly. The 2014 state broadband assessment found a shortage of personnel to fill technical positions in school districts, a situation that continues to be a concern, especially in rural areas.

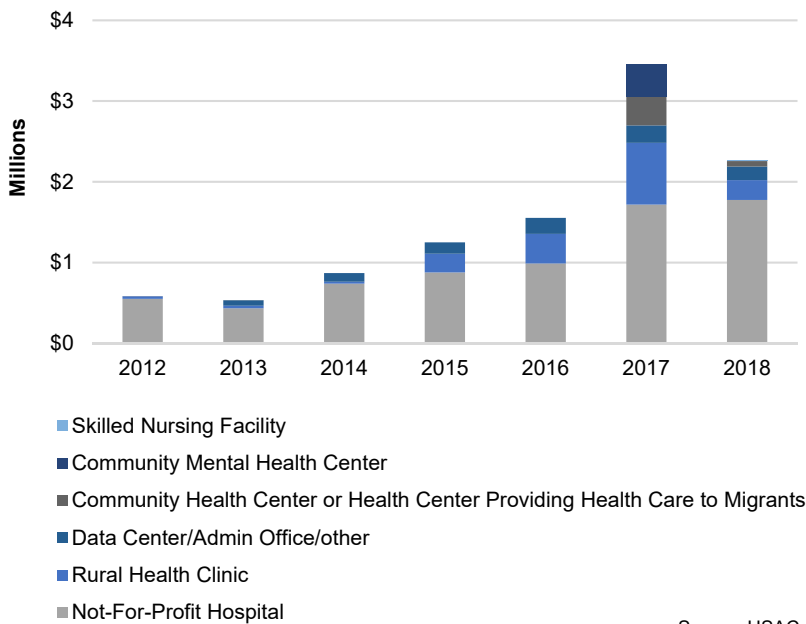
Data from the Department of Workforce Solutions indicates 16 counties in the state lack any candidates for network and systems administrator positions as of September 2019. Neither PSFA, DoIT, nor Workforce Solutions tracks employment and job postings specifically for school or library information technology positions. However, interviews with PSFA and NMSL staff report

this lack of technical expertise is an ongoing issue among smaller and rural recipients of E-Rate and BDCP funds.

Access to telehealth in New Mexico is growing due primarily to federal sources. Telehealth is fundamentally changing how patients interact with the healthcare system and receive care, ranging from video telemedicine consults to remote electronic monitoring of medical devices worn by patients in their own homes. The FCC and American Public Health Association have recently characterized broadband access as a “super-determinant” of health. Reliable broadband connections are essential to ensure providers and patients receive these state-of-the-art services, especially in rural areas where patients may be far from healthcare facilities providing specialized care.

Much like the E-Rate program for public schools and libraries, federal funding programs exist for healthcare facilities to receive subsidized broadband connectivity. The Federal Communications Commission (FCC) runs the Healthcare Connect Fund (HCF) program to assist eligible rural hospitals, clinics, and healthcare providers with paying the costs of network equipment and internet connectivity improvements. The program offers discounts of 65 percent of the total cost of the improvements, with the remaining 35 percent borne by the recipient through its own sources or other public subsidies. Certain nonrural providers may also be eligible to receive funding if they meet certain criteria or apply as part of a consortium with predominantly rural providers.

Chart 9. Federal Healthcare Connect Awards in New Mexico, FFY12-FFY18
(Total = \$10.5 million)



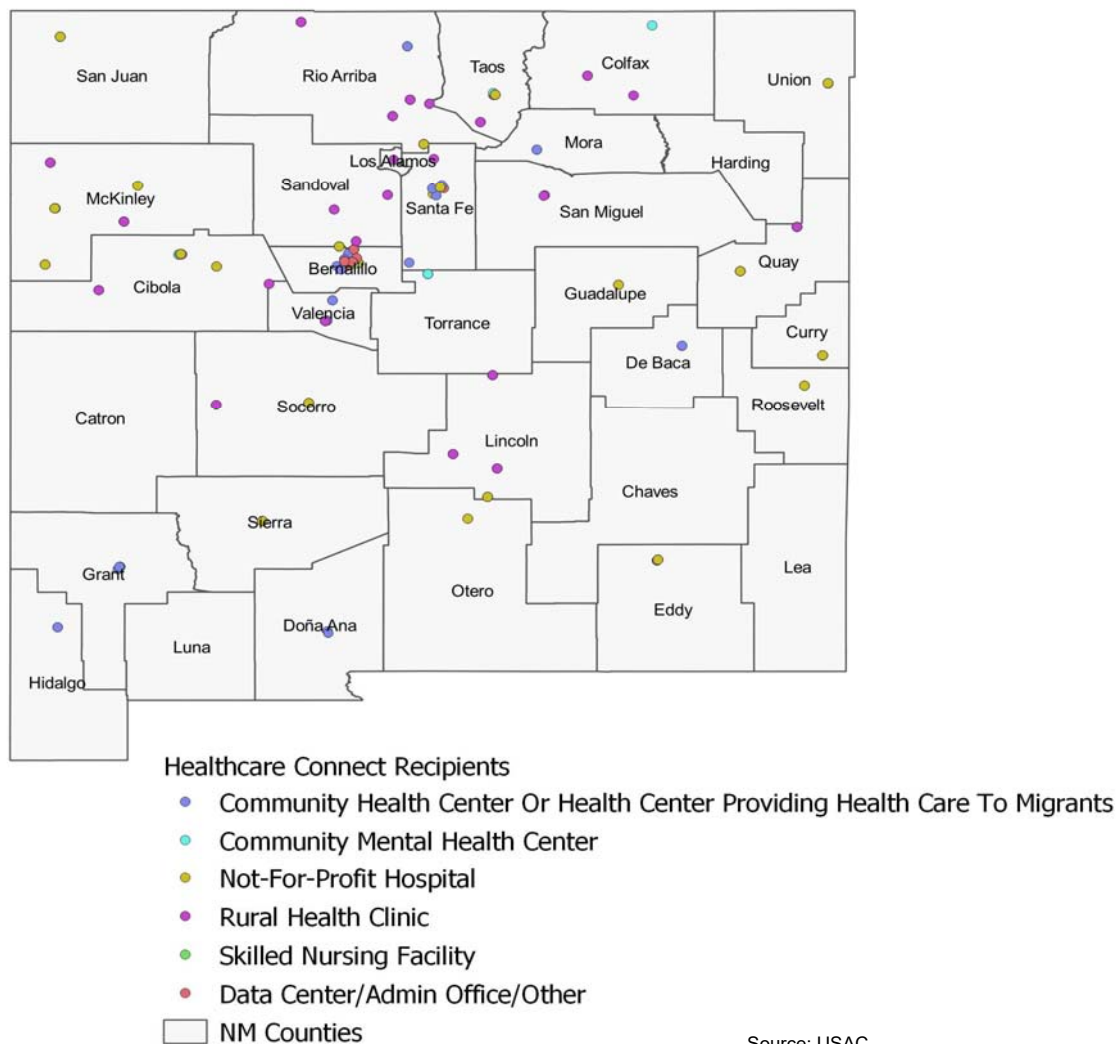
Source: USAC

Since federal fiscal year 2012, New Mexico hospitals and providers have received \$10.5 million in HCF assistance. Most of this, about two-thirds overall, has gone to nonprofit hospitals. Another 16 percent has supported rural health clinics, and 9 percent has supported the broadband needs of healthcare providers’ data centers or administrative offices. Community health centers and community mental health centers have received about 4 percent each.

Providers receiving funding are scattered throughout the state. However, there are significant clusters of funded providers and hospitals, as well as data centers and administrative offices, in or near urban centers such as Albuquerque and Santa Fe. These providers, which include large providers such as Presbyterian Healthcare Services, may only receive funding as part

of a consortium that includes a majority of rural healthcare providers. Appendix D includes a chart of Healthcare Connect Fund amounts distributed in New Mexico by county since FY12.

Figure 6. Locations of Healthcare Connect Fund Participants, FFY12-FFY18



In 2018, 264 healthcare provider sites received HCF funding for broadband subscriptions and network equipment, over a threefold increase from 2013 when 85 healthcare provider sites received HCF funds. In 2018, 126 provider sites had broadband speeds meeting the FCC’s broadband definition (25/3 Mbps). In 2016, only 68 providers statewide were receiving broadband speeds at the 25/3 Mbps level. Current provider speeds range from 30 Mbps to 1 Gbps in download speeds, with the majority being between 100 Mbps and 200 Mbps.

In addition to the healthcare facilities themselves having reliable broadband connectivity, patients rely heavily on technology for monitoring and maintaining their health. From receiving lab results electronically to scheduling a medical appointment, the healthcare system increasingly assumes patients are able to access medical information via a computer or smart phone, which is not possible for many New Mexicans living in rural regions with poor broadband coverage.

Ensuring adequate broadband in rural locations throughout the state and encouraging increased telemedicine services could substantially improve patient care, avoid unnecessary healthcare costs, and retain reimbursement charges in the local community. The state can help increase the adoption of

telemedicine services in rural regions through the identification of rural healthcare facilities lacking adequate bandwidth, facilitating improved connectivity and technology among rural healthcare facilities, and improving broadband access to rural households so patients can play an active role in their health.

Case Study: UNM ACCESS Telemedicine

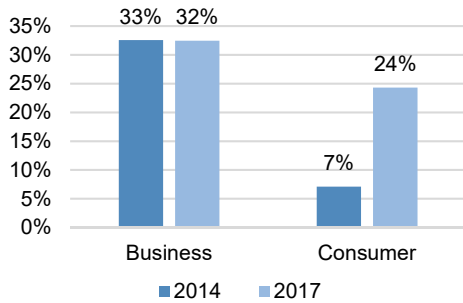
UNM Health's Access to Critical Cerebral Emergency Support Services (ACCESS) Telemedicine has served nearly 4,000 patients and saved an estimated \$24 million in annual medical costs. Prior to the program, nearly all patients evaluated for a neurological emergency in New Mexico were transferred to UNM Hospital or another out-of-state Level 1 trauma center, commonly by air transport which costs around \$38 thousand per transport. Additionally, local hospitals can retain reimbursements by keeping patients local. ACCESS network hospitals have earned an estimated \$18 million in retained dollars.

Stagnant growth in business speeds has limited achievement of broadband economic development goals. The 2014 plan's first economic development goal was to "increase the availability of broadband for businesses in rural areas and increase the development of 100 Mbps+ broadband throughout the state to retain and attract businesses." Between 2014 and 2017, the number of census blocks in New Mexico where advertised consumer (residential) speeds reached 100 megabits per second (Mbps) or more, regardless of technology used, grew nearly threefold, from under 12 thousand to over 40 thousand, or from 7 percent of all census blocks in the state to 24 percent. Meanwhile, however, the percentage of blocks with available business speeds meeting or exceeding this threshold actually decreased slightly, from 33 percent to 32 percent.

The reasons for this small decrease are unclear but could represent a flattening of demand for high-speed business access or be the result of some limitation affecting the supply of 100 Mbps+ speeds. The latter is a potential indicator of cost thresholds beyond which providers are unwilling to invest in upgrading infrastructure and equipment to higher speeds.

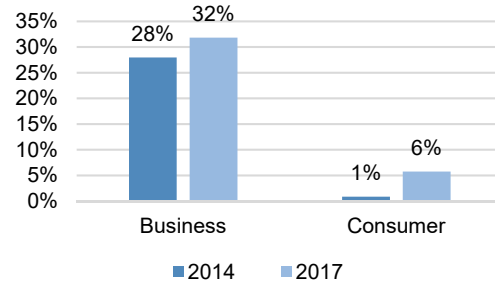
When examining only fiber and fixed wireless technologies, which are the focus of many subsidized broadband projects and have the potential to connect rural areas to the wider internet through high-speed connections over the airwaves to the fiber-optic backbone, availability of 100 Mbps+ access to businesses grew from 28 percent of all census blocks to 32 percent. This means virtually all census blocks with 100 Mbps + business access in 2017 had either fiber or fixed wireless technology available, and any growth in the 100 Mbps+ business market occurred with these technologies. Consumer growth of these technologies, on the other hand, accounted for a small portion of the overall growth in availability of 100 Mbps+ access in that market.

Chart 10. Percent of NM Census Blocks with Available or Advertised Speeds of at Least 100 Mbps



Source: LFC analysis of FCC Form 477 data

Chart 11. Percent of NM Census Blocks with Speeds of at Least 100 Mbps Available or Advertised over Fiber or Fixed Wireless



Source: LFC analysis of FCC Form 477 data

It is important to note these results are based on Federal Communications Commission (FCC) Form 477 data. While this data is the most comprehensive available for block-level analysis, it is also widely acknowledged as flawed because of how it defines availability of broadband speeds. Federal rules consider a block “served” if just one address is served or capable of being served by a provider that offers a given broadband technology or speed. Actual uptake of service is likely to be much lower, and no FCC or New Mexico state data currently captures the technology or speeds that households or businesses actually subscribe to.

Applications for a new federal program by three New Mexico ISPs illustrate the high cost of rural broadband development. In 2018, Congress passed legislation that created the Rural eConnectivity Pilot Program, or ReConnect Program, within the U.S. Department of Agriculture (USDA) to support expansion of broadband infrastructure to underserved rural areas. Eligible areas are those where at least 90 percent of households lack sufficient broadband access, defined as speeds slower than 10 Mbps download and 1 Mbps upload (10/1 Mbps). Funded projects must be capable of providing speeds of at least 25/3 Mbps to every property in the included service area. The legislation appropriated a total of \$600 million for the program, of which \$200 million is for grants, \$200 million is for loans, and \$200 million is for combined grant and loan projects.

To date, three New Mexico entities have applied for \$23.3 million in funding under the grant-only portion of the program, which requires 100 percent of households in eligible service areas lack sufficient broadband access. These entities are ENMR Telephone Cooperative, Peñasco Valley Telephone Cooperative, and the Pueblo of Acoma. These proposals would support over 2,200 households and a total population of nearly 6,400 at a total cost of \$31.1 million. Matching funds must comprise 25 percent of the total project cost and must be expended before federal funds.

The total cost of the proposed projects comes out to roughly \$14 thousand for each household served, or \$10 thousand per household just from federal funds. This high cost is largely driven by one proposed project that would involve new fiber-to-the-premise installation at a cost of over \$32 thousand per household in the service area, which consists of numerous disconnected, far-flung, and sparsely populated parcels throughout eastern New Mexico.

Conversely, the project proposed by Acoma Pueblo involves a fixed wireless solution, which would have a much lower cost per household at about \$1,600.

The proposed projects include some parcels in four New Mexico counties designated by USDA as “persistent poverty counties,” where at least 20 percent of the population was living in poverty in the 1980, 1990, and 2000 decennial censuses and the 2007-2011 American Community Survey 5-year estimates. These are Cibola, Guadalupe, San Miguel, and Socorro.

Table 12. New Mexico Applications for USDA ReConnect Grants

Applicant	Federal Grant Requested	Matching Funds	Total Cost	Households Without Broadband	Population Served	Total Cost per Household	Project Description
ENMR Telephone Cooperative	\$19,231,542	\$6,410,514	\$25,642,056	789	1,790	\$32,499	For a fiber-to-premise solution targeting farms, businesses, and critical community facilities near existing fiber facilities that lack sufficient broadband and overall meet the requirement of rurality with population densities of six or less per square mile.
Peñasco Valley Telephone Cooperative	\$3,162,975	\$1,054,325	\$4,217,300	659	1,689	\$6,400	For access equipment and transport fiber additions to provide upgraded broadband capabilities to 23 proposed funded service areas located in the applicant's existing ILEC service area in New Mexico.
Pueblo of Acoma	\$942,955	\$314,318	\$1,257,273	771	2,908	\$1,631	For 25/3 Mbps Fixed Wireless broadband service to its community, where 100 percent of premises are without sufficient access to broadband service.
Total	\$23,337,472	\$7,779,157	\$31,116,629	2,219	6,387	\$14,023	

Source: USDA

Right-of-Way Remains a Substantial Obstacle to Broadband Infrastructure Deployment in New Mexico.

During an October 2016 Science, Technology, and Telecommunications Committee hearing, ISPs noted the cumbersome process of navigating right-of-way issues with multiple government and tribal jurisdictions. Municipalities in New Mexico can impose franchise fees on utilities that cross into their jurisdictions, and counties and tribes can require right-of-way fees. Gaining the necessary approvals and permits can be a costly and lengthy endeavor.

Case Study: Kit Carson Electric Cooperative

Kit Carson Electric Cooperative's foray into the broadband business involved laying approximately 2,100 miles of new fiber. Its network project spanned lands under the jurisdiction of NMDOT, the Interstate Stream Commission, State Land Office, Department of Game and Fish, federal Bureau of Land Management, Carson National Forest, Taos Pueblo, and Picuris Pueblo. Additionally, consultation was required with the federal Bureau of Indian Affairs, U.S. Fish and Wildlife, and the U.S. Army Corps of Engineers. Over 120 miles of the new fiber was within state highway rights-of-way and included around 2,700 individual crossings or parallel locations. According to NMDOT procedures, each of these 2,700 instances required individual permit applications and exhibits. However, after discussions with NMDOT Districts 4 and 5, it was agreed Kit Carson would be allowed to submit applications by highway segments. Ultimately, over 750 applications were submitted to NMDOT for review and approval. Kit Carson was also required to complete field surveys, provide reports, and obtain clearances from the State Historic Preservation Office and the NMDOT Environmental Division for approximately 200 individual encroachments.

The New Mexico Department of Transportation (NMDOT) issues permits for utility installation, including fiber-optic cable and other broadband-related infrastructure, in state-owned highway right-of-way. NMDOT is exploring the use of resource sharing agreements under which the state grants the use of its right-of-way to run data transmission lines in exchange for connecting to and using this infrastructure for free or at reduced cost. NMDOT may be able to use such agreements to facilitate access to data services for electronic message signs, traffic cameras, and other operations facilities. The Federal Highway Administration has identified Maryland as one state with a well-developed resource sharing program, including a dedicated state account within its transportation trust fund for information technology projects and state statutes that specify free use of public right-of-way for telecommunications services by nonprofit entities.

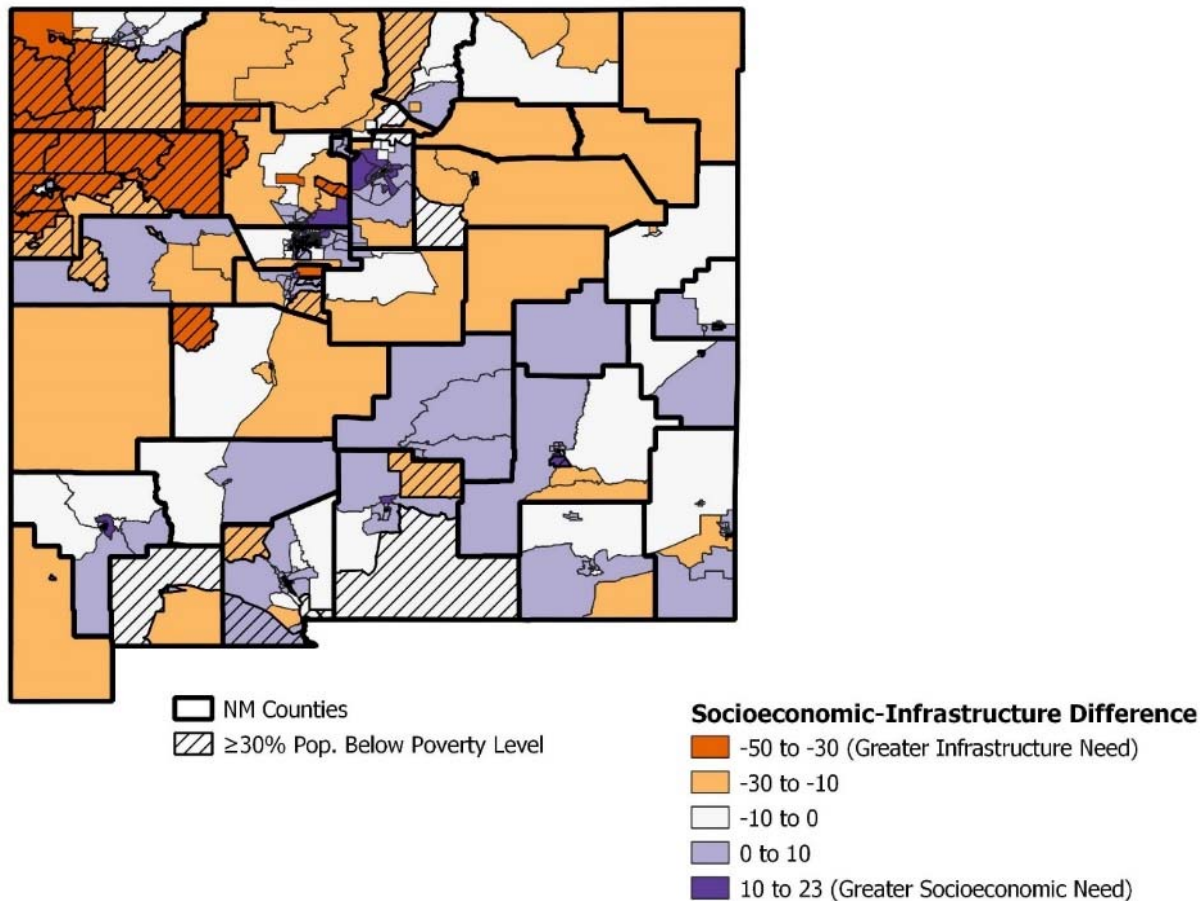
Other states have passed legislation facilitating easier right-of-way acquisition for broadband deployment. Since 2012, Arizona has had a "dig once" policy under which the state installs empty conduit in its right-of-way during all highway construction projects and then leases it to telecommunications providers at a cost-based rate. In 2017, Colorado passed legislation granting broadband providers permanent right-of-way over, under, upon, and across all state-owned public lands on "payment of just compensation." In 2019, the Colorado legislature enabled electric utilities with preexisting easements on private property to install, maintain, or own broadband facilities (including fiber lines) within the electric easement. Tennessee and Montana have laws similar to Colorado's and allow cooperatives right-of-way access on state lands. Georgia allows its transportation department, in consultation with the Georgia Technology Authority, to promote the use of highways and state-owned roads for broadband deployment. Wisconsin legislation allows state departments, agencies, and commissions with control of state lands to grant easements for broadband infrastructure, and if an easement is granted in an underserved area, no fee may be charged.

The Most Cost Effective Use of Limited State Resources is Likely to Be Supporting Middle-Mile and Last-Mile Networks With a Mix of Technologies Rather Than Major Fiber Construction.

Broadband use in some parts of New Mexico may benefit more from programs to leverage existing resources rather than building out new infrastructure. The digital divide index (DDI), developed by researchers at Purdue University, provides a measure of the extent to which populations are unequal in their ability to access and use the internet. The DDI consists of two parts: a

socioeconomic component that takes into account characteristics such as poverty, disability, and age, and an infrastructure and adoption component that measures broadband access, availability, and speeds. Higher scores indicate a greater digital divide in a given region.

Figure 7. Levels of Broadband Infrastructure and Socioeconomic Need in New Mexico Census Tracts



Source: LFC analysis of Purdue Center for Regional Development and American Community Survey data

In the map in Figure 7, orange census tracts have higher infrastructure and adoption indices, indicating a greater need for additional broadband development and higher speeds. Purple tracts have higher socioeconomic indices, meaning the digital divide in these areas may be better addressed through digital literacy efforts or increasing the population’s knowledge and ability to access existing broadband resources.

Recent research suggests public investment in broadband – particularly in the case of municipal networks built, owned, and operated by local governments – has the potential to saddle taxpayers with high costs and uncertain benefits. Studies by researchers at George Mason University and the Technology Policy Institute suggest these types of projects have limited impact on business establishment, private sector job creation, and broadband adoption rates, especially if they are executed for competitive reasons in areas where other services are already available.

A more cost-effective approach to the use of public funds is likely to be targeting projects in areas unserved or underserved by the middle- and last-mile networks that connect groups of end users to the larger backbone. In rural areas where homes and other structures may be separated by relatively wide distances, running new strands of buried fiber-optic cable at tens of thousands of dollars per mile to serve a low-density population is unlikely to yield an economical return on investment for most ISPs in the short run.

Using existing infrastructure to the maximum extent possible, such as through leveraging agreements for pole attachments to allow for expansion of wireless systems, or building off existing fiber or copper lines, should take precedence over entirely new construction where possible. In many cases, it may be appropriate to combine different types of technologies to ensure maximum connectivity at the least cost. A 2018 study by the Boston Consulting Group estimates the aggregate cost of fiber to the home in rural areas nationwide would cost between \$45 billion and \$65 billion. The same study suggests fixed wireless systems that use antennas to transmit data to homes over the air would cost between \$15 billion and \$25 billion, and TV white spaces and projects using a mix of technologies would cost between \$10 billion and \$15 billion.

In Virginia, the Legislature and executive have identified utility companies as being well-positioned to support broadband deployment efforts, especially in rural parts of the state. As the utilities themselves are investing in broadband infrastructure for grid transformation, an opportunity exists to leverage utility efforts into wider-ranging broadband connectivity. In 2018, the Legislature statutorily required the two investor owned utility companies in the state to conduct feasibility studies on providing or supporting broadband services. In May 2019, Appalachian Power (one of the investor owned utilities) sought authorization for a rural county pilot project where it would partner with a local ISP to provide the middle-mile fiber connection.

In New Mexico, most rural telephone cooperatives and some rural electric cooperatives provide broadband services. A key attribute possessed by most of these rural co-ops is an unparalleled understanding of their service territory and knowing where broadband deficiencies likely exist. Despite the case for rural co-op participation in broadband deployment, only two rural telephone co-ops have participated in the PRC's state rural universal service fund broadband grant program. Other co-ops expressed confusion about program requirements and uncertainty if participation in the SRUSF could adversely impact their ability to receive federal funding. Also, the required match, 25 percent of the total project cost, was found to be too financially burdensome by some co-ops.

Case Study: Massachusetts Last Mile Program

Some states have created dedicated programs specifically for last-mile networks in unserved or underserved locations. For example, in 2017, Massachusetts established its Last Mile Program to support residential broadband development in 44 rural, western Massachusetts towns, providing funding for a variety of models, including multi-town collaborations, municipal networks, and public-private partnerships. The program does not favor any specific technology over another, and only requires projects meet minimum speed requirements of 25/3 Mbps and adhere to affordability and sustainability standards without ongoing state subsidies.

No action has been taken on a previous LFC report that recommended supporting demand aggregation to lower broadband costs in rural areas.

In January 2017, LFC staff produced an evaluation memorandum detailing opportunities for leveraging the internet purchasing power of schools and public entities to lower the overall cost of high-speed internet service in rural areas. This paper noted that once key infrastructure is built, most recurring costs to broadband operators come in the form of the electronic equipment required to route and transmit data traffic. Leveraging the purchasing power of local institutional customers, such as school districts, to establish additional “carrier hotels” where any provider can house its equipment in shared locations throughout the state could induce smaller networks to participate, thus potentially reducing their own costs of establishing middle-mile or last-mile networks in these locations.

To date, the state has not acted to facilitate demand aggregation and has instead pursued a strategy of procurement optimization to reduce costs for public entities purchasing broadband equipment and services through price agreements. As the basis for this decision, DoIT cited a cost model from the organization EducationSuperHighway that recommended using a procurement optimization strategy for E-Rate projects as the basis for a future feasibility study for physical demand aggregation.

New Mexico’s higher education broadband network presents one possible opportunity to do this by leveraging an existing fiber backbone to connect data centers housed at outlying branch campuses with middle-mile and last-mile networks in their local areas. DoIT, New Mexico State University, and the New Mexico Institute of Technology jointly administer the Rio Grande Optical Network (RGON), a fiber trunk line that extends from Albuquerque to Las Cruces, and the University of New Mexico manages links between its own branch campuses. Leveraging these locations as hubs for other ISPs to build out their own last mile networks in nearby underserved locations could enhance both commercial internet service and the state’s educational network. Appendix E includes a map of New Mexico’s higher education broadband network.

Recommendations

DoIT should:

- Immediately begin planning and development of criteria for use of the \$10 million appropriation in FY20, including requirements to ensure the program
 - Does not duplicate the existing state rural universal service fund,
 - Targets middle-mile or last-mile networks in unserved or underserved locations that may be ineligible for federal funds;
 - Requires a minimum non-state match,
 - Requires minimum speeds of at least 25/3 Mbps, and
 - Ensures compliance with New Mexico’s constitutional anti-donation clause;
- Ensure the maps and assessment produced for the Rural Broadband Program inventory unserved and underserved locations ineligible for federal funds but which may be suitable for state-funded projects;
- Work with school districts, higher education institutions, and other community anchor institutions to identify opportunities for demand aggregation using existing infrastructure;
- Work with the Department of Finance and Administration and the Legislative Finance Committee to develop Accountability in Government Act performance measures around statewide broadband goals, including minimum data speeds and connectivity of rural residents, businesses, and community anchor institutions; and
- Work with the Department of Workforce Solutions to identify shortages of qualified network and systems administrators in rural areas with educational and other broadband needs and develop a strategy to train and recruit individuals for those positions.





Appendix A: Evaluation Scope and Methodology

Evaluation Objectives.

- Review and analyze the impact of state spending on the development and implementation of broadband infrastructure in New Mexico; and
- Evaluate the management, oversight, and planning of broadband development in New Mexico.

Scope and Methodology.

- Reviewed:
 - Applicable state and federal laws and regulations
 - DoIT broadband plans and contracts for broadband plans
 - LFC file documents
 - Laws, reports, and documents from other states relative to broadband projects and programs
 - State and federal funding data
 - State and federal broadband deployment data and maps
 - Available project certification committee (PCC) documents for DoIT's rural broadband project
- Interviewed DoIT, PRC, PSFA, and State Library broadband program management
- Interviewed other broadband stakeholders including industry representatives, state cooperative associations, telehealth stakeholders, and relevant staff at the Department of Transportation and Human Services Department
- Attended interagency broadband planning discussions

Evaluation Team.

Brian Hoffmeister, Lead Program Evaluator

Jacob Rowberry, Program Evaluator

Authority for Evaluation. LFC is authorized under the provisions of Section 2-5-3 NMSA 1978 to examine laws governing the finances and operations of departments, agencies, and institutions of New Mexico and all of its political subdivisions; the effects of laws on the proper functioning of these governmental units; and the policies and costs. LFC is also authorized to make recommendations for change to the Legislature. In furtherance of its statutory responsibility, LFC may conduct inquiries into specific transactions affecting the operating policies and cost of governmental units and their compliance with state laws.

Exit Conferences. The contents of this report were discussed with the Secretary of the Department of Information Technology and his staff on October 28, 2019.

Report Distribution. This report is intended for the information of the Office of the Governor, Department of Finance and Administration, Office of the State Auditor, and the Legislative Finance Committee. This restriction is not intended to limit distribution of this report, which is a matter of public record.

Jon Courtney

Deputy Director for Program Evaluation

Appendix B: Ranking of State Broadband Subscription Rates

U.S. States and Territories by Percentage of Households That Have a Broadband Subscription, 2018

Rank	State/Territory	Total Households	Households with Broadband Subscriptions	Percentage of Households with Broadband Subscriptions
1 (tie)	Utah	998,891	898,696	90.0%
1 (tie)	Washington	2,895,575	2,605,049	90.0%
3	Colorado	2,176,757	1,945,729	89.4%
4	New Hampshire	531,212	473,223	89.1%
5	California	13,072,122	11,600,417	88.7%
6	Delaware	367,671	324,894	88.4%
7	Maryland	2,215,935	1,953,703	88.2%
8	New Jersey	3,249,567	2,859,120	88.0%
9 (tie)	Massachusetts	2,624,294	2,307,900	87.9%
9 (tie)	Oregon	1,639,970	1,441,775	87.9%
11	Alaska	254,551	222,665	87.5%
12	Connecticut	1,378,091	1,199,033	87.0%
13	Minnesota	2,194,452	1,904,319	86.8%
14 (tie)	Arizona	2,614,298	2,254,666	86.2%
14 (tie)	Idaho	640,270	551,989	86.2%
16	District of Columbia	287,476	247,562	86.1%
17	Nevada	1,129,810	970,118	85.9%
18 (tie)	Nebraska	765,490	656,309	85.7%
18 (tie)	Hawaii	455,309	390,353	85.7%
18 (tie)	Wyoming	230,252	197,291	85.7%
21	Virginia	3,175,524	2,717,984	85.6%
22 (tie)	Rhode Island	406,573	346,878	85.3%
22 (tie)	New York	7,367,015	6,280,593	85.3%
24	Florida	7,809,358	6,657,251	85.2%
25	Illinois	4,864,864	4,140,239	85.1%
26 (tie)	Texas	9,776,083	8,262,153	84.5%
26 (tie)	Ohio	4,685,447	3,959,625	84.5%
28	Wisconsin	2,371,960	2,003,048	84.4%
29	Kansas	1,133,408	955,764	84.3%
30 (tie)	Michigan	3,957,466	3,329,047	84.1%
30 (tie)	Pennsylvania	5,070,931	4,262,463	84.1%
32	Maine	570,307	478,825	84.0%
33	Georgia	3,803,012	3,184,947	83.7%
34 (tie)	Montana	431,421	360,573	83.6%
34 (tie)	Iowa	1,267,873	1,059,643	83.6%
36	North Carolina	4,011,462	3,349,401	83.5%
37	Missouri	2,434,806	2,019,142	82.9%
38	Indiana	2,599,169	2,151,442	82.8%
39	Vermont	261,373	215,562	82.5%

U.S. States and Territories by Percentage of Households That Have a Broadband Subscription, 2018

Rank	State/Territory	Total Households	Households with Broadband Subscriptions	Percentage of Households with Broadband Subscriptions
40 (tie)	South Dakota	345,449	283,635	82.1%
40 (tie)	Tennessee	2,603,140	2,136,269	82.1%
42	Oklahoma	1,485,310	1,217,175	81.9%
43	Kentucky	1,732,713	1,415,036	81.7%
44	South Carolina	1,927,991	1,571,282	81.5%
45	North Dakota	319,355	256,495	80.3%
46	Alabama	1,855,184	1,471,696	79.3%
47	West Virginia	734,703	580,117	79.0%
48	Louisiana	1,737,220	1,356,709	78.1%
49 (tie)	Arkansas	1,156,347	889,382	76.9%
49 (tie)	New Mexico	794,093	610,703	76.9%
51	Mississippi	1,108,630	845,411	76.3%
52	Puerto Rico	1,179,637	733,317	62.2%

Source: ACS 2018 1-Year Estimates

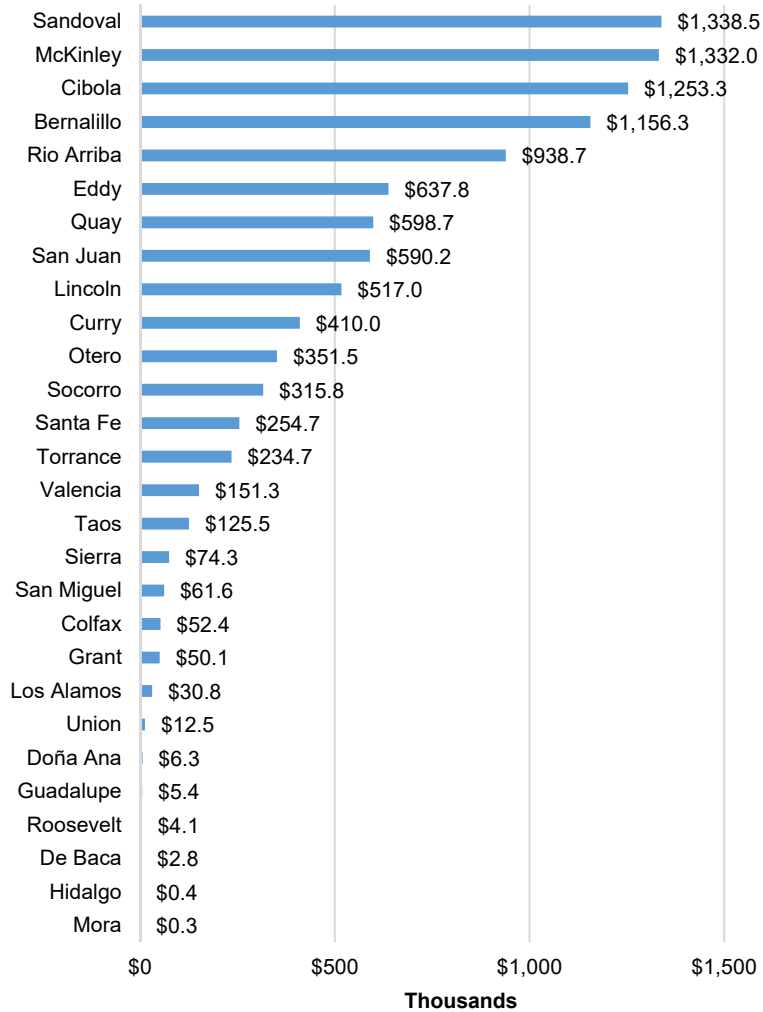
Appendix C: Details of Selected Other State Broadband Oversight and Coordination Models

Maine	<p>Statutory Goals (35-A Maine Rev. Stat. 9202-A)</p> <ul style="list-style-type: none"> • Universal broadband service to residents, businesses, and community anchor institutions. • Secure, reliable, competitive, and sustainable forward-looking infrastructure. • All residents, businesses, and institutions should be able to take advantage of economic opportunities available through broadband <p>Designated Lead Agency (35-A Maine Rev. Stat. 9203)</p> <ul style="list-style-type: none"> • ConnectME Authority <ul style="list-style-type: none"> ◦ Quasi-governmental authority consisting of seven voting members <p>Key Statutory Duties/Responsibilities</p> <ul style="list-style-type: none"> • Establish criteria defining unserved and underserved areas; • Support local and regional broadband planning • Facilitate state support for infrastructure deployment; • Collect and disseminate information; • Administer the ConnectME Fund and Municipal Gigabit Broadband Access Fund <p>Dedicated Funding Sources</p> <ul style="list-style-type: none"> • ConnectME Fund, consisting of revenues from assessments on communications services providers (35-A Maine Rev. Stat. 9211) • Municipal Gigabit Broadband Access Fund, consisting of federal funds, bond proceeds, and any other public or private sources (35-A Maine Rev. Stat. 9211-A)
Minnesota	<p>Statutory Goals (Minn. Stat. 237.012)</p> <ul style="list-style-type: none"> • No later than 2022, all Minnesota homes have access to high-speed broadband with speeds of at least 25/3 Mbps. • No later than 2026, all Minnesota businesses and homes have access to at least one provider of broadband with speeds of at least 100/20 Mbps. • By 2022 and thereafter, be among the top five states for broadband speeds and access, and top 15 when compared to countries globally for broadband penetration. <p>Designated Lead Agency (Minn. Stat. 116J.39)</p> <ul style="list-style-type: none"> • Office of Broadband Development <ul style="list-style-type: none"> ◦ Housed within Department of Employment and Economic Development. ◦ Director appointed by Governor. <p>Key Statutory Duties/Responsibilities</p> <ul style="list-style-type: none"> • Serve as central broadband planning body. • Coordinate with state, regional, local, and private entities to develop a uniform state broadband access and usage policy. • Coordinate efforts with state, local, and private entities to meet the state's broadband goals. • Develop, coordinate, and implement the state broadband development program. • Provide consultation services to local units of government and sponsors of broadband projects. • Encourage public-private partnerships. • Serve as information clearinghouse for federal sources of rural broadband funding. • Provide logistical and administrative support to Governor's Broadband Task Force. • Report annually to relevant legislative committees on broadband availability and needs, including speeds and capacity in public institutions including schools, libraries, and hospitals, and make policy and legislative recommendations. <p>Dedicated Funding Sources (Minn. Stat. 116J.39.4)</p> <ul style="list-style-type: none"> • Border-to-Border Broadband Development Grant Program, consisting of bond proceeds and special revenues

Virginia	Statutory Goals <ul style="list-style-type: none"> • Not established.
	Designated Lead Agency (Va. Code 2.2-205.2) <ul style="list-style-type: none"> • Commonwealth Broadband Chief Advisor <ul style="list-style-type: none"> ○ Appointed by Governor. ○ Housed within the Office of Secretary of Commerce and Trade. ○ Staffing support from the Center for Innovative Technology and the Department of Housing and Community Development.
	Key Statutory Duties/Responsibilities <ul style="list-style-type: none"> • Serve as single point of contact and integration for broadband issues, efforts, and initiatives. • Maintain broadband maps, plans, and data. • Continually monitor and analyze broadband trends, policies and investments outside the state. • Research and evaluate emerging technologies. • Coordinate with state agencies and departments to target funding and serve as a central coordinating position and repository. • Develop a strategic plan and submit an annual report that includes, but is not limited to, broadband deployment in the areas of education, telehealth, workforce development, and economic development.
	Dedicated Funding Sources <ul style="list-style-type: none"> • None directly administered by the Office of the Commonwealth Broadband Chief Advisor.
Washington	Statutory Goals (RCW 43.330.536) <ul style="list-style-type: none"> • By 2024, all Washington businesses and residences have access to high-speed broadband that provides minimum speeds of 25/3 Mbps. • By 2026, all Washington communities have access to at least one gigabit per second symmetrical service at anchor institutions like schools, hospitals, libraries, and government buildings. • By 2028, all Washington businesses and residences have access to at least one provider of broadband with speeds of at least 150/150 Mbps.
	Designated Lead Agency (RCW 43.330.532) <ul style="list-style-type: none"> • Governor's Statewide Broadband Office <ul style="list-style-type: none"> ○ Director appointed by Governor. ○ Housed within the Department of Commerce.
	Key Statutory Duties/Responsibilities (RCW 43.330.534) <ul style="list-style-type: none"> • Serve as the central broadband planning body for the state of Washington. • Coordinate with local, tribal, public, private, and nonprofit organizations and utilities to develop strategies and plans promoting broadband infrastructure and access. • Develop, recommend, and implement a statewide broadband plan and make recommendations for increased usage in rural and other unserved areas. • Update the state's broadband goals and definitions for broadband service in unserved areas as technology advances. • Encourage public-private partnerships to increase broadband deployment and adoption. • When developing plans or strategies for broadband deployment, consider: <ul style="list-style-type: none"> ○ Partnerships between communities, tribes, nonprofit organizations, local governments, utilities, and public and private entities; ○ Funding opportunities that provide for the coordination of public, private, state, and federal funds for broadband infrastructure or services in rural and unserved areas; ○ Barriers to the deployment, adoption, and utilization of broadband service, including affordability of service. • Assist applicants for the Broadband Service Expansion Grant and Loan Program with seeking federal funding or matching grants and other grant opportunities for deploying broadband services. • Take all appropriate steps to seek and apply for federal funds for which the office is eligible. • Collaborate with the utilities and transportation commission, the office of the chief information officer, the department of commerce, the community economic revitalization board, the public works board, the state librarian, and all other relevant state agencies.
	Dedicated Funding Sources (RCW 43.155.160 and 43.155.165) <ul style="list-style-type: none"> • Broadband Service Expansion Grant and Loan Program, funded by appropriations, bond proceeds, loan repayments, and other special revenues <ul style="list-style-type: none"> ○ Eligible applicants include local governments, tribes, nonprofit organizations, cooperatives, multiparty entities comprised of public entity members, LLCs organized for the purpose of expanding broadband access, and incorporated businesses or partnerships.

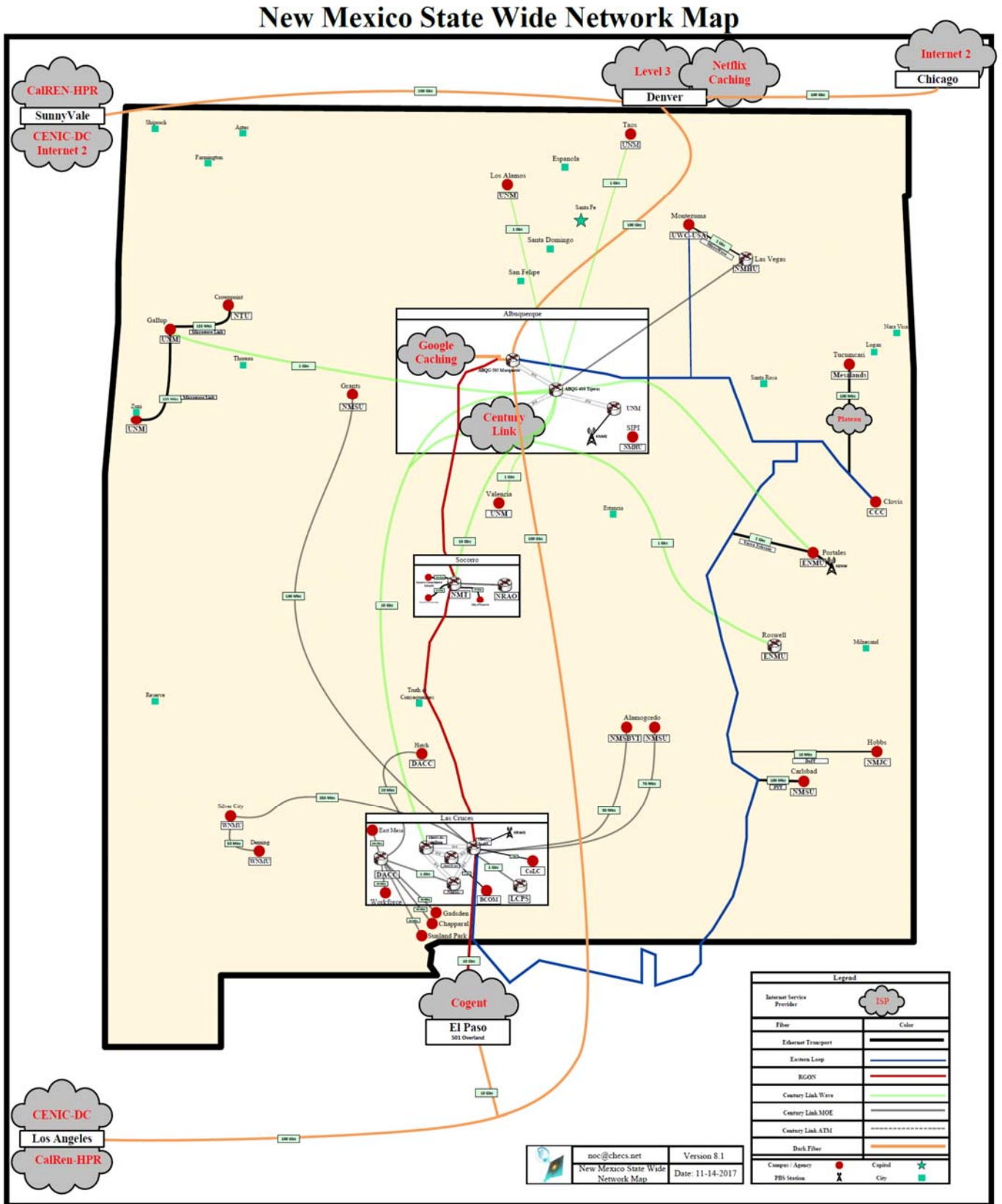
Appendix D: Healthcare Connect Fund Disbursements by County since FFY12

Total Healthcare Connect Funding by County since FFY12



Source: USAC

Appendix E: New Mexico Higher Education Network Map



Source: Council of Higher Education Computing/Communication Services (CHECS)