Nevada State Broadband Connectivity Strategy

Nevada Governor's Office of Science, Innovation and Technology

Universal Access

Digital Equity

Authors

This paper was researched and written by Joe Freddoso at Mighty River, LLC, and Brian Mitchell, at the Nevada Governor's Office of Science, Innovation and Technology. The authors would like to acknowledge contributions from Eric Flock of E-Rate Central and many staff from across State government and the Nevada System of Higher Education.

Contents

Executive Summary

The State of Broadband in Nevada

Challenges on the Road to Universal Access

Unprecedented Federal Funding for Broadband

Nevada's Broadband Goals

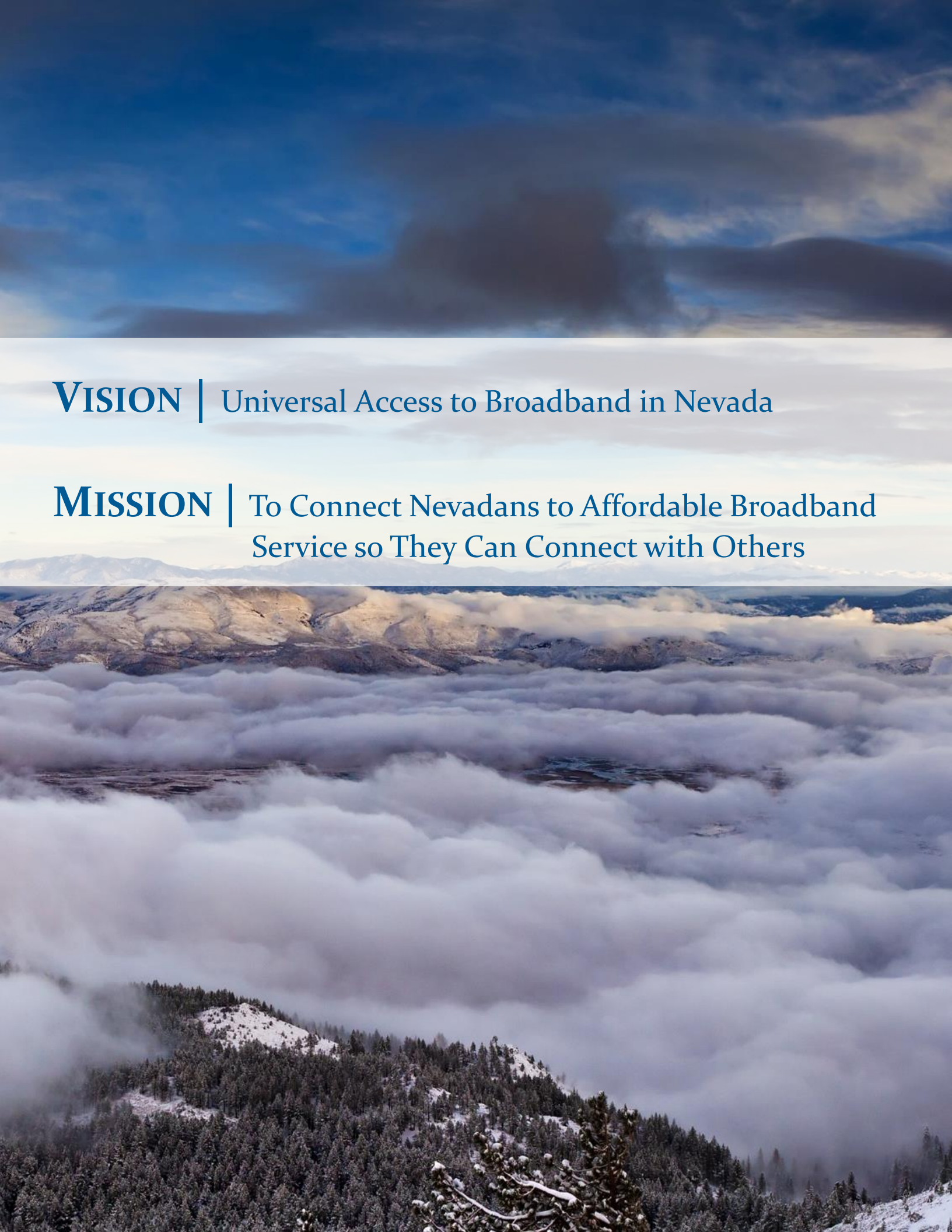
Appendix 1: Definitions

Appendix 2: Summary of OSIT's Past and Current Efforts to Increase Connectivity in Nevada

Appendix 3: Summary of Federal Broadband Programs

Appendix 4: RDOF and CAF II Results

Appendix 5: Priority Infrastructure Projects



VISION | Universal Access to Broadband in Nevada

MISSION | To Connect Nevadans to Affordable Broadband Service so They Can Connect with Others

Executive Summary

Executive Summary

Our world is becoming ever increasingly connected. Today, students in Nevada can access educational opportunities previously only available to a select few in the most urban areas while their parents work from home or the office with colleagues around the world to tackle big problems. Small businesses in Nevada have access to a global marketplace to sell services and goods. And, Nevadans have access to healthcare specialists previously only available after hours or days of travel. Endless possibilities are made possible by high-speed broadband.

While broadband is becoming as vital to our life today as electricity, not all Nevadans have access to it for a variety of reasons. For example, residents of rural areas in Nevada lack broadband service with the same speeds and reliability as their urban counterparts. Many Nevadans that live in areas with access to readily available broadband service are unable to afford it or a device to access it. Other Nevadans do not access the internet because they lack the digital literacy to do so. In the future, both access to broadband and the knowledge of how to use it will increasingly determine Nevadans' ability to learn, earn, and live well. As such, universal access is our goal and nothing short of it should be acceptable. In this sense, universal access means all Nevadans have access to affordable broadband service and the tools to help them utilize it.

Although Nevada's broadband gaps predate the pandemic, COVID-19 has put a shining spotlight on both the need for broadband and the need for specific strategies to close those gaps. For many Nevadans during the pandemic, a broadband connection was the essential connection to school, work, healthcare, higher education and workforce training, assistance programs, government services, worship, and, most importantly, family and friends. For too many Nevadans during the pandemic, the lack of broadband meant being disconnected from school, work, and society. Communities throughout our state that were already hit harder by the pandemic were less resilient and have been slower to recover without broadband. Nevada cannot become truly connected without connecting its most underserved and vulnerable communities.

While Nevada has made significant progress during the last five years to close the digital divide and deploy additional broadband infrastructure, more work is needed[1]. Unprecedented federal funding for broadband infrastructure will come to Nevada and it is the State's belief that these funds must be put to work to move Nevada closer to universal access to broadband. In his *Every Nevadan Recovery Framework*[2]*,* Governor Sisolak and other state leaders outlined the State's priorities and categories of strategic enhancement to ensure Nevada recovers and becomes more resilient. Access to affordable and reliable broadband service will play an important role in achieving the goals of each category as outlined in the table below.

[1] A more thorough discussion of the connectivity gaps in Nevada is found below.

[2] https://nvhealthresponse.nv.gov/wp-content/uploads/2021/04/Every-Nevadan-Recovery-Framework_final.pdf

Category of Strategic Enhancement	The Role of Broadband in Advancing the Governor's Recovery Agenda
Increasing Access to Health Care and Community-based Services	Broadband provides greater accessibility to telehealth or telemedicine visits for many different services including routine wellness visits, post procedure checkups and mental and behavioral health services for Nevadans in rural areas and Nevadans in urban areas without access to a personal vehicle. In addition, State and local governments and community non-profits are now offering more services online, including services addressing food and housing insecurity, employment, and workforce training.
Strengthening Public Education	A home broadband service, along with a connected device, such as a laptop or Chromebook, is a key part in closing the homework gap and ensuring that all students have the resources they need to succeed. For rural students and low-income urban students in particular, broadband is the connection to the outside that makes available a world of educational resources previously only available to the most privileged students in urban areas. Access to broadband is a necessary component to the efforts of the State and school districts to ensure equity in education.
Supporting Disadvantaged Communities	National and local data outlined below show that diverse and underserved communities, particularly those that are economically vulnerable, are more likely to experience the digital divide. Without reliable and affordable broadband service, these communities risk falling further behind as access to the Internet and digital skills are increasingly necessary tools for communication, education, access to services, and access to employment.
Strengthening the Workforce, Supporting Small Businesses and Revitalizing the Economy	The need for expanded job training and retraining programs has been amplified in the aftermath of the pandemic. Many displaced workers are unable to travel to participate in workforce training due to lack of transportation, lack of availability of services nearby, or childcare responsibilities. Online and virtual training options are a necessary part of the solution for many hard-hit Nevadans. As tourism begins to resume, visitors to Nevada expect reliable and robust connectivity. Broadband service is key efforts to attract people to live, work, and play in rural Nevada. Modern, reliable broadband infrastructure supports economic development and diversification efforts, including recruiting new employers and remote workers, supports jobs in export industries, and helps small businesses to find new customers. Growing broadband infrastructure is a key to growing Nevada's economy.
Investing in Infrastructure	The pandemic has shown that redundant and resilient broadband and telecommunications infrastructure is important to employment, commerce, education, healthcare, and wellbeing like other critical transportation and utilities infrastructure. Investing in broadband infrastructure aligns with the Governor's goals of creating high-paying short-term and long-term jobs.

Category of Strategic Enhancement	The Role of Broadband in Advancing the Governor's Recovery Agenda
Modernizing and Enhancing State Government Services	Nevadans are increasingly accessing government services online. Increased access to online services particularly benefits citizens in rural, low-income, and other underserved areas that are not located near government buildings.
Addressing Budget Shortfalls	Online government services can be more efficient and cost effective in some circumstances. For example, using telemedicine where appropriate for inmate healthcare as opposed to transporting inmates across the state will save the Nevada Department of Corrections a significant amount of money each year.

Beyond leveraging or continuing to leverage one-time and ongoing federal funding programs, closing the digital divide and moving toward universal access will require policy and programmatic changes in some areas and doubling down on existing policies and programs in other areas. Cooperation among State agencies and between the State, local governments, telecommunications providers, philanthropy, and economic development, business, healthcare, public safety, and community stakeholders will be essential. Universal access will require strong partnerships and alignment around shared objectives.

To that end, Nevada Comprehensive Connectivity Strategy focuses on achieving five long-term goals:

> **Goal 1:** By 2029 (a year after deployment deadline for RDOF funds) every Nevadan has access to affordable broadband service at home, school and work that scales to levels above the FCC's minimum standard for broadband. Community Anchor Institutions (Libraries, Schools, Universities, Colleges, 2-year Colleges, and Healthcare Providers) will also have adequate broadband service to support community needs.
>
> **Goal 2:** Every student has access to a connected device (Laptop, Tablet or Chromebook) and a broadband connection at school and at home capable of supporting virtual learning.
>
> **Goal 3:** By 2025, develop and implement a plan that provides broadband infrastructure access to all hospitals, clinics, tribal clinics, and prison systems in the state.
>
> **Goal 4:** Make access to broadband infrastructure and access to a workforce skilled in broadband infrastructure construction an economic development competitive advantage for Nevada.
>
> **Goal 5:** By 2023, a statewide coordinated effort exists to expand the reach of digital equity and inclusion programming.

Undergirding each goal are a number of strategies and actions that if taken can serve to advance Nevada closer to universal access. The COVID-19 pandemic brought together State and local governments, school districts, telecommunications providers, and philanthropy in an unpresented effort to connect kids. Together, we ensured that every student in the state engaging in virtual learning had a connectivity solution and a connected device. We hope to harness and continue that collaborative spirit to continue this important work to ensure that all Nevadans are able to access, afford, and use the Internet to learn, earn, and live well.

The State of Broadband in Nevada

The State of Broadband in Nevada

Nevada ranks as the 35th most connected state in the US[3]. Access to broadband service, however, differs based on location. Nevada's urban counties generally have better access to wired broadband service, low-cost plans, and greater competition in the marketplace. Connectivity varies widely between and within Nevada's rural counties.

Data from the 2021 Federal Communications Commission's (FCC) annual broadband report sheds light on the state of connectivity throughout the state[4]. Before diving in, it is important to note that the FCC's data does have some significant limitations that overstate the level of access to broadband in Nevada and across the country. FCC data is based on internet service providers' self-reported coverage. If the provider offers service to one household in a census tract, the entire tract is considered covered. This overstatement is principally a rural problem but also affects low-income urban areas as well. For years, states and providers alike have voiced concerns with federal broadband availability maps and now both the FCC and the NTIA are undertaking efforts to improve the accuracy of federal maps.

FCC data show that in urban areas, over 99 percent of residents have access to broadband service at or above 25Mbps download and 3Mbps upload, which is the current FCC standard. In contrast, just 66 percent of rural areas have access to the same level of service. The table below shows broadband access by county.

State/County	Population	% of Population with Fixed 25/3 Mbps	Population Density	Per Capita Income (2018)
Nevada	3,079,822	97.1%	28.1	$31,604
Carson City	55,916	99.5%	386.5	$29,767
Churchill County	24,909	88.9%	5.1	$26,606
Clark County	2,266,703	99.4%	287.2	$29,256
Douglas County	48,905	96.5%	68.9	$36,390
Elko County	52,460	78.4%	3.1	$33,091
Esmeralda County	873	23.3%	0.2	$24,713
Eureka County	2,029	6.2%	0.5	$34,590
Humboldt County	16,831	90.7%	1.7	$30,516
Lander County	5,532	0.2%	1.0	$33,329
Lincoln County	5,183	87.0%	0.5	$25,304
Lyon County	57,509	82.3%	28.7	$26,855
Mineral County	4,405	71.5%	1.2	$22,897
Nye County	46,522	85.9%	2.6	$25,092
Pershing County	6,725	17.7%	1.1	$19,330
Storey County	4,121	69.1%	15.7	$35,887
Washoe County	471,519	97.2%	74.8	$33,546
White Pine County	9,580	0.9%	1.1	$26,412

[3] https://broadbandnow.com/Nevada
[4] https://docs.fcc.gov/public/attachments/FCC-21-18A1.pdf

Broadband accessibility on tribal lands is generally worse than in Nevada as a whole and worse when compared to tribal lands in the US as a whole.

Total Population	Population with Fixed 25/3 Mbps	Percentage of Nevada Population	Percentage of US Population
14,680	7,483	51.0%	79.1%

Digging deeper into the FCC data, 31,620 of Nevada's approximately 1.285 Million households[5] lack access to the FCC's current minimum broadband service levels of 25Mbps download and 3Mbps upload service. Five Broadband Service (Anthem Broadband, Connect Everyone, Cox Communications, GeoLinks, StarLink) providers successfully bid to serve 30,584 of the 31,620 unserved locations through the FCC Rural Digital Opportunity Fund (RDOF) in late 2020. This will enhance their ability to serve these locations. As of the publishing date of this report, the FCC has not approved distributions to any of the five providers.

When FCC data is combined with Census Data and survey data from the US Department of Commerce's National Telecommunications and Information Administration (NTIA) and data from other Federal agencies, the stark challenge facing rural Nevada becomes even more evident. This data is combined in an effort called the I3 Connectivity Explorer. I3 Connectivity Explorer pulls data from U.S. Government agencies — FCC, Census, EPA, NTIA, USDA — and public sources including the Measurement Lab and the Pro Publica Congress API. Here are some interesting statistics about Internet Access in NV:

- A total of 678 Census tracts in NV track broadband access/broadband subscription data. This represents the entire State of NV.
- 78 Census tracts (almost all rural) in NV have 1/3 of homes with no Internet Access
- 4 Census tracts (all rural) in NV have ½ of homes with no Internet Access

Eight predominantly rural counties in NV, score above 50 what I3 Connectivity Explorer terms the digital distress index (highest distress score is 100 and the higher the score, the higher the distress). The 8 counties and their digital distress scores are: Pershing (100); Mineral (80.37); Eureka (77.76); Esmeralda (66.22); Lander (64.48); White Pine (53.02); Nye (51.46); Humboldt (50.45). The digital distress index measures the following:

- Percent of homes with a cellular data only subscription
- Percent of homes with no internet access (not subscribing)
- Percent of homes relying only on mobile devices
- Percent of homes not owning a computing device

Nevada's Urban Markets

Finally, even in high density metropolitan areas like Las Vegas and Reno, the latest service statistics show that there is currently one dominant competitor offering a broadband service that scales to meet the expected minimum broadband services outlined in current draft broadband stimulus bills that have been introduced in Congress. The Accessible, Affordable Internet for All Act sets minimum broadband

[5] https://www.fcc.gov/auction/904

speeds at 50Mbps symmetrical scaling to 100Mbps symmetrical service.[6] Currently only the cable modem broadband service provider (the cable company) offers this level of service in Las Vegas and Reno markets and cable modem service typically offers lower than 50Mbps upload speeds. Fiber to the home is available to less than 25% of the homes in each market.[7]

With high speed, scalable, future-proof Internet access becoming more and more important in daily lives, the State of Nevada must focus State, County and Local government efforts on broadband investments that not only address those communities that lack today's minimum level of access but also address future needs for residential and business broadband service that go well beyond the current 25Mbps download/3Mbps upload minimum broadband definition of the current FCC.

The Impact of COVID-19

This document would be incomplete without the mention of the pandemic. The COVID-19 pandemic has exposed further Nevada's (NV) lack of broadband service availability particularly in rural, tribal lands and frontier parts of the State. This lack of access creates divides in access to education, access to healthcare, economic vitality for individuals and economic development opportunities for large parts of rural NV. A couple of statistics display the increased reliance on broadband service as a result of the COVID-19 pandemic.

The average daily in-home data usage in the United States has increased significantly during the coronavirus (COVID-19) outbreak in March 2020. Compared to the same time in March 2019 the daily average in-home data usage has increased by 38 percent to 16.6 gigabytes, up from 12 gigabytes in March 2019. The increase can be observed across almost all device categories with the data usage of gaming consoles and smartphones increasing the most.[8]

Virtual Private Network (VPN) (dedicated, secure connectivity paths from one site to another) usage in the United States has surged during the coronavirus crisis, increasing 124 percent during the two weeks between March 8 and March 22, 2020. The United States reported an increase of over 33,000 confirmed COVID-19 cases during these first two weeks in March 2020. Increased VPN usage can have many reasons, the most popular ones being access to other digital media content and social networks, and most importantly, access to different news sources. As some countries restrict access to many news and media outlets, users frequently use VPN to stay up to date with crucial developments. [9]

Education application usage increased by 124% year over year in this period.

[6] https://www.congress.gov/bill/116th-congress/house-bill/7302
[7] https://broadbandnow.com/Nevada/Reno?zip=89504
[8] https://www.statista.com/statistics/1106863/covid-19-daily-in-home-data-usage-change-us-2020/
[9] https://www.statista.com/statistics/1106137/vpn-usage-coronavirus/

Challenges on the Road to Universal Access

Challenges on the Road to Universal Access

Nevada faces a number of different challenges in providing universal access to broadband services.

Geography: Nevada is a geographically large state with 90 percent of its population living in its urban areas[10]. Nevada's rural cities and towns are isolated, surrounded by rugged, mountainous, and arid terrain. Even though it consistently ranks as one of the five fastest growing states, Nevada ranks in the bottom 10 states in terms of population density[11]. The combination of distance, difficult terrain, and low population density make private investment in broadband infrastructure expensive and often unattractive to private broadband service providers as there is often no path to a return on investment.

> **Distance:** Communities in Nevada are isolated; on average, distances between cities on Nevada's major rural corridors is greater than 50 miles.
>
> **Terrain:** Due to Nevada's terrain, the cost per mile of fiber installation is in the range of $22-$35 per foot for buried fiber compared to the national average of $15-$20 per foot of buried fiber.[12]
>
> **Density:** fewer potential subscribers makes it difficult to attract new providers to a community or to entice an incumbent to upgrade its infrastructure without significant public investment.

Redundancy and Resiliency: During the last decade, connectivity has become an important factor in the State's economic development efforts to attract, retain, and expand companies. Connectivity is important to large, new and expanding data center companies like Switch, Google, and Apple; to healthcare providers expanding coverage through telemedicine; to legacy industries like gaming and mining; and to smaller employers seeking to compete in a global marketplace. One key to successfully connecting communities and businesses alike is diverse fiber paths along key middle mile fiber routes. Route diversity or redundancy is important so that a single fiber cut does not result in a broadband outage.

Fiber routes often follow rights of way along major freeways and highways in order to minimize environmental disturbance and costs. In Nevada, important fiber routes exist along I-80, I-15, US 50, US 95, and US 6. Two problems exist in many places in Nevada that contribute to a lack of redundancy and resiliency. First, key fiber routes are single pathed, meaning that a single fiber pathway serves large areas. Second, these pathways often lack interconnect facilities in rural areas. Interconnect facilities are like off-ramps that can facilitate last-mile connections in communities.

An example of the key corridor challenges in Nevada comes from the City of Elko. Recently service providers interested in deploying last mile fiber and wireless service in the City of Elko and the Spring Creek development had difficulty getting quotes for Internet Service on diverse pathways between Reno and Salt Lake City. If a last mile provider relies on only one upstream pathway to reach an Internet on-ramp in a major city, one fiber cut, or equipment interruption causes a complete service outage. Last mile providers strongly prefer multiple pathways of upstream service to enhance the resiliency of their

---

[10] https://med.unr.edu/Documents/med/statewide/reports/2017FINAL_DATABOOK_ADA_introduction.pdf

[11] https://www.states101.com/populations/nevada#:~:text=The%20population%20density%20in%20Nevada,(48th%20out%20of%2056).

[12] https://ops.fhwa.dot.gov/publications/fhwahop09021/03cost.htm

last mile service. If the I-80 corridor in NV is challenged in this manner, imagine the challenges in other routes.

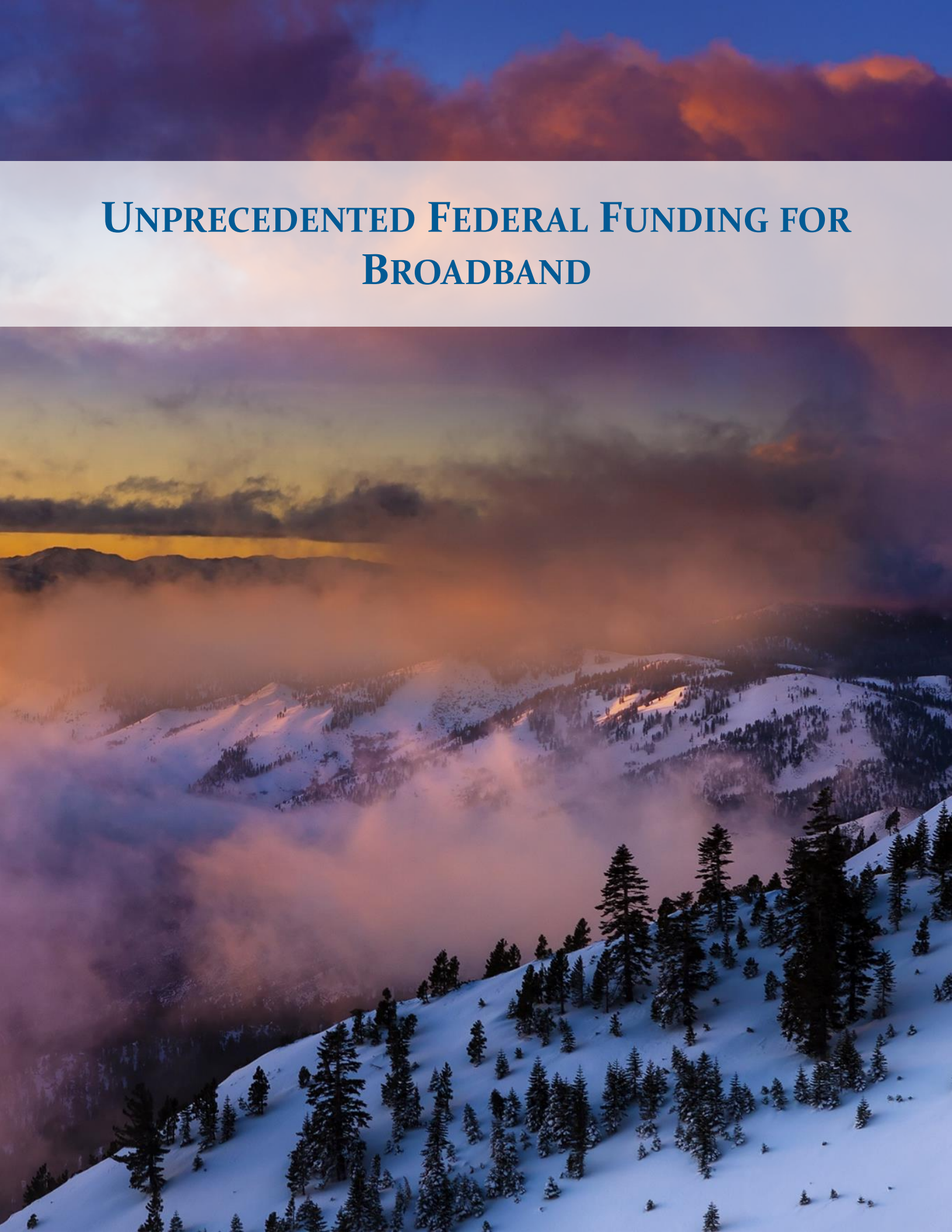
Affordability: It is important to note that access to broadband infrastructure does not equate to access to broadband service or broadband adoption as many households in Nevada do not subscribe to a home broadband service even when one is available to them for a variety of reasons including cost and lack of digital literacy. According to the Pew Research Center, cost was the top reason cited for not subscribing to a home broadband service.[13] Many individuals instead substitute their smartphone for their internet needs. Home broadband subscription rates are 10 percentage points or more lower for Blacks, Hispanics, those with a high school education or less, those earning less than $30,000 per year, those over 65, and those living in rural areas.[14] Looking at broadband adoption for education, a recent US Census Bureau survey provides some insights into internet availability in households in Nevada with children during the pandemic.[15] 76 percent of the 536,000 households surveyed in Nevada reported always having internet available with generally lower internet availability rates for households with lower levels of education, lower levels of income, and households aged 65 and above. These same households are also less likely to own a computer, tablet, or other connected device and are more likely to rely solely on a smartphone for internet access.

Digital Literacy: In Nevada, senior citizens are 10 percent less likely to have home broadband service as those in the 18-64 age cohort, based on data from the 2018 American Community Survey (ACS).[16] As with the general population, ACS data indicate that senior citizens with low incomes, low educational attainment, that live in rural areas, are Black, Latino, female, or single, or have a disability are all more likely to not have a home broadband service. Low broadband adoption rates among seniors are both caused by and contribute to digital illiteracy. Low broadband adoption rates contribute to increasing inequities and have implications for seniors in many areas, including lack of access to information, connection to family and community, access to healthcare, and access to government services.

Given these challenges, Nevada ranks as the 35th most connected state in the US[17]. Population growth and greater needs for connectivity for work, education, healthcare, commerce, and entertainment mean an ever-increasing need for more broadband infrastructure. For rural cities in particular, access to reliable broadband service is now increasingly critical to attracting and retaining residents and industries.

[13] https://www.pewresearch.org/internet/2019/06/13/mobile-technology-and-home-broadband-2019/
[14] Ibid.
[15] https://www.census.gov/data/tables/2021/demo/hhp/hhp22.html
[16] https://agingconnected.org/wp-content/uploads/2021/05/Aging-Connected_Exposing-the-Hidden-Connectivity-Crisis-for-Older-Adults.pdf
[17] https://broadbandnow.com/Nevada

Unprecedented Federal Funding for Broadband



Unprecedented Federal Funding for Broadband

While this document is intended to be a long-term strategy to guide the growth of broadband access in Nevada, it comes at a unique time for the state. In response to the COVID-19 pandemic, the federal government has appropriated billions of dollars in funding that could be used for broadband infrastructure.

Some of these funds, such as the US Treasury Coronavirus Capital Fund and the US Treasury State and Local Coronavirus Recovery Fund are formula funds. Nevada's share of the funding for both broadband and infrastructure more broadly, counting the State and local governments, is over $400 million.

Other funds, such as the National Telecommunications and Information Administration's (NTIA) Broadband Infrastructure Program grant, the NTIA Tribal Broadband Connectivity Program, and the Economic Development Authority's (EDA) Public Works and Economic Assistance Adjustment grant are competitive grants.

Recent non-pandemic-related federal funding streams for broadband infrastructure include the Rural Digital Opportunity Fund, the 5G Fund for Rural America, and the Connect America Fund II. These grant funds flow directly to telecommunications service providers who win territories in reverse auction.

These funding streams supplement existing federal funding streams like E-rate and the Rural Healthcare Program (RHP) that the State and other entities have targeted for some time. A more detailed summary of these programs can be found in Appendix 3.

These large federal allocations represent a once-in-a-lifetime opportunity to make lasting and life-changing investments to broadband infrastructure throughout the state. A thoughtful, coordinated, and cohesive effort is required to effectively leverage these funds and achieve the Governor's goal of Universal Access. Cooperation across sectors and levels of government will be critical.

Nevada's Broadband Goals

Nevada's Broadband Goals

This section takes the myriad of Nevada's challenges, opportunities and best practices and wraps them into specific goals that are proposed to guide Nevada's work in broadband in the next five to ten years. The goals are detailed with specific tasks and with organizations who are expected to be involved in carrying out the tasks. Five main goals are outlined and explained below. As plans to realize these goals and objectives are made, equity should be the north star guiding public and private partners' actions and investments.

Goal 1: By 2029 (a year after deployment deadline for RDOF funds) every Nevadan has access to affordable broadband service at home, school and work that scales to levels above the FCC's minimum standard for broadband. Community Anchor Institutions (Libraries, Schools, Universities, Colleges, 2-year Colleges, and Healthcare Providers) will also have adequate broadband service to support community needs.

- **Lead Organizations:** OSIT; Tribal Government; County Government; Local Government; Broadband Service Providers; NV Broadband Task Force; Nevada Indian Commission

- **Definition:** The last mile service type and technology is preferred to be fiber, but in frontier areas with densities below Nevada's median density of 25.6 persons per square mile, last mile Wireless with nearby fiber backhaul and proven satellite technologies will be considered as meeting the goal. Affordability will be defined using FCC and other cost data information.

- **Task 1:** OSIT coordinates and assists State Government, Local Government, Economic Development and Service Provider efforts to pursue funding for broadband Infrastructure. The focus should be on reoccurring FCC programs including RDOF, Lifeline and E-rate, USDA and EDA grant programs as well as one-time funds from sources such as the American Rescue Plan.

- **Task 2:** OSIT, with input from relevant stakeholders and the public, develops a list of priority middle mile and last mile broadband projects.

- **Task 3:** OSIT, with input from relevant stakeholders and the public, develops equity-focused criteria and a process for allocating public broadband infrastructure funds to priority broadband projects that lead to Universal Access.

- **Task 4:** OSIT, with input from relevant stakeholders in local government, develops and awards a Broadband Ready Communities designation to encourage local governments to adopt policies that increase broadband infrastructure development, with Universal Access a key criterion in awarding the designation.

- **Task 5:** OSIT assists in the creation of Broadband Action Teams in counties, cities and Tribal Reservations and Colonies where none currently exist and facilitates a Whole Community Connectivity Program[18] process leveraging Community Anchor Institution broadband infrastructure as a launching point for improved home and business broadband access.

[18] https://osit.nv.gov/Broadband/Community_Connectivity/

- **Related policy Initiatives:** Nevada Connect Kids-State E-rate Match; State Level Coordination; Public Private Partnerships; Nevada Universal Service Fund; Nevada State Infrastructure Bank; NV DOT Dig Once and Fiber Trade; Broadband Adoption.

Goal 2: Every student has access to a connected device (Laptop, Tablet or Chromebook) and a broadband connection at school and at home capable of supporting virtual learning.

- **Lead Organizations:** OSIT; The Nevada Department of Education; Nevada Indian Commission; Tribal Government; School Districts; Charter Schools; NevadaNet; The Nevada State Library; Local Library Systems/Districts
- **Definition:** Over the last three years significant improvement has been realized in providing mainly fiber-based, scalable, more affordable broadband connections to Nevada K-12 schools, Tribal libraries and Public libraries. The progress has been made possible through increased leverage of the FCC E-rate program. With new, increased standards for school and library connectivity taking effect in the near future, Nevada should continue its efforts to scale these connections.
- **Task 1:** OSIT continues to provide State E-rate planning and technical support to E-rate applicants with the goal that each school and library where appropriate is connected to a fiber connection that scales.
- **Task 2:** OSIT gathers annual information on student home connectivity and access to connected devices as part of Nevada's effort to define its broadband gap and provides a gaps analysis and recommendations to the legislature.
- **Task 3:** OSIT will continue to encourage service providers who receive E-rate funding to (by following E-rate rules on cost allocation) deploy new infrastructure to consider expanding their service area beyond the E-rate funded facility and serve the greater community.
- **Related Policy Initiatives:** Nevada Connect Kids- State E-rate Match; Broadband Adoption; Broadband Mapping; Broadband Ready Communities

Goal 3: By 2025, develop and implement a plan that provides broadband infrastructure access to all hospitals, clinics, tribal clinics, and prison systems in the state.

- **Lead Organizations:** OSIT; NV Hospital Association; State Office of Rural Health; Nevada Rural Hospital Partners; Nevada Health Centers; Nevada Rural Hospital Association; For Profit Hospitals; Nevada Indian Commission; Tribal Governments; Nevada Department of Corrections; NevadaNet
- **Definition:** Nevada's rural healthcare clinics, tribal healthcare clinics and prison systems currently rely on low bandwidth and marginally scalable connectivity that currently does not support robust telehealth services in rural and remote areas. The goal of access to a full suite of telehealth services is achievable if coordination among various entities takes place.
- **Task 1:** OSIT continues to provide FCC Rural Healthcare Program planning and technical support to eligible healthcare providers.

- **Task 2:** Use existing public and private middle mile infrastructure to cost effectively implement the statewide telehealth network. This could include:
    - Exploring using E-rate funded infrastructure that has been properly cost allocated.
    - Leveraging the NevadaNet research and education network as the foundation for a Statewide Telehealth Network.
    - Potentially expanding the reach of existing healthcare networks to interconnect with NevadaNet to reach additional healthcare providers.
- **Task 3:** Expand efforts to seek and secure Federal and private foundation funding to bring Telehealth equipment to rural public healthcare clinics and Tribal healthcare clinics.
- **Related Policy Initiatives:** Public/Private Partnerships; State Level Coordination; Nevada USF; Nevada State Infrastructure Bank; NV DOT Dig Once and Fiber Trades; Broadband Ready Communities

Goal 4: Make access to broadband infrastructure and access to a workforce skilled in broadband infrastructure construction an economic development competitive advantage for NV.

- **Lead Organizations:** GOED; NV DOT; OSIT; Regional Economic Development Agencies; County and Local Government; NV Treasurer; NV State Broadband Task Force
- **Definition**: Work to attract investment in key corridor fiber paths (major highways) in NV. Identify specific opportunities where more localized investment in broadband infrastructure can attract incubation, expansion or relocation of jobs.
- **Task 1:** State Workforce Development Agencies collaborate to evaluate existing broadband-related workforce supply and demand and develop policies and programs to ensure the availability of a skilled workforce that meets the needs of employers.
- **Task 2:** Where possible, add broadband infrastructure to other infrastructures being built to attract economic development opportunities. Broadband infrastructure is often a logical and cost effective add on to a road, water/sewer, electric grid or natural gas project.
- **Task 3:** Coordinate State, Federal and Private investments to align with priority middle mile, last mile broadband projects and State economic development priorities.
- **Task 4:** Create a map of Broadband Ready Communities and recent and planned State infrastructure investments that can serve as a resource to companies looking to expand or relocate to Nevada.
- **Related Policy Initiatives:** Public/Private Partnerships; NV DOT Dig Once and Fiber Trade; Broadband Ready Communities; Broadband Mapping; State Level Coordination; Nevada Broadband Workforce

Goal 5: By 2023, a statewide coordinated effort exists to expand the reach of digital equity and inclusion programming.

- **Lead Organizations:** OSIT, NTIA (advice); Local and County Government; Nevada Indian Commission; Tribal Government; Nevada Department of Education; Nevada State Library; Nevada System of Higher Education
- **Definition:** The NTIA has published and updated standards that define effective and efficient digital equity and broadband adoption programs. The State of Nevada, led by the lead organizations listed, should use the NTIA best practice outlines to assess localized digital equity and broadband adoption programs and offer assistance in helping these programs scale their reach and effectiveness.
- **Task 1:** Inventory, assess and help to promote local digital equity and broadband adoption programs that show promising results and reach.
- **Task 2:** Develop and regularly convene a network of digital equity stakeholders to identify barriers and needs, share promising practices, coordinate efforts and develop a digital equity and digital literacy plan.
- **Task 3:** Invite local and national experts (NTIA) to assist the lead organizations and local programs to improve the effectiveness of programs. Stage trainings or webinars that will help local programs improve their scalability and reach.
- **Related Policy Initiatives:** Broadband Adoption; Broadband Mapping; State Level Coordination; Broadband ready communities

Appendicies

Appendix 1: Definitions

To understand the opportunities the broadband landscape and Nevada's opportunities to enhance broadband infrastructure, a brief explanation of the broadband infrastructure ecosystem is provided for context.

Broadband Infrastructure is also defined by three general geographic locations that define the broadband delivery system. These are Last Mile, Middle Mile and Long Haul:

Last Mile-The portion of the broadband/Internet Access delivery system (delivery system) that reaches individual residences, multi-dwelling apartments/high rises, mobile wireless devices, and small businesses. Last mile service technologies vary from fiber, copper, coaxial cable, fixed wireless, and mobile wireless technologies. Last mile connections flow upstream to small neighborhood interconnect points (telecommunications cabinets) and eventually to ward/district central offices that often serve thousands of connections.

Nevada's Last Mile Landscape. The focus of many State broadband efforts is to get service to the unserved or underserved in the State. However, a look at the available data shows that Nevada may have both a rural and urban underserved issue.

Nevada's Rural Broadband Issue: The scope of Nevada's rural broadband challenge is partially uncovered with a search of last mile connectivity data in the State from various sources. Current Federal Communications Commission (FCC), Microsoft and BroadbandNow data differ significantly on the status of last mile access in NV.

There is a discrepancy within the data collected by the FCC. Data from the Fixed Broadband Deployment map[19] published by the FCC, which is collected by FCC form 477 filings from service providers, shows on its national broadband map that every address in NV has access to 25 Mbps download/3 Mbps (25/3) upload service over Cable, DSL, Fiber, Fixed Wireless or Satellite Connections. The 25/3 service is the FCC's current definition of minimum residential broadband service.

However, the FCC, in its Rural Digital Opportunity Fund (RDOF) subsidy program eligibility maps[20], shows that 31,620 residential locations in NV (out of 1.285 million households[21]) are eligible for RDOF program subsidies, meaning that these locations are not currently served by 25/3 service. The large majority of these locations are in rural NV, which, when the approximately 1 million households in the Las Vegas and Reno Metropolitan areas are removed, this shows that about 25% of Nevada's rural households lack 25/3 service according to the RDOF eligibility statistics.

Nevada's Urban Broadband Issue: BroadbandNow tracks availability of service in NV[22]. BroadbandNow survey and data gathering from broadband providers show that, without regard to speed, 96.8% of Nevadans have access to a wireline broadband

[19] https://broadbandmap.fcc.gov/#/
[20] https://www.fcc.gov/auction/904
[21] https://www.census.gov/quickfacts/NV
[22]https://broadbandnow.com/Nevada#:~:text=It%20revealed%20that%2093%25%20of,access%20to%201%2Dgigabit%20broadband.

service (either DSL over copper, cable modem service or fiber). However, a relatively small percentage of Nevadans, 20.9%, have access to fiber last mile connections and only 24.6% of residential locations have access to gigabit broadband service. This represents about 268,565 households of NV's 1.285 Million households with access to fiber and 316,110 households with access to gigabit service.

With the number of households in the Las Vegas and Reno metro areas being in the range of 1 million households, this means that large areas of Las Vegas and Reno have no access to fiber last mile service. While cable modem service penetration across the state is high, measuring 92.9% availability, the lack of a fiber option, particularly in major metropolitan areas could lead to a lack of scalability in services in the future and a gradual degradation of service from a sole cable provider over time, with higher oversubscription rates and lack of upgrades. County and municipal officials should work with the Nevada Governor's Office of Science, Innovation and Technology to monitor service and work with existing service providers to address capacity and availability issues.

Middle Mile-This is the portion of the broadband delivery system that connects the series of central offices to a large, regional interconnect site. These central offices or regional interconnect sites can be owned by a single telecommunications carrier or be more neutral Interconnect sites with ownership by a third party or by several telecommunications carriers. Several Internet Service Providers often create a presence in neutral interconnect sites and sell last mile providers Internet access capacity from these sites. The middle mile network is mostly fiber in cities over 15,000 residences. In small rural towns the middle mile may still be copper or in NV, millimeter wave or other high-bandwidth wireless technologies.

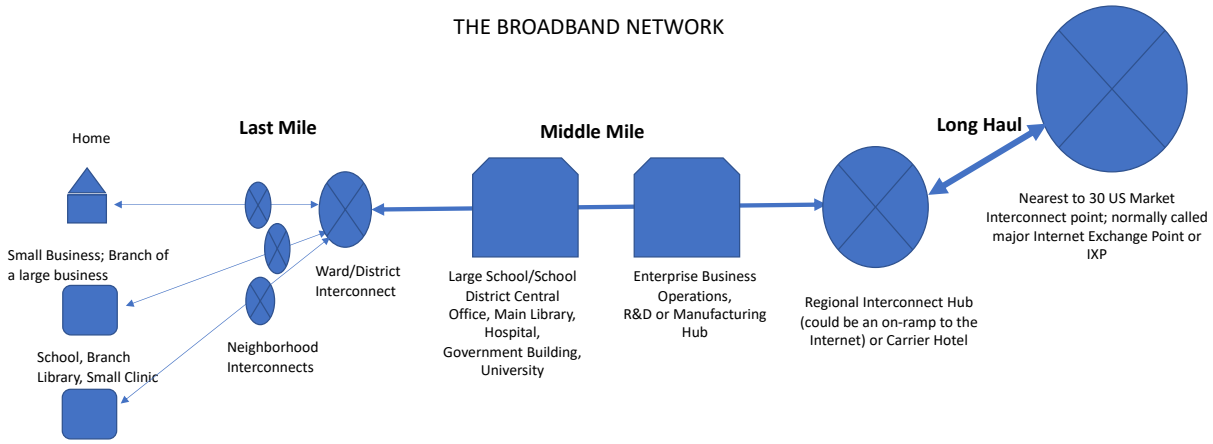
Along key corridors in NV, such as I-80, I-15, US-50, US-93, US-95, US-6, existing fiber paths are present but as work with the owner/provider has shown the last three years, these pathways often lack interconnect facilities in rural areas and are single pathed, meaning fiber feeding a site from only one direction along one path of fiber.

Economic development projects and last mile broadband deployments are now dependent on accessing multiple, diverse paths of fiber along these key trunk or middle mile routes because most companies require fiber from different directions to serve their sites so a single fiber cut does not cause a broadband service interruption.

Long Haul-The long-haul routes are the Interstate Highway Systems of the Internet. These are main fiber routes that connect major telecommunications interconnect points in large cities. The most valuable long-haul routes connect the neutral Internet Exchange Points in the 12 largest cities in the US (Atlanta, Boston, Dallas, Chicago, Houston, Las Vegas, Los Angeles, Miami, Seattle, San Francisco/Santa Clara, Washington DC). The next 18 largest cities continue to build value in their neutral Internet Exchange points. Owners of complete fiber or portions of fiber runs between major metro locations participate in the long-haul market.

The following diagram depicts the last mile, middle mile and long-haul portions of the broadband network.

Figure 1: Diagram of Last Mile, Middle Mile and Long-haul Sections of the Broadband Network



Current and future generation broadband infrastructure takes and will take four general forms: Fiber optic infrastructure; Fixed and Mobile Wireless Infrastructure, Satellites and Interconnect Infrastructure.

Fiber Optic Infrastructure – Fiber optic cables are made of micro-sized strands of glass. Fiber optic cable is the fastest and highest capacity broadband infrastructure. Fiber optic cable is also secure and has limited potential for signal interference. Fiber optic cable makes up nearly 100% of the long haul national, international and undersea broadband networks. Fiber optic cable is the medium for the vast majority of the middle mile portion of broadband networks and is emerging as the second most common (next to coaxial cable) infrastructure in last mile home broadband networks. Currently approximately 11 million of 126 million last mile connections in the United States are fiber connections.[23]

The maximum capacity of fiber optic cable to carry voice, video and data traffic has not yet been reached. The capacity is limited by the routers, switches and optics used to provision service over the fiber. Right now, speeds in excess of 1 TB are being deployed in long haul networks. Many last mile markets in the US offer 10Gbps home connections over fiber. Other countries including South Korea and Japan have standardized on fiber connections.[24]

Mobile and Fixed Wireless-Wireless infrastructure –communications towers, water towers, electric poles, other vertical assets (buildings); antennas; spectrum are all critical in the delivery of wireless broadband service. Wireless connectivity is mainly a last mile technology that is highly dependent on the wireless signal finding fiber quickly to reduce latency, spectrum conflicts and capacity overloads. In rural and remote areas, wireless signals can be regenerated and strengthened over several (3 or 4) hops, but in higher density areas the closer the fiber backhaul the better. This applies to both the fixed wireless (connectivity to a stationary device) and mobile wireless space.

[23] http://blog.yalebooks.com/2020/03/30/fiber-connectivity-in-the-united-states/
[24] http://blog.yalebooks.com/2020/03/30/fiber-connectivity-in-the-united-states/

New technologies are emerging in the wireless space. 5G is the latest generation of mobile wireless technology. 5G delivers last mile speeds in the gigabit range using several bands of different spectrums. 5G service is dependent upon a higher density of shorter towers and antennas[25] and more available fiber backhaul routes with greater strand counts[26].

Mesh technologies are also emerging in the wireless space. A mesh network can be compared to an outdoor version of a home wi-fi network. Hundreds of outdoor outfitted wireless access points are placed around a geographic area and these wireless access points form an area of contiguous high bandwidth Wi-Fi connectivity. These mesh networks easily route around wireless access points that malfunction, lose power or are impacted by an outage. While individual connectivity to the Internet is one mesh network application, the emerging world of Internet of Things sensors, Smart City applications and other emerging applications are also improved in the mesh network environment.[27]

Satellites-Satellite broadband connectivity is usually reserved for very rural and remote areas. A signal is beamed from a satellite to a receiving dish on a customer premise. Internet traffic travels both upload and download with a fairly significant delay (latency) especially when compared to fiber or fixed wireless last mile networks. Recently, Elon Musk's SpaceX and Starlink [28] divisions have been testing higher satellite bandwidth speeds through the use of thousands of **low orbiting small satellites** linked by lasers to form a "mesh network in space"[29]. This is an exciting advancement particularly for rural area broadband and should be monitored closely.

Interconnect facilities-One of the issues identified as hinderance to rural broadband deployment is the investment in rural interconnect facilities.[30] These are physical facilities, often shipping container sized huts, that connect the middle mile or long-haul segment of a network with last mile connections. As you will read later in the feasibility study, Nevada lacks interconnect facilities on rural highways like US-50, US-93, US-95 and US-6. The lack of interconnect facilities in rural and frontier areas of NV is directly related to the lack of last mile wired and wireless broadband service in these areas. The lack of interconnect facilities makes fiber paths along these routes inaccessible to provide local service.

[25] http://www.emfexplained.info/?ID=25916#5G%20working%20with%204G
[26] https://community.fs.com/blog/5-types-of-optical-fibers-for-5g-networks.html
[27] https://www.electronicdesign.com/markets/energy/article/21750433/a-dozen-top-applications-for-mesh-networks#:~:text=Meshes%20also%20help%20tie%20together,monitoring%20and%20managing%20the%20battlefield.&text=Broadband%20wireless%20access%3A%20A%20mesh,DSL%20lines%20aren't%20available.
[28] https://www.starlink.com/
[29] https://www.theverge.com/2020/9/3/21419841/spacex-starlink-internet-satellite-constellation-download-speeds-space-lasers
[30] http://broadbandbreakfast.com/2020/09/strategies-for-interconnecting-middle-mile-and-last-mile-fiber-critical-amid-covid19-pandemic/

Appendix 2: Summary of OSIT's Past and Current Efforts to Increase Connectivity in Nevada

For the last three years, Nevada, through the Nevada Governor's Office of Science, Innovation and Technology (OSIT), has supported communities across the state in developing and implementing an integrated planning and implementation strategy to improve broadband service. This "Whole Community Connectivity"[31] process has the following elements:

- Organizing Community leaders across government, tribal, business, education, healthcare, transportation, public safety and concerned citizens into a community based "Broadband Action Team"
- Provide K12 Schools (mainly the public schools), libraries, tribal libraries, healthcare providers and tribal health centers with the support needed to pursue reimbursement for construction of modern broadband infrastructure and the costs of monthly broadband service through the FCC's E-rate and Rural Healthcare Programs[32]
    - There has been a 500% increase in E-rate participation from FY2016 to FY2020.
    - Leveraging the Nevada Connect Kids E-rate special construction match fund appropriated by the Nevada Legislature and signed into law by the Governor. This fund has been sustained since its initial passage in 2017[33]. This fund provides up to 10% funding for the construction of new broadband infrastructure to serve schools and libraries and is matched dollar for dollar with additional E-rate funds.
        - In FY2020 E-rate has approved $1.3M in special construction funding to build over 630,000 ft of fiber to the Eureka County School District, Shoshone-Paiute Tribal Library and the Austin and Battle Mountain Libraries.
- Monitor other Federal broadband subsidy (Connect America Fund, RDOF and 5G Fund for rural America); grant and loan programs (USDA Community Connect; USDA ReConnect; Economic Development Administration (EDA); and Community Development Block Grant Funding) and assist eligible communities and broadband service providers in pursuing these funds.
- Leverage Federal programs, Nevada Connect Kids E-rate state match, the Nevada Governor's Office of Science, Innovation and Technology (OSIT) Education Broadband Grants to gain a base of modern broadband infrastructure in a community and then work with the broadband service provider owners of this modern infrastructure to extend broadband service to the remainder of the community.
- Work with the Governor's Office of Economic Development, Nevada's Regional Economic Development agencies, the Nevada Department of Transportation and recently, the Nevada State Treasurer to seek other public and private support for community broadband projects.
- Work with NevadaNet, the state's Research and Education Network that provides broadband access to NSHE institutions, K12 school districts, rural healthcare, correctional facilities, and many state agencies, to extend broadband access to community anchor institutions such as local libraries, museums, and municipal buildings.

[31] https://osit.nv.gov/Broadband/Community_Connectivity/

[32] https://osit.nv.gov/Broadband/NV_Connect_Kids_Initiative/

[33] https://www.leg.state.nv.us/Session/78th2015/Reports/history.cfm?ID=1118

The following chart displays areas of Nevada where, in the last three years, E-rate funds have led to the deployment of new, modern broadband infrastructure. In Ely and Elko, with assistance from OSIT, these E-rate funded projects are being used to extend robust, scalable, future proof broadband service to the remainder of the community. Other rural communities in Nevada are working to replicate the successes achieved in Ely and Elko.

Figure 2: E-rate Funded construction projects in NV – 2017-2019

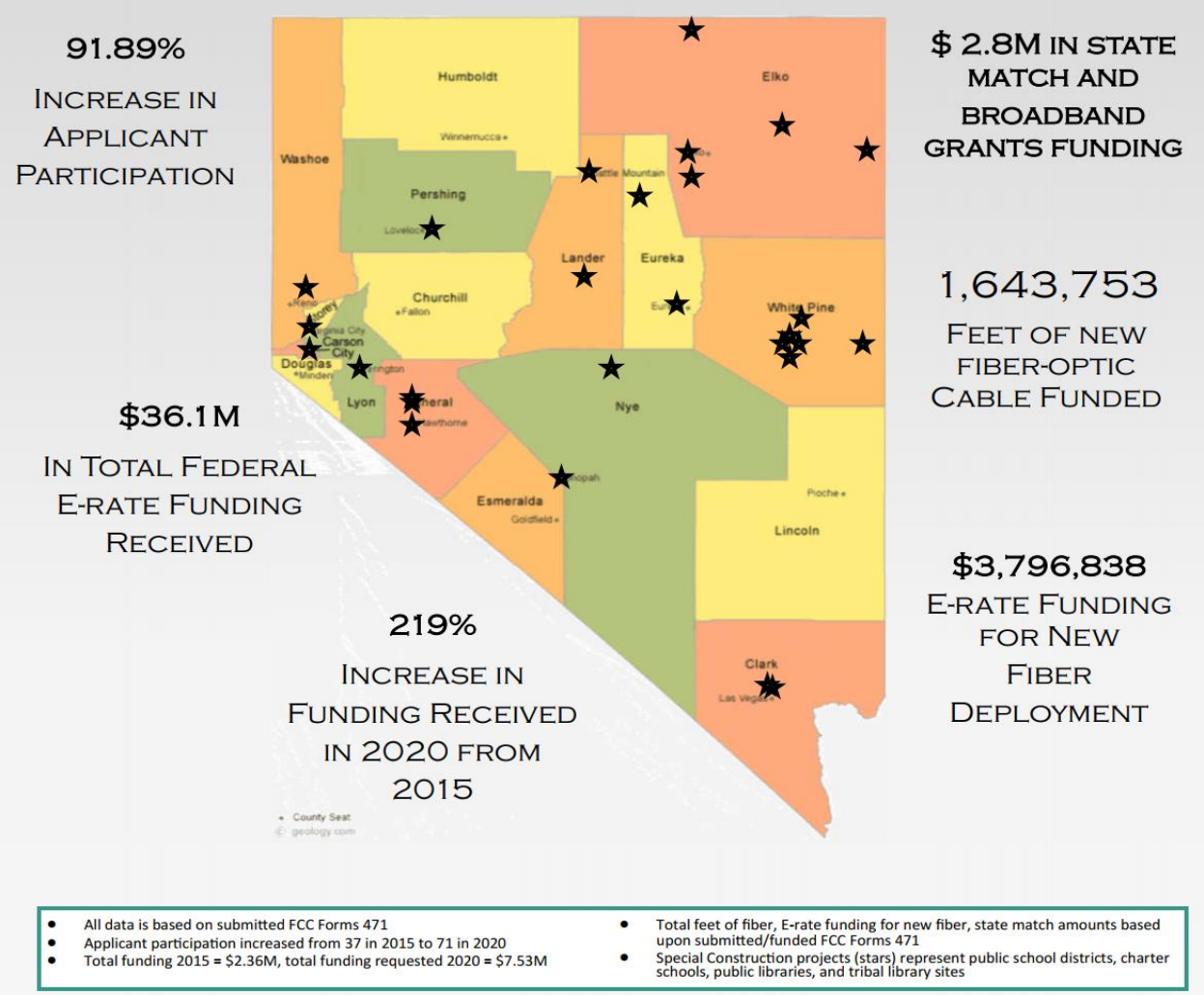
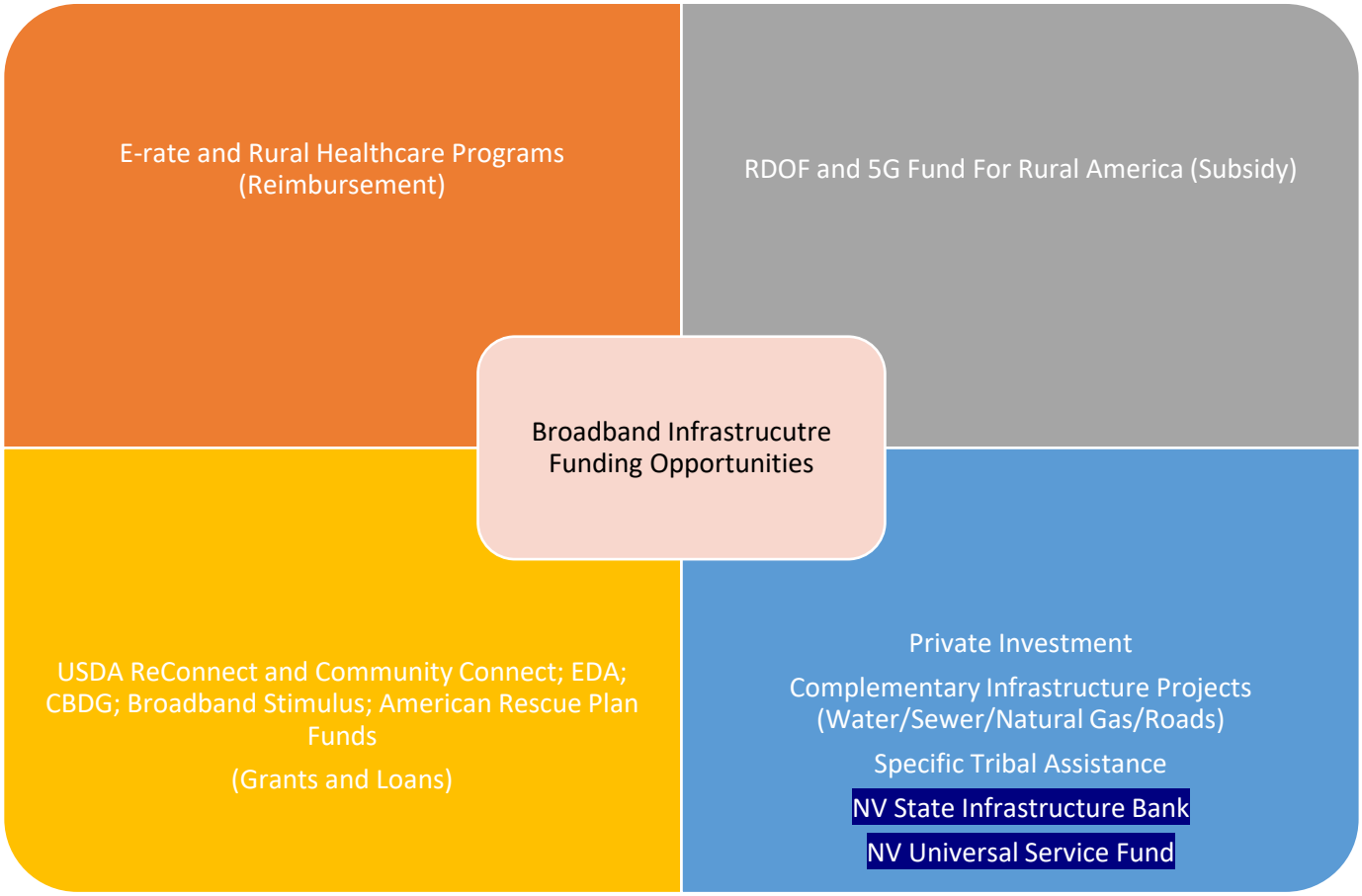


Figure 3: Coordination of Broadband Funding Sources



Dark Blue Highlights – indicates programs that are still in development

As the diagram above depicts, broadband infrastructure has disparate and mostly complementary funding sources. Nevada Counties, Cities, Towns and Census Designated places should explore all funding sources in the upper left, upper right and lower left boxes in tandem with developing the State and Private investment opportunities listed in the lower right box.

The details regarding these funding sources were explained in the previous section. The State of Nevada offers planning and application support to Counties, Cities, Towns, Census Designated Places, School Districts, and Libraries in pursuing these funding opportunities through the:

- Governor's Office of Science, Innovation and Technology (OSIT) (E-rate, Rural Healthcare, RDOF, 5G Fund, USDA Community Connect and ReConnect; Tribal Assistance).
- Governor's Office of Economic Development (EDA and CBDG)
- Nevada Treasurer's Office (NSIB and Private Investment)

Unlike many other infrastructures where grants or appropriations of funds from one program disqualify the applicant for other program funding, broadband infrastructure funding is often "stackable." Current examples are in Elko County and White Pine County, where:

Elko County

- Elko formed a very active broadband action committee with 20+ Community Leaders from across government, regional and state economic development agencies, business, education (K12 and Higher), healthcare, public safety, transportation and concerned citizens.
- The broadband action committee surveyed business and residential broadband customers in Elko County. A recent survey by the **Elko Daily Press**[34] confirmed the results of the survey the Elko Broadband Action Committee conducted 2 years earlier.
- The broadband action committee compiled a broadband action plan for Elko County based on these needs.
- After making the Elko County broadband action public, the City of Elko and Spring Creek received interest from 4 service providers to improve broadband service in the City of Elko and the Spring Creek Development.
    - This included two providers interested in deploying Fiber to the Home (FTTH) service in the City of Elko and Spring Creek
    - Nevada Gold Mines[35]agreed to provide seed financing to one of the FTTH service providers. Installation of service by this provider is set to begin in Q1 Calendar Year 2021.
- The broadband action committee also assisted the Shoshone-Paiute Tribe bring fiber service to the tribal library in Owyhee, NV leverage FCC E-rate funds. The same fiber plant that serves the tribal library can be leveraged to bring robust, scalable fixed wireless service to the Duck Valley reservation.
- The broadband action committee continues to work with the Te-Moak Tribe of the Western Shoshone Band Colonies in Elko, South Fork and Wells on solutions to improve service. Again, leveraging E-rate reimbursement for fiber service to the Tribal Library in these locations will be an essential element of a broader, community-based solution.
- Elko County School District successfully leveraged E-rate and Nevada Connect Kids Initiative funding to build over 125,000 feet of new fiber. This replaced 100Mbps circuits with service levels of 10Gbps.

White Pine County

- White Pine County formed a broadband action committee with representatives from government, regional and state economic development agencies, the Ely Shoshone Tribe, education, business, healthcare and concerned citizens in 2017. This broadband action committee surveyed the business community and residential broadband customers to identify needs.
- The broadband action committee compiled a broadband action plan for White Pine County based on these needs.
- E-rate reimbursement funds were used by a for-profit service provider to replace the White Pine County School District fixed wireless network with an all fiber to the school network for the

[34] https://elkodaily.com/opinion/editorial/poll-elko-area-residents-unhappy-with-internet-options/article_46cfaac8-cacb-5bf2-80df-fb9db5ff4a31.html?utm_medium=social&utm_source=email&utm_campaign=user-share

[35] https://elkodaily.com/mining/community-broadband-project-moving-forward/article_2b212f8b-5c8e-5513-9101-2c558914b286.html

School District instructional facilities in Ely, Baker, Lund and McGill. These builds totaled over 337,000 feet of new fiber. This replaced 100Mbps circuits with service levels of 1Gbps.

- A private provider also leveraged E-rate reimbursement funds to build fiber to the White Pine County Library in Ely, the Learning Bridge Charter Academy, and the Ely Shoshone Tribal Library
- A private provider also leveraged Rural Healthcare program reimbursement funds to provide service to the Ely Shoshone Tribal Healthcare Clinic

The OSIT Whole Community Connectivity[36] process, which is offered to every County, City, Town and Census Designated place in NV at no cost, helps broadband action teams formed in Counties/Cities/Towns/Census Designated places work with private sector service providers to logically and systematically pursue these funding sources. Beyond Elko and White Pine counties, the following communities have also participated in the Whole Community Connectivity Program: The Town of Austin; Humboldt County; City of Mesquite; Pershing County; City of Ely; Lander County; Tahoe Transportation Authority; Carson City; Douglas County; Ely Shoshone Reservation; Moapa River Indian Reservation- Moapa Paiutes; Te-Moak- Battle Mountain, South Fork, and Wells bands; Fort McDermitt Indian Reservation- Shoshone and Paiute Tribes.

[36] https://osit.nv.gov/Broadband/Community_Connectivity/

Appendix 3: Summary of Federal Broadband Programs

In the coming months, there will be unprecedented levels of Federal Broadband Investments. This will seed investments of private capital from broadband service providers and private equity firms. The Federal Investments will come both from existing program and potential infrastructure stimulus appropriations bills that will be undertaken in the 117th Congress.

The existing and planned Federal Sources of Funding are as follows:

Fund Source	Fund Name and Definition	Process/Nevada
Federal Communications Commission (FCC)	**Rural Digital Opportunity Fund** – (RDOF) the RDOF is the successor to the FCC's Connect America Fund. It will distribute $20 Billion via reverse auction to bridge rural broadband gaps. The first phase of the auction will begin in October 2020 and will award $16 Billion in 10-year broadband subsidies for Service Providers ($1.6 Billion per year for 10 years). The subsidies are awarded via reverse auction. Reverse auction participants bid against reserve prices for eligible census blocks.	Auction began on October 29th and concluded on 12/1/2020. Nevada had 31,623 locations that are identified by the FCC as lacking minimum broadband service. Through the auction 30,584 of these locations will receive service over the next 5 years. Service Providers were awarded $63.5M over the next 19 years to serve these 30,584 locations. Appendix 4 contains a table of the RDOF awards by County for the State of NV. In addition, the FCC's predecessor program to RDOF, the Connect America Fund (CAF) awarded $25.5 Million in broadband subsidies to service providers to deploy 25Mbps download 3 Mbps upload service in rural parts of NV. This money was awarded in 2018 and deployments of service are underway. The CAF awards are also listed in Appendix 4.

Fund Source	Fund Name and Definition	Process/Nevada
FCC	**5G Fund for Rural America**- $9 Billion in subsidies awarded via reverse auction to introduce 5G mobile wireless service to most rural	The first round of funding will be $8 Billion. The first round is expected to begin in late calendar year 2022. Expect

	areas of the country. This will be particularly relevant in NV as much of the State lacks mobile wireless service. There is a special allocation for enhancing wireless service on tribal lands in the 5G Fund for Rural America.	significant investments in NV from this program, in the range of $7.5-8 Million per year for 10 years. The final rules for the 5G Fund for Rural America will be considered by the FCC Commissioners at their monthly open meeting on October 27, 2020. First analysis shows that 65% of the land area of NV would be eligible for subsidy funding under this program.

Fund Source	Fund Name and Definition	Process/Nevada
FCC	**E-rate**-The FCC's E-rate program reimburses applicants (School Districts, Schools, Library Systems, Libraries) for the cost of their broadband connections (FCC E-rate Website). Reimbursements range from 20-90% of the total one-time and monthly recurring costs. The reimbursement rate is based on the % of student participation in the National School Lunch Program (NSLP) in the district.	School or library must follow E-rate procurement guidelines. Nevada School Districts; Libraries; Tribal Schools and Tribal Libraries receive about **$12 Million annually** in reimbursements for broadband services under the E-rate program and over $170 Million over the life of the Program.
FCC	**Rural Healthcare Program (RHP) -** The FCC's RHP provides reimbursements for broadband connections to rural healthcare providers and some urban healthcare providers if a member of a consortium that has a majority of rural based members. The RHP has two funding scenarios, the telecommunications program and the healthcare connect fund (HCF). The Healthcare Connect Fund is a flat 65% reimbursement of broadband costs for participants.	Applicants must follow RHP procurement guidelines Nevada rural healthcare providers have participated in this reimbursement program for over a decade. Nevada's share of funding however has been below potential.

Fund Source	Fund Name and Definition	Process/Nevada
US Treasury	**State and Local Coronavirus Recovery Fund-** Revenue Replacement for lost state and local revenue; Fund unemployment shortfalls; Fund budget shortfalls; Infrastructure projects and investments in water, sewer, or broadband.	Under the interim final rule, eligible projects are expected to focus on locations that are unserved or underserved. The interim final rule treats users as being unserved or underserved if they lack access to a wireline connection capable of reliably delivering at least minimum speeds of 25 Mbps download and 3 Mbps upload. This threshold is consistent with the FCC's benchmark for an ''advanced telecommunications capability.'' This threshold is also consistent with thresholds used in other Federal programs to identify eligible areas to be served by programs to improve broadband services.

Fund Source	Fund Name and Definition	Process/Nevada
US Treasury	**Coronavirus Capital Fund-** Broadband Infrastructure and Broadband Infrastructure Planning are the only eligible expenditures.	A minimum amount of $100 Million will be allocated to each state with another $4 Billion being allocated based on population. Treasury guidance for the Coronavirus Capital Fund is expected to stay consistent with the State and Local Fund.

Fund Source	Fund Name and Definition	Process/Nevada
NTIA	**Broadband Infrastructure Program-** $288 Million competitive grant program for deployment of broadband infrastructure	Must be a covered partnership to be eligible to apply. The Act defines a covered partnership as a partnership between: (A) a State, or one or more political subdivisions of a State; and (B) a provider of fixed broadband service. A

		covered partnership must include at least one provider of fixed broadband service and a fixed broadband service provider can be a partner in more than one application. The Governmental Entity must be the lead applicant.

Fund Source	Fund Name and Definition	Process/Nevada
NTIA	**Tribal Broadband Connectivity Program-** $980 Million competitive grant program for the deployment of broadband infrastructure and broadband adoption programs, including use and digital equity.	All 27 Tribes, Bands, and Colonies in Nevada are eligible to apply. Projects that promote the adoption and use of broadband services are eligible for funding, including: (i) Broadband education, awareness, training, access, equipment and support (ii) affordable broadband programs, such as providing free or reduced-cost broadband service and preventing disconnection of existing broadband service; (iii) distance learning; (iv) telehealth; (v) digital inclusion efforts; and (vi) broadband adoption activities.

Fund Source	Fund Name and Definition	Process/Nevada
US Department of Commerce- Economic Development Authority	**Public Works and Economic Assistance Adjustment Grant-** Competitive grant program that funds projects that respond to economic injury as a result of the COVID-19 pandemic.	EDA solicits applications from applicants in rural and urban areas to provide investments that support construction, non-construction, technical assistance, and revolving loan fund projects under EDA's Public Works and EAA programs. Grants and cooperative agreements made under these programs are designed to leverage existing regional assets and support the implementation of

	economic development strategies that advance new ideas and creative approaches to advance economic prosperity in distressed communities. EDA provides strategic investments on a competitive- merit-basis to support economic development, foster job creation, and attract private investment in economically distressed areas of the United States. State and local governments, Tribes, higher education, and other non-profits are eligible recipients of funding.

Appendix 4: RDOF and CAFII Results

Rural Digital Opportunity Fund Results – Released 12/7/2020

NV RDOF Results				
State	**County**	**Company**	**Locations**	**10 year subsidy**
Nevada	Carson City, NV	Connect Everyone LLC	379	$1,600,375.59
Nevada	Carson City, NV	Space Exploration Technologies Corp.	58	$256,688.00
Nevada	Carson City, NV Total		437	$1,857,063.59
Nevada	Clark, NV	Connect Everyone LLC	4,689	$17,991,475.45
Nevada	Clark, NV	Cox Communications, Inc.	812	$286,903.30
Nevada	Clark, NV	Space Exploration Technologies Corp.	205	$264,332.70
Nevada	Clark, NV Total		5,706	$18,542,711.45
Nevada	Douglas, NV	California Internet, L.P. dba GeoLinks	69	$406,968.00
Nevada	Douglas, NV	Connect Everyone LLC	1,697	$2,528,916.00
Nevada	Douglas, NV Total		1,766	$2,935,884.00
Nevada	Elko, NV	Connect Everyone LLC	2,077	$9,533,198.18
Nevada	Elko, NV	Safelink Internet LLC	1,244	$983,934.00
Nevada	Elko, NV	Space Exploration Technologies Corp.	26	$142,263.00
Nevada	Elko, NV Total		3,347	$10,659,395.18
Nevada	Esmeralda, NV	Space Exploration Technologies Corp.	568	$1,035,680.10
Nevada	Esmeralda, NV Total		568	$1,035,680.10
Nevada	Eureka, NV	Connect Everyone LLC	557	$2,352,003.17
Nevada	Eureka, NV Total		557	$2,352,003.17
Nevada	Humboldt, NV	California Internet, L.P. dba GeoLinks	267	$706,356.00
Nevada	Humboldt, NV	Connect Everyone LLC	2,552	$844,687.30
Nevada	Humboldt, NV Total		2,819	$1,551,043.30
Nevada	Lander, NV	California Internet, L.P. dba GeoLinks	175	$290,316.00
Nevada	Lander, NV	Safelink Internet LLC	1,484	$213,727.50
Nevada	Lander, NV Total		1,659	$504,043.50
Nevada	Lincoln, NV	Space Exploration Technologies Corp.	1	$10,531.50
Nevada	Lincoln, NV Total		1	$10,531.50

Nevada	Lyon, NV	California Internet, L.P. dba GeoLinks	2,158	$4,816,079.50
Nevada	Lyon, NV	Connect Everyone LLC	1,446	$1,627,781.20
Nevada	Lyon, NV Total		3,604	$6,443,860.70
Nevada	Mineral, NV	Space Exploration Technologies Corp.	57	$86,122.60
Nevada	Mineral, NV Total		57	$86,122.60
Nevada	Nye, NV	Space Exploration Technologies Corp.	1,854	$1,458,497.50
Nevada	Nye, NV Total		1,854	$1,458,497.50
Nevada	Pershing, NV	California Internet, L.P. dba GeoLinks	153	$183,642.00
Nevada	Pershing, NV	Connect Everyone LLC	1,233	$1,582,607.40
Nevada	Pershing, NV Total		1,386	$1,766,249.40
Nevada	Storey, NV	California Internet, L.P. dba GeoLinks	59	$107,316.00
Nevada	Storey, NV	Connect Everyone LLC	1,241	$1,479,029.80
Nevada	Storey, NV Total		1,300	$1,586,345.80
Nevada	Washoe, NV	Connect Everyone LLC	1,525	$6,439,506.00
Nevada	Washoe, NV	Space Exploration Technologies Corp.	207	$604,440.30
Nevada	Washoe, NV Total		1,732	$7,043,946.30
Nevada	White Pine, NV	California Internet, L.P. dba GeoLinks	264	$173,645.50
Nevada	White Pine, NV	Connect Everyone LLC	3,527	$5,529,587.30
Nevada	White Pine, NV Total		3,791	$5,703,232.80
Nevada Total			30,584	$63,536,610.90

CAF II 903 Auction Awards – from 2018-Deployments are underway

Connect America Fund Phase II Auction Nevada Results by County (Total Support $)

State	County	Bidder	Locations	Total Support (10 years)	PER LOCATION
NV	Elko	Commnet Wireless, LLC	148	$612,006.20	$ 4,135.18
NV	Esmeralda	Commnet Wireless, LLC	274	$47,581.00	$ 173.65
NV	Eureka	Commnet Wireless, LLC	660	$1,914,057.60	$ 2,900.09
NV	Humboldt	Commnet Wireless, LLC	1,699	$2,456,802.40	$ 1,446.03
NV	Lander	Commnet Wireless, LLC	979	$2,516,683.00	$ 2,570.67
NV	Lyon	California Internet, L.P.	454	$1,833,910.40	$ 4,039.45
NV	Lyon	Commnet Wireless, LLC	1,248	$1,932,197.50	$ 1,548.24

NV	Mineral	Commnet Wireless, LLC	870	$1,469,564.20	$ 1,689.15
NV	Nye	Commnet Wireless, LLC	2,790	$4,245,177.60	$ 1,521.57
NV	Pershing	Commnet Wireless, LLC	804	$2,089,877.40	$ 2,599.35
NV	Washoe	Commnet Wireless, LLC	1,997	$4,802,110.20	$ 2,404.66
NV	White Pine	Commnet Wireless, LLC	1,375	$1,583,779.60	$ 1,151.84
Total			**13298**	**$ 25,503,747.10**	**$ 1,917.86**

Appendix 5: Priority Infrastructure Projects

There are several worthwhile broadband infrastructure projects in NV that have immediate time horizons. These projects are constantly monitored and updated by the Nevada Governor's Office of Science, Innovation and Technology (OSIT). OSIT, through its State Broadband Office, works with Communities, Healthcare Providers, School Districts, Service Providers and Tribal Governments to discuss and incubate broadband infrastructure projects.

It is envisioned that funding for these projects would make use of multiple sources of capital including private investment, federal program grants, low interest loans and reimbursements, conduit leases from NV DOT projects and potential investment/financing from the NSIB.

A few of these projects are listed below:

Project location	Project name	Description	Investment
I-80 UT to CA Border	I-80 Alternative Route	Build an alternative path of fiber along the I-80 Corridor from the Utah to the CA Border. Providers have long required an alternative path along the I-80 corridor. The lack of a diverse path has limited: - Broadband options for cities and towns along the I-80 corridor - Economic development and job growth from entities like mining operations; data centers; advanced manufacturing facilities that require more than one upstream Internet pathway for resiliency. Several service provider partners would likely be interested in investing with the State in this pathway. This path of fiber could also qualify for Federal broadband stimulus if there is a program in the 117th Congress.	Assume NV DOT grants right of way access at no cost in exchange for a State owned conduit $76 Million Cost estimate for 411 miles of buried fiber @ $35 per foot (engineering; permitting; materials; labor)
Clark County	Clark County Rural Fiber	Fiber to serve Indian Springs; Goodsprings and Searchlight; Mesquite	$40 Million for diverse fiber builds into the communities. Cox Communications is interested in serving these

			markets and would likely lease fiber if infrastructure is built to these markets that interconnects with other long-haul fiber routes.
Nevada Side of the Tahoe Basin	Tahoe Basin Fiber	Fiber to the Home infrastructure on the NV side of Lake Tahoe	Federal transportation funding and emergency management funding is partially secured. Private investment could be used to build laterals off middle-mile routes of fiber to reach homes. $12-15 Million cost estimate.
US-50 Ely to Fallon	Create rural interconnects on US-50	Creating interconnect points in Eureka, Austin and Middlegate on existing Zayo and NV Energy fiber route along US-50	These interconnect facilities would allow more robust broadband service to residential and business customers in the few communities along US-50. Cost is about $350K per interconnect. Switch could be a potential partner on this.
US-6; US-95; Alt-95; US-395	Create rural interconnects	**Reference the NNDA Las Vegas to Reno Corridor Project** Enhancing interconnect facilities along these corridors – Warm Springs, Tonopah, Coaldale, Mina, Hawthorne, Schurz; Minden; Gardnerville; Yerington	Switch, VEA, Praxis and CC Comm would be potential partners. This is placement of some new facilities but also increasing the capacity of some existing facilities. Enhancing the ability to provide 10G and eventually 100G backhaul. $4 Million
I-80 Corridor from West Wendover to Reno	Enhance Sprint and CenturyLink/ Level3 Interconnect facilities along the I-80 Corridor	Enhancing the capability to provision 100G bi-directional upstream services from Internet PoPs along I-80. These are interconnect facilities along the existing single path fiber. The interconnect facilities will require upgrade in the next two to five years.	Switch, Sprint and CenturyLink/Level3 would be the partners here. $6 Million investment approximately.
Elko/Spring Creek	Fiber to the Home	Invest with one of two providers interested in deploying Fiber to the Home and Fiber to the business in this market.	$42 Million project; Vendors are seeking bridge financing of about $14 Million until revenue generation begins.

Tribal Lands	Enhanced service to tribal residences on tribal lands	Duck Valley Indian Reservation (Owyhee/Elko); Duckwater Indian Reservation (Nye); Ely Shoshone Reservation (White Pine); Fallon Paiute-Shoshone Reservation (Churchill); Fort McDermitt Indian Reservation (Humboldt); Fort Mojave Indian Reservation (Clark); Goshute Reservation (White Pine); Las Vegas Indian Colony (Clark); Lovelock Indian Colony (Pershing); Moapa River Indian Reservation (Clark); Pyramid Lake Indian Reservation (Washoe/Storey/Lyon); Reno-Sparks Indian Colony (Washoe); Te-Moak Tribe (Elko and Lander); Walker River Indian Reservation (Mineral/ Churchill/Lyon); Washoe Tribe (Douglas); Winnemucca Indian Colony (Humboldt); Yerington Reservation (Lyon); Yomba Reservation (Nye)	Increase fixed wireless and fiber penetration on tribal lands; Seed money may be available from Federal and State sources. $30 Million approximate

This is not meant to be an exhaustive list, but the pipeline of projects is constantly assessed and updated.