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MALENA DAILEY
PROGRESSIVE POLICY INSTITUTE

NOVEMBER 2023

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INTRODUCTION

Standards for connectivity have evolved to reflect the transition to the online world, where fast internet connection is a prerequisite for integral services such as education, health care, and access to the global economy. As such, it has become more important than ever that Americans have access to reliable, updated broadband options, and that both federal and state policy support the availability of these services.

In California, these priorities have been recognized by Governor Newsom, who signed legislation directing $6 billion to expand broadband coverage for all Californians in 2021. "Delivering broadband to all is essential to California's success," says Newsom. "Access to high-speed internet can mean the difference between launching a successful career and being without work."

Meanwhile, the Biden administration has made a federal commitment to expanded service, with $65 billion being allocated for broadband deployment as part of the Infrastructure Investment and Jobs Act in 2021.[1] Of this funding, at least $1.86 billion is being directed to California through the Broadband Equity, Access, and Deployment (BEAD) program,[2] directed specifically towards underserved and high-cost areas.

The influx of government support and rising consumer demand have enabled internet service providers to invest heavily in high-speed, high-capacity wireless and fiber cable connections. However, in the face of California's ambitious goals for widespread coverage, the transition needed to enable the modernization of network infrastructure may be hampered by longstanding regulatory requirements.

By designating certain service providers as "carriers of last resort," some states impose requirements to provide basic telephone service to all customers within a designated service area. The intention is to ensure all consumers have access to voice services, especially in rural and underserved locations. Today, companies are required to continue to maintain the copper wires that carry voice

traffic, rather than working to replace legacy networks with updated technologies that provide modern internet services. Though the FCC addressed this at a federal level through a 2019 order, California is one of at least 38 states that continue to impose such requirements on carriers.[3]

Now, with rapidly improving standards for connectivity in an ISP market that has proved more competitive over time, the monetary and opportunity costs associated with the state requirement to maintain deteriorating copper networks are mounting. This policy brief quantifies these costs and highlights the importance of updating policy for network infrastructure to ensure that California can efficiently allocate available resources to expand broadband connection across the state.

COST OF LEGACY NETWORKS

Legacy networks represent a relic of the past that has not kept up with the standards of modern technology. As of 2021, less than a third of American households were still connected via copper wires.[4] In California specifically, just 2.7% of California adults had access to landline-only services.[5]

Nonetheless, significant resources are still expended on maintaining alternative legacy networks. AT&T, for example, spends over a billion dollars a year maintaining copper networks in California alone.[6] With at least 15% of California households lacking any broadband connection,[7] and the digital divide disproportionately impacting rural and low-income communities, the need to build and maintain broadband infrastructure through reallocation of these funds is clear. California regulators have estimated that it will take roughly $10 billion to expand coverage to all residents of the state,[8] and with 2021 funding from the state government facing reductions and deferrals by the State Assembly over the next few years,[9] current government funding falls short of what is needed to make widespread coverage a reality.

AT&T estimates that it is reasonable to expect roughly $5 billion of private and public telco investment will go into the maintenance of outdated copper networks in California over the next five years.

The Fiber Broadband Association estimates that it costs $60,000 to $80,000 per mile to install fiber broadband, with costs ranging from $700 to $1,500 per household in more urban settings and from $3,000 to $6,000 per household in rural areas.[10]

If telcos were allowed to repurpose funds dedicated to copper wires to fiber optic cables, rural residents of California could reap the benefits. While acknowledging that the redirection of funds cannot be entirely predicted, understanding the monetary cost of copper wire maintenance highlights the opportunity cost of continuing to impose such requirements. Note that the following figure is based on the previously stated estimates by the Fiber Broadband Association. It assumes the highest cost for broadband installation given that carrier requirements are meant to benefit the most difficult to reach, underserved rural areas.

FIGURE 1: PROJECTION OF OPPORTUNITY COST PRESENTED BY CONTINUING TO MAINTAIN COPPER WIRING

	Rural Households Served (number of households)	Route Miles of Installed Cable (miles)
5-year period ($5b)	833,333	62,500
10-year period ($10)	1,666,666	125,000

As Figure 1 shows, funding by just one service provider into copper wire maintenance is roughly equivalent to the cost of connecting over 800,000 rural households over the next five years. Since two million California households did not have broadband in 2020,[11] the redirection of these funds has the potential to swiftly move the state toward universal broadband service.

SOCIAL AND ECONOMIC BENEFITS OF BROADBAND

Social and economic benefits associated with high-capacity internet expansion to rural areas should also be considered in the opportunity cost of copper wire maintenance. Particularly relevant in a post-pandemic environment, online essential services such as health care, education, and work enabled by access to high-speed broadband provide resources and opportunities that might otherwise be inaccessible to rural areas, both in California and throughout the United States.

a. Access to telehealth services

Reliable broadband remains one of the biggest challenges in the rural adoption of telehealth services,[12] though telehealth is a critical component of expanding access to health care in these geographic regions. Less than 10% of U.S. physicians practice in rural communities,[13] where 25% of the population lives. In California, of the 55 rural hospitals open as of April 2023, 29% were at risk of closing. Of the at-risk hospitals, those serving low-income communities are particularly vulnerable.

As such, remote access to health care providers has enormous potential to quickly connect those lacking in adequate options with quality providers, especially in cases of specialized care. An example where this has been particularly successful is in mental health care, where rural individuals and non-elderly adults are more likely to use telehealth for mental health and substance use disorder visits, especially in areas with fewer providers.[14] For rural communities disproportionately impacted by substance abuse disorders, telehealth offers a solution that closes the gap of access to care in areas that lack mental health professionals.

b. Rural economies and remote work

Expansion of broadband access has also been shown to empower rural economic growth. At the most basic level, access to fiber optic broadband is positively correlated with property

value and has been found to increase rental values by 8% and property purchase values by 2.8%.[15] More indirectly, stable broadband access enables population increases in the era of remote work, which has made it more attractive for workers to relocate to small towns with lower costs of living without sacrificing the variety of employment opportunities that come with living in major metropolitan areas. The rise of remote work during the height of the pandemic translated to the revival of small towns, where many workers relocated to avoid high living costs with no requirement to be physically near employers. After a decade of consistent decreases in population, rural counties saw a net gain in population from mid-2020 through mid-2021.[16] In line with this, job postings in rural areas increased 52% from 2019 through 2021, compared with 11% growth in major cities.[17]

c. Learning outcomes for rural and low-income students

The absence of high-capacity broadband access at school and at home — especially among lower-income and minority families — has put rural students at a disadvantage relative to the educational opportunities offered to their urban and suburban peers.[18] A study of Michigan school districts found that consistently, and controlling for other demographic factors, students with high-speed at home internet access had higher GPAs than students without access. The same proved true for standardized test scores.[19]

In California, a 2021 study by CalMatters found that 3 in 10 rural students came from households without reliable internet, attributed to a combination of lack of access and affordability.[20] It is for this reason that the digital divide in students is especially of concern when considering the implications for social mobility. By designing education in a way that reaps the benefits of regular internet access, students who cannot afford connected devices are left behind, and communities with inadequate access to broadband are put at a significant disadvantage.

CONCLUSION

For California to reap the full benefits of private and public investment in telecommunications infrastructure, it is critical that state policies enable service providers to invest in new technology rather than sink resources into maintaining legacy copper networks. With five years of continued maintenance representing broadband connections to an estimated 800,000 rural households, there is an urgent need to redirect wasted resources onto the installation of networks that can support the future of communications technology.

Rural communities are best served by allowing service providers to invest in responding to the changing market rather than investing in outdated technology. Effective rollout of broadband has positive implications for health, education, and the economy, and brings opportunity for growth to rural communities which have been subject to declining populations and opportunities for work over the past several decades. California can advance its broadband goals allowing the replacement of copper networks, empowering access to the next generation of technology for those who have previously lacked access to the benefits of online services.

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PROGRESSIVE POLICY INSTITUTE
1156 15th Street NW
Ste 400
Washington, D.C. 20005

Tel 202.525.3926
Fax 202.525.3941

info@ppionline.org
progressivepolicy.org