

State of Our State: Broadband Internet

Thousands of Rural and Low-Income Tennesseans are Missing Out on the Benefits of Broadband

The internet drives the Tennessee economy by connecting people to jobs, education, health services and each other.

In today's digital world, broadband, or high-speed internet by fixed connection that meets the Federal Communication Commission's (FCC) minimum speed threshold of 25 Mbps for download and 3 Mbps upload, is as necessary as other public utilities, such as water and electricity. Yet thousands of Tennesseans do not have access to broadband internet, and many who live in areas where the service is provided cannot afford it.(i)

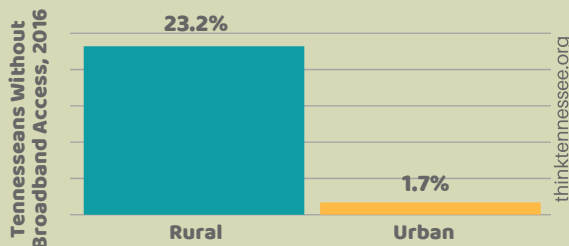
Too many Tennesseans lack broadband internet. One in four rural families live in areas without access to broadband. Even where broadband is available, a quarter of all households and nearly half (49.6%) of the poorest Tennesseans (<\$20,000 annual income) do not have a broadband subscription.(ii)

Together, we can close the digital divide in Tennessee. State leaders have an important role to play in connecting all Tennesseans to broadband. While there is no one-size-fits-all solution, this brief provides an overview of policies that have been shown to improve broadband access and affordability across a variety of communities, including hard-to-reach areas and those with small populations.

Broadband Access

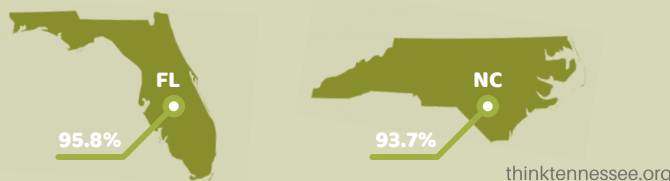
Tennessee ranks 24th in the percentage of households within areas serviced by broadband providers (91.1%).

But access is unequal. **Nearly a quarter of rural families are without access to broadband**, while only 1.7% of urban Tennesseans lack the service.(iii)



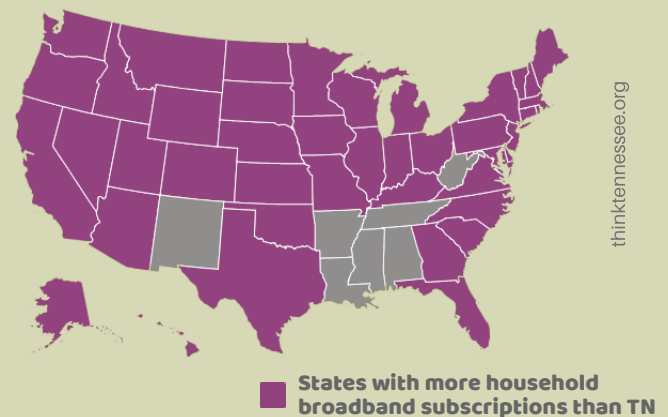
Over a quarter of a million Tennesseans (286,000) live in areas with no wired internet providers; 654,000 do not have access to high-speed broadband and 782,000 only have access to one broadband provider, severely limiting their cost options.(iv)

What peer states have greater access to broadband?



Broadband Subscription

Tennessee has a lower percentage of households with a paid internet subscription, such as cable, fiber optic or DSL, than most states (ranking 45th). Nearly one in four Tennesseans (23.3%) have not adopted some form of high-speed internet service in their home.(v)



Under half of Tennesseans (46.8%) have adopted fixed broadband at the FCC speed benchmark.(vi)

The cost of subscription is a key barrier for low-income Tennesseans, as 81% of those with incomes below \$30,000/year cite affordability as a main concern in adopting internet service.(vii)



FCC data may be underestimating the number of Tennesseans without broadband access as it uses information supplied by internet services providers at the census block level. Because census blocks can span residential blocks and counties, **even a census block labeled as having service may contain residents without broadband access.**(viii)



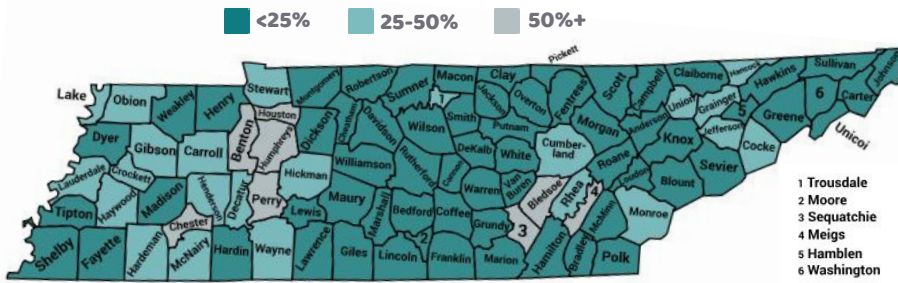
Lack of Broadband Access Keeps Nearly a Quarter of Rural Tennesseans Offline

Among the one-third of Tennesseans who live in rural communities, **nearly one in four (23.2%) live in areas where broadband internet service is not available.**(ix)



Rural areas are less likely to have the robust infrastructure metro areas have for broadband internet as **internet service providers (ISPs) prioritize broadband deployment to areas with higher population density and purchasing power, and therefore with higher profitability.** These market dynamics have created a rural-urban digital divide that leaves thousands of rural Tennesseans without access to the many benefits broadband internet offers.

County Population Without Broadband Access, 2016



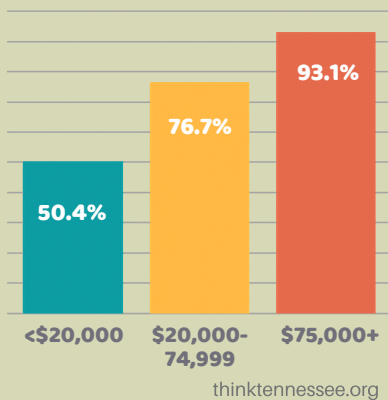
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In eight of the 71 Tennessee counties that are mostly rural, more than half of residents lack access to broadband. In another 24 rural counties, between 25% and 50% of families lack broadband access. **Strategies to deploy broadband to rural Tennessee must address the diversity of challenges presented by areas that vary in their population density, physical terrain and constituent needs.**(x)

Even Where Available, Broadband is Often Too Expensive for Low-Income Families in Tennessee

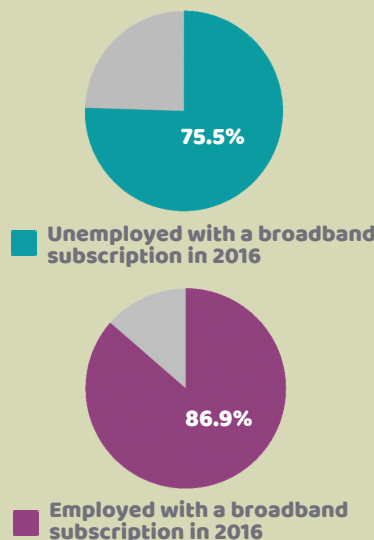
High broadband subscription prices are a key barrier for many Tennesseans with limited financial means and lower levels of education. 43% of Americans without broadband say they lack the service because it is too expensive. Digital literacy and access to computers are also key determinants of broadband service adoption. In Tennessee, this plays a key role in broadband adoption as the state ranks 41st in the number of households that do not have computers or smartphones (370,732 households).(xi)

Broadband Subscription by Annual Income Level in Tennessee, 2016

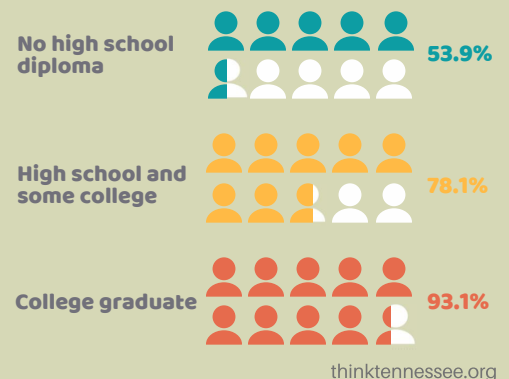


Only half of Tennessee's poorest families have adopted broadband, compared to three-quarters of families making \$20,000-\$74,999. Virtually all of those making more than \$75,000 subscribe to a broadband service.(xii)

Employment also plays a key role, as employed Tennesseans are more likely to have the means to have a broadband internet subscription than those who are unemployed.(xiii)



Broadband Subscription by Education Level in Tennessee, 2016



About half of Tennesseans without a high school diploma subscribe to a broadband service, while eight in ten who completed some college and nine in ten college graduates have a subscription.(xiv)

Broadband is the Key to Connecting Tennesseans to Economic, Educational and Health Opportunities



Broadband internet boosts local economic development through business attraction and job growth, and it helps families gain wealth and economic mobility by facilitating access to employment.

Large and Small Business Growth:

- ◇ **34% of businesses** in Tennessee cite broadband as a main driver in their decisions to locate to the state. They also attribute **43% of new jobs and 66% of revenues** to broadband availability.(xv)
- ◇ Between 2011 and 2015, the fiber infrastructure in Hamilton County generated significant economic and social benefits, accounting for **\$1.3 billion and 5,200 jobs**.(xvi)
- ◇ Among the **14.1% of Tennesseans** who run businesses exclusively from their home, **66.8% would not be in business** without the internet and **92.8% say broadband specifically is essential** for their business.(xvii)

Job Search and Employment:

- ◇ For every 1,000 new broadband users, **80 new jobs** are created.(xviii)
- ◇ In comparison to offline job searches, online searches **decrease the time of unemployment by 25%**.(xix)

Household Wealth:

- ◇ Gaining 4 Mbps can increase household income by **\$2,100 per year on average**.(xx)
- ◇ **20% of households in Tennessee report \$5,000 in additional income per year** from using the internet.(xxi)



Broadband internet facilitates access to education for Tennesseans of all ages and improves educational outcomes.

Access to High-Quality Education:

- ◇ Broadband-enabled technologies improve **teachers' instructional toolbox**, facilitate more engaging teaching activities and **enhances students' learning environments**.
- ◇ It also facilitates **professional development** and **distance learning** through online courses.(xxii)

Educational Outcomes:

- ◇ **70% of teachers assign homework that requires broadband internet access**. The digital divide leaves rural and low-income students without essential tools for keeping up with their schoolwork outside of the classroom, creating what is called the "homework gap." Access to broadband helps reduce this gap as students with home internet tend to have **higher reading, math and science achievement scores**.(xxiii)



Broadband internet is a fundamental resource for connecting rural communities to healthcare.

Access to Healthcare:

- ◇ Broadband can facilitate access to medical care and **improve patient outcomes in rural communities through telemedicine**, allowing patients access to medical professionals who are located far from rural communities and would be costly to see in person.(xxiv)

Reduction of Costs:

- ◇ Rural patients could save between **\$2,000 and \$110,000 in transportation costs** by not having to travel for care at a far-away hospital.
- ◇ Patients could also save between **\$3,000 and \$70,000 in missed work time**.
- ◇ Hospitals could cut expenses by allowing the outsourcing of specialized medical care. The annual cost for not having telemedicine, for example, can be up to **\$370,000 per rural hospital**.(xxv)

Broadband Can Help Tennessee Farmers Prosper and Empower a More Civically Engaged Electorate



Broadband internet increases agricultural productivity and helps farmers stay competitive.

Conducting Business Online:

- ◆ Farms across the country increasingly rely on the internet to conduct business. The percentage of farms relying on the internet increased from about **36% in 2009 to 47% in 2017**.
- ◆ Tennessee farmers use the internet less than farmers from all bordering states except Alabama. In 2017 in Tennessee, only **one in five farms used the internet to purchase agricultural supplies** and only **one in ten conducted marketing** activities on the internet.(xxvi)

Agricultural Productivity:

- ◆ Broadband connectivity is an essential tool for **precision systems** that enable farmers to increase their productivity by using sensors that collect data and help monitor livestock health, the sustainability of grazing lands, crop health and water use.
- ◆ **Farmers could save between \$13 and \$25 per acre** from precision agriculture in corn production, but only with a reliable high-speed internet connection that allows sensors to transmit the data farmers then download and analyze to improve their operations.(xxvii)



Broadband contributes to a more engaged and informed electorate in an age when the internet has become an essential component of American politics.

Access to News and Other People:

- ◆ A clear majority of Americans (**88%**) **think the internet is good for society**, and they attribute this positive evaluation to how the internet facilitates access to information and other people.(xxviii)
- ◆ **Three-quarters of Americans believe the internet makes them better informed** about national (74%) and international news (75%).(xxix)

Civic Engagement:

- ◆ In 2018, **53% of Americans report being civically active on social media**, and 69% say social media plays an important role in getting politicians to pay attention to issues they care about.(xxx)
- ◆ **34% of Americans use the internet to contact government officials**, sign petitions and engage in political debate.(xxxi)
- ◆ People with access to the internet are **more likely to vote, participate in election campaigns, engage with local government** officials and work with political organizations.(xxxii)

How is Tennessee Addressing Barriers to Broadband Access and Adoption?



The 2017 Tennessee Broadband Accessibility Act established mechanisms to increase broadband access for the state's most economically disadvantaged counties through grants and tax credits for internet service providers, deregulation to allow electric cooperatives to offer residential internet and digital education programs through local libraries.(xxxiii)

- **Investment** – The Broadband Accessibility Grant Program provides **\$30 million over three years** to assist service providers in the deployment of broadband infrastructure in under-served areas. In 2018, the grant program, implemented by the Tennessee Department of Economic and Community Development, awarded nearly **\$10.8 million across nine grants to bring broadband to 5,200 new locations** after receiving 71 applications that requested more than \$66 million. The General Assembly approved an additional \$5 million for the grant program for 2019.

- **Deregulation** – Eight of the 23 electric cooperatives that service 70% of the state are now either providing internet or building infrastructure to do so.
- **Education** – In partnership with the Tennessee State Library and Archives, the TNECD and the Secretary of State’s Office will provide 52 grants totaling nearly \$109,000 to assist libraries with digital literacy programs, purchasing computers and implementing youth science and technology education.



The Tennessee State Library and Archives (TSLA) has set guidelines that require libraries serving at least 5,000 patrons to offer meeting spaces and computers to community organizations for digital literacy training. Currently, 75% of libraries meet these guidelines. TSLA awards grants of up to \$20,000 to libraries that can match 50% to purchase hardware, software and internet connection equipment. 18 libraries throughout the state also lend internet hotspot devices to patrons without access to broadband.(xxxiv)

Lessons from Other States: Community-Owned Networks, Balanced PPPs and Dig Once Policies



Community-Owned Broadband Networks:

Networks built and owned by local governments that use fiber-optic cables to provide phone, television and internet services. Networks can be fully public or based on some type of public-private partnership. Though municipalities and ISPs face financial risks in generating sufficient revenue to sustain these types of networks, **over 150 communities across the country have successfully developed their own internet networks** helping boost local economic development by increasing internet speeds, providing more affordable subscriptions, saving taxpayer money, keeping and creating jobs and attracting new business.(xxxv)

- **Chattanooga’s** municipal network increased its lowest speed from 15 Mbps in 2009 to 100 Mbps in 2017, while maintaining its monthly subscription rate at \$57.99. This is considered one of the fastest residential internet services in America.
- **Martin County, Florida** decided to build its own fiber network after Comcast proposed increasing prices by over 800% in five years. The new publicly-owned network will save the county \$30 million over 20 years.
- **Virginia Beach** saves \$500,00 in taxpayer dollars each year through its municipal network.
- **Springfield, Missouri and Martinsville, Virginia** created over 400 jobs each thanks to their new municipal fiber networks.

Tennessee's municipal electric systems are authorized to provide broadband, and several do so: **Jackson, Chattanooga, Clarksville, Erwin, Newport, Morristown, Bristol, Pulaski, Columbia and Fayetteville.** Still, **Tennessee has enacted some of the nation's most difficult legal roadblocks for municipal broadband** development in cities that do not own electric utilities. These cities are not allowed to issue bonds backed by ratepayers or taxpayers to fund their own fiber networks. Even municipalities that do own electric systems are limited by current law, as they are not allowed to expand beyond their service territories to increase broadband access to adjacent areas.(xxxvi)



Balanced Public-Private Partnerships (PPPs)

Partnerships between local governments and a private entity to build and operate a high-speed internet network. Unlike private-led investment, public-led contracting and open access networks, balanced public-private partnership (PPPs) are based on equally sharing costs and financial risks, as well as build-out responsibilities, and revenue benefits. Balanced PPPs are said to provide more equitable access to high-speed internet in low-population-density and hard-to-reach areas.

The partnership between **Westminster, Maryland and the ISP Ting Fiber** is an early model whose results are promising pending the completion of the fiber network in early 2019. The city and Ting share the cost of paying back the bonds used to build the network, but Westminster will carry out the build-out and own the network, while Ting will lease the network and be responsible for the equipment needed to provide internet service. Ting was granted exclusive service-provision rights for an initial period but will later manage the network as open access to other providers.(xxxvii)



Dig Once Policies

The installation of conduit and fiber optic cables in conjunction with public right-of-way construction for the installation or repair of utility equipment and/or roadwork. The Dig Once approach reduces the cost of broadband deployment and minimizes the disruption of public rights of way. Moreover, underground fiber provides more reliable broadband services as it is less likely than pole-attached fiber to be damaged by weather conditions, falling trees and pole deterioration.

Installing underground conduit and fiber is the greatest cost barrier of broadband deployment. Excavating for the installation of fiber is 10 times more expensive than implementing Dig Once approaches to installing fiber in conjunction with other roadwork. The average cost of installing underground fiber is \$27,000 per mile, a cost that could be reduced in urban areas by 25-33% and in rural areas by 16% through Dig Once policies. These cost reductions promote competition in broadband service provision and increase customer choice.

Adopted successfully in Arizona, Minnesota, Utah and West Virginia, Dig Once policies vary. They might (1) include government-mandated installation and ownership of fiber networks to be bought or leased by ISPs; (2) coordination between government and private entities when roadwork occurs or (3) voluntary or mandatory joint-trenching efforts among entities interested in excavating.(xxxviii)

How Might Tennessee Further Increase Broadband Access and Adoption?

There is no one-size-fits-all solution to solving our state’s diverse broadband access and affordability challenges, particularly in rural areas that vary in their population density, physical terrain and constituent needs. Hence, **state leaders have an important role to play in convening and enabling communities** to create their own pathways to deploy reliable and affordable broadband infrastructure. Below are some policy options for state policymakers to consider.



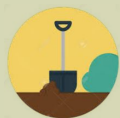
Encourage and assist local government with broadband-adoption programs through digital literacy, service discounts and device subsidies.

- Metro areas are leading the way through the implementation of the Tech Goes Home program (Chattanooga), the Anytime Access for All (Nashville) and Connect Home Initiative (Nashville and Memphis). In Chattanooga, broadband adoption among participants increased from 64% to 91% after completing the Tech Goes Home program, which cost the city about \$330 per participant over two years.



Prioritize the funding of broadband infrastructure that can be shared among multiple service providers , instead of limiting funding to one private provider per community.

- Funding infrastructure to be used by multiple ISPs reduces the cost of service provision by build-out time and costs, all of which benefits consumers directly. This could be done through competitive grants to fund core fiber networks and towers.(xxxix)



Incentivize broadband infrastructure deployment and service provision competition through a Dig Once policy, a proven cost- and time-efficient approach for the deployment of fiber infrastructure.



Remove restrictions on municipal electrics and electric cooperatives to provide broadband internet inside and outside their services areas, either independently or through public-private partnerships.

- Rural Tennessee is more likely to be serviced by municipal electrics or cooperatives, which do not benefit from tax incentives to deploy broadband as large ISPs do. Hence, these local, non-commercial entities could be best suited to address the broadband needs of rural Tennessee.

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