



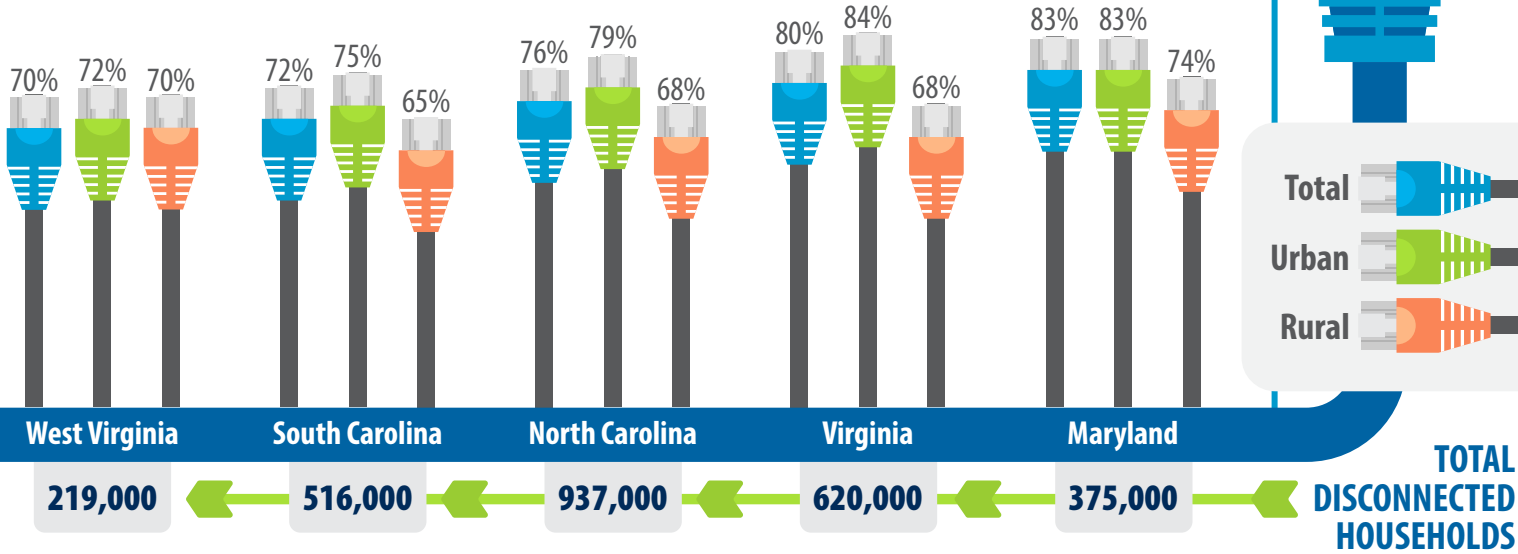
CONNECTING RURAL HOUSEHOLDS TO BROADBAND: BARRIERS AND MODELS FOR PUBLIC INTERVENTION



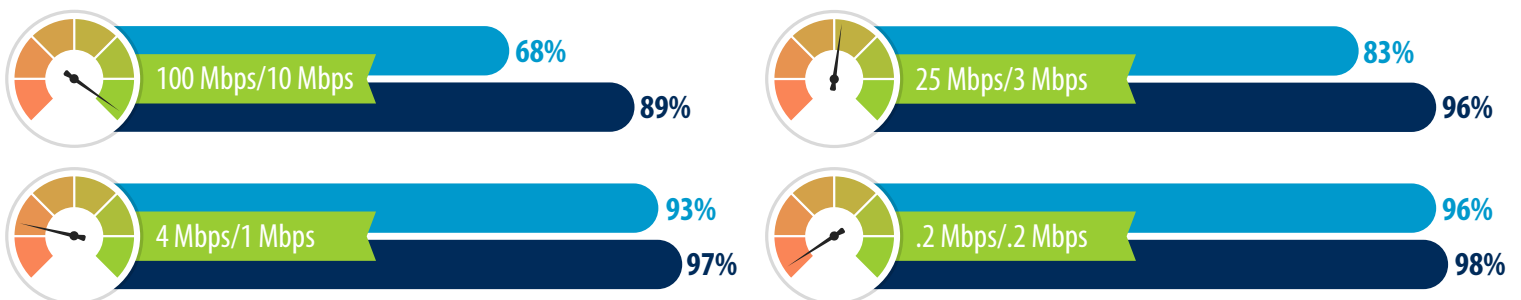
THE PROBLEM

A smaller share of rural households in the 5th District are connected to the internet, compared with urban areas.

HOUSEHOLDS WITH BROADBAND SUBSCRIPTION BY COUNTY TYPE¹, 2017



HOUSEHOLDS IN 5TH DISTRICT WITH ACCESS TO NON-SATELLITE BROADBAND PROVIDER BY SPEED² & COUNTY TYPE, JUNE 2017



Uptake is slower partly because many rural areas do not have access to providers of high-speed internet.



MAIN BARRIER TO BROADBAND: **COST**

The main impediment to greater access to faster broadband options in rural areas is cost. It is more expensive for companies to extend broadband infrastructure to less-populous areas. **Consider the following hypothetical communities:**



LOW-DENSITY DEPLOYMENT (2 HOMES/SQUARE MILE)

Component	# of Units	Total cost
Network Terminator	6 ct.	\$1,200
Drop Fiber	900 ft.	\$1,350
Static Costs ³		\$101,940
Total		\$104,490
Cost per Residence		\$17,415

— Fiber (Cable and Drop) ● Splitter (FDH) ● Fiber Service Terminal (FST)

MEDIUM-DENSITY DEPLOYMENT (8 HOMES/SQUARE MILE)

Component	# of Units	Total cost
Network Terminator	24 ct.	\$4,800
Drop Fiber	2,400 ft.	\$3,600
Static Costs ³		\$101,940
Total		\$110,340
Cost per Residence		\$4,597.⁵⁰



Nearly 1/4 the cost of low-density areas



POSSIBLE SOLUTIONS FOR BROADBAND ACCESS EXPANSION IN RURAL COMMUNITIES

Options for broadband expansion in rural communities differ by cost and effectiveness.⁴

Technology	Definition	Cost to Connect (Rural)	Max Download Speed	Potential Limitations
Wireless — 6MHz TV White spaces	Internet using parts of broadcast TV spectrum	\$10B–\$15B	33 Mbps	Shares TV airwaves, possibly limiting speed and requiring FCC rule compliance
Wireless — 700 MHz Fixed	Internet using a stationary radio link	\$15B–\$25B	1,000 Mbps	Shares airwaves with other technologies, possibly limiting speed
Wireless — 2,500 MHz 4G LTE	Internet using a high-frequency radio link	\$25B–\$40B	100 Mbps	Only cost-effective in areas with over 200 people/sq. mile
Satellite	Internet using satellite signals	\$30B–\$45B	100 Mbps	Data usage limitations, higher latency and higher consumer costs
Fiber-to-home	Internet using fiber optic technology	\$45B–\$65B	1,000 Mbps	Higher upfront construction costs and delays

POTENTIAL PARTNERS

There are numerous different potential players in broadband development projects:



FUNDERS

Institutional Investors
Venture Capitalists
Angel Investors
Governments
Opportunity Zone Funds
Financial Institutions⁵
Philanthropy



DEVELOPERS & OPERATORS

Local Governments
Internet Service Providers
Nonprofit Consortia
Cooperatives



STAKEHOLDERS

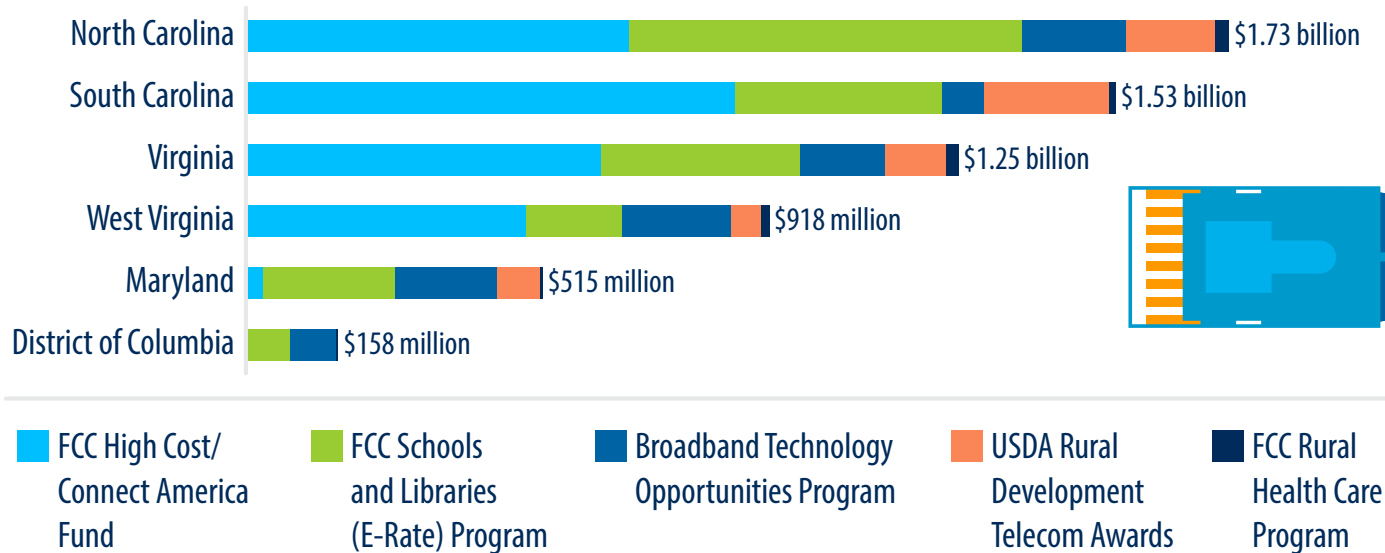
Residents
Educational Institutions
Health Care Providers
Businesses
Nonprofits
Government Agencies



BROADBAND FUNDING

The federal government is the largest single funder of broadband infrastructure projects in the 5th District, supporting **\$6.09 billion** in investments between 2009 and 2016.

FEDERAL SUPPORT⁶ FOR BROADBAND INFRASTRUCTURE EXPANSION, FY09–16



MODELS FOR PUBLIC BROADBAND EXPANSION

5th District Example

Local governments in particular can assume different roles in broadband projects:

	Location	Technology
PUBLIC POLICY: Changing regulations and plans to encourage private broadband development	Jackson County, NC	N/A
INFRASTRUCTURE ONLY: Providing conduit and dark fiber services to local organizations and ISPs	Holly Springs, NC	Fiber
PUBLIC-PRIVATE PARTNERSHIP (P3): Partnering with one or more private organizations to plan, fund, build and maintain a network	Westminster, MD	Fiber
PUBLIC SERVICES PROVIDER: Connecting public organizations with fiber or wireless technology	Virginia Beach, VA	Fiber
OPEN ACCESS: Opening publicly owned fiber optic networks to private service providers	Danville, VA	Fiber
RETAIL PROVIDER (BUSINESS ONLY): Offering internet services to business and industrial districts	Allegany County, MD	Fixed Wireless
RETAIL PROVIDER (RESIDENT & BUSINESS): Offering internet services to all residents	Wilson, NC	Fiber



For more information, visit:

https://www.richmondfed.org/community_development

ENDNOTES

¹ For this infographic, urban areas are defined as counties in metro areas with 1 million or more residents (USDA Rural Urban Continuum Code (RUCC) 1) or any county in a metro area with 250,000 to 1 million residents (RUCC 2). Rural/smaller towns are those in RUCC categories 3–9. For more information about the USDA RUCC, please see <https://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx>.

² 25 Mbps download/3 Mbps upload is the FCC-defined benchmark broadband speed.

³ Static Costs include fiber service terminal, trenching, splitter cabinet and splitter cord.

⁴ DSL technology not included because its average download speeds are below the FCC benchmark threshold of 25 Mbps/3 Mbps.

⁵ Bank investment in broadband infrastructure for low- and moderate-income communities may qualify for Community Reinvestment Act (CRA) credit.

⁶ The High Cost, Schools and Libraries and Rural Health Care Programs are part of the FCC's Universal Service Fund.

GENERAL SOURCES

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