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Internet of Things, Home Networking, Smart Cities, and Emerging Services

Cable and Rural Broadband How Cable Plays a Critical Role in Closing the Digital Divide

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**VIRTUAL EXPERIENCE
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KEY POINTS

1. Broadband is a problem in rural areas
2. Cable has traditionally avoided serving rural areas due to technical or financial criteria that were valid in the past. Based on business requirements and goals at the time
3. Cable has a history that is rooted in meeting challenges like rural broadband
4. Times have changed and the conditions today allow Cable to overcome the challenges

Varying standards and definitions

- *FCC definition*
 - Internet access at 25Mbps download and 3Mbps upload
 - <https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2015-broadband-progress-report>
- Wide bandwidth data transmission which transports multiple signals and traffic types
(Wikipedia)
- Commonly refers to high-speed Internet access that is always on and faster than the traditional dial-up access
(<https://www.fcc.gov/general/types-broadband-connections>)

Year Published	Source	Download Speed	Upload Speed
2021	US Treasury Department (minimum build-to, proposed)	100 Mbps	20 Mbps
2021	US Treasury Department (Eligibility)	<25 Mbps	<3 Mbps
2018	USDA ReConnect (Build-To)	25 Mbps	3 Mbps
2018	USDA ReConnect (Eligibility)	<10 Mbps	<1 Mbps
2015	FCC	25 Mbps	3 Mbps
2010	FCC	4 Mbps	1 Mbps
1996	US Telecommunications Act	200 Kbps	200 Kbps

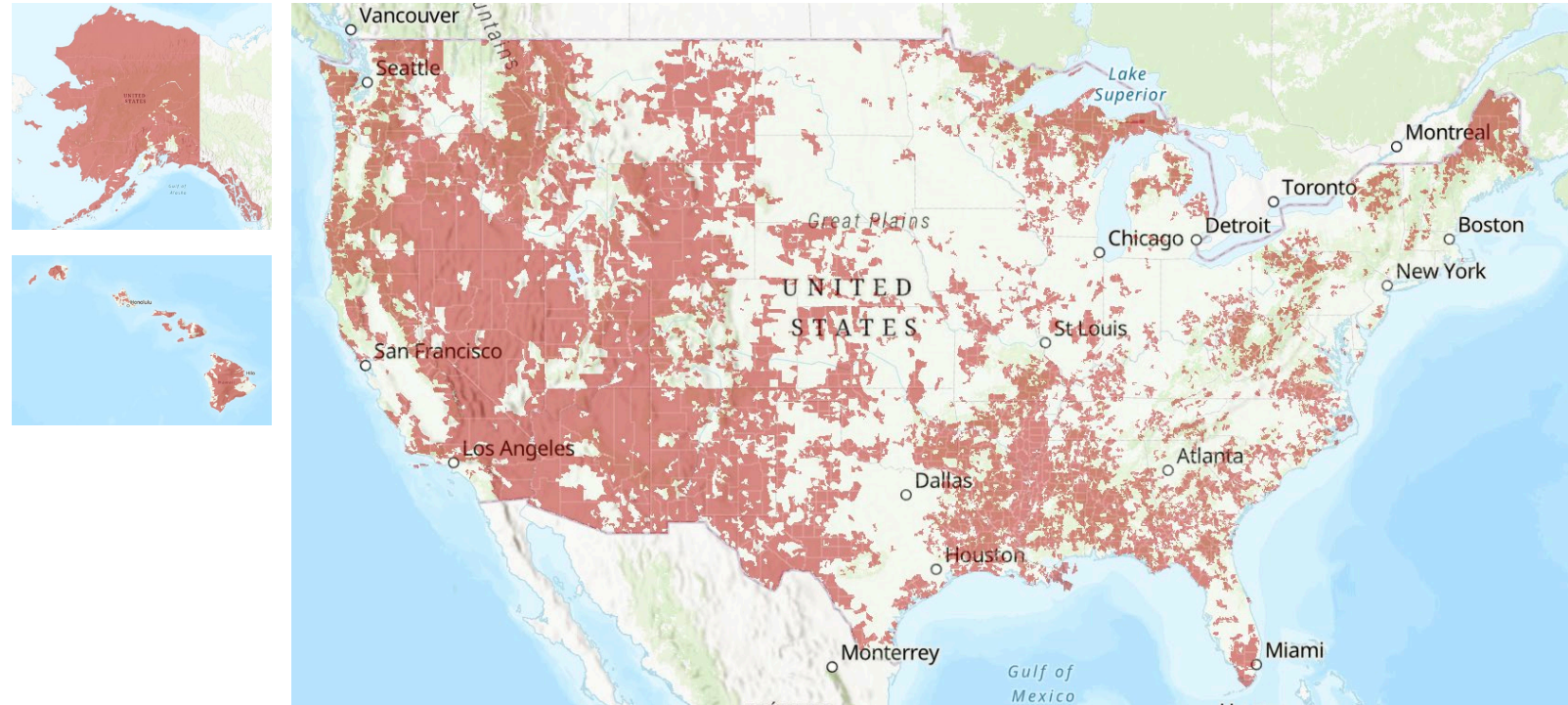
Areas where no provider reports service at 25/3Mbps

14 million to 160 million American households do not have access to broadband Internet.

**Based on the method used for estimation

Two major causes:

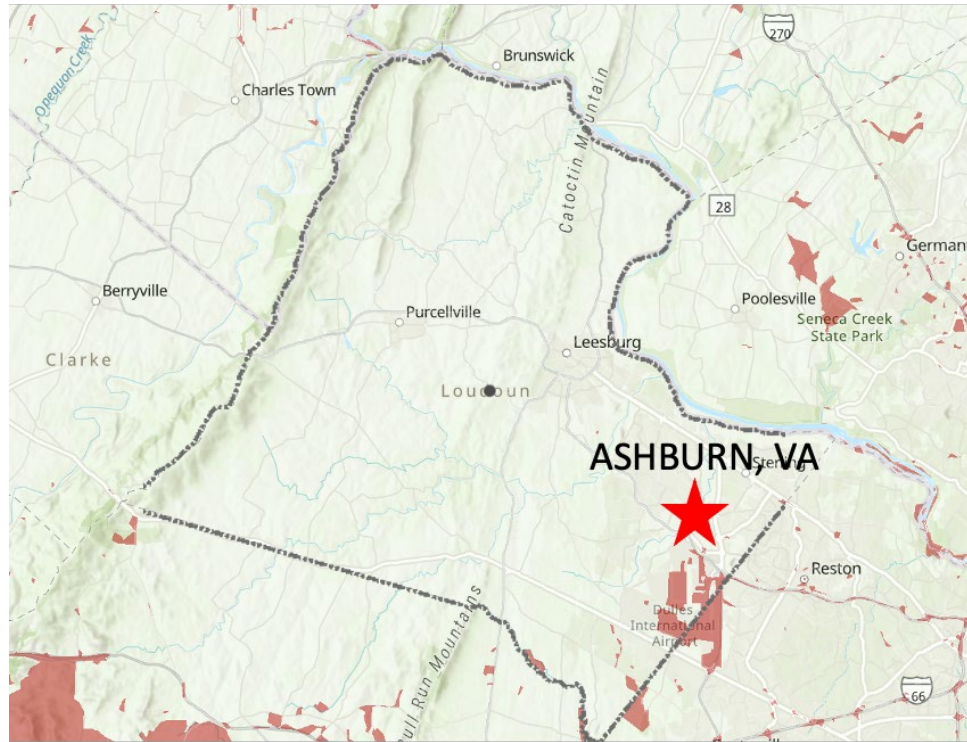
- No "physical" access
- Not affordable



Map Courtesy of: NTIA Indicators of Broadband Need

<https://broadbandusa.maps.arcgis.com/apps/webappviewer/index.html?id=ba2dcd585f5e43cba41b7c1ebf2a43d0>

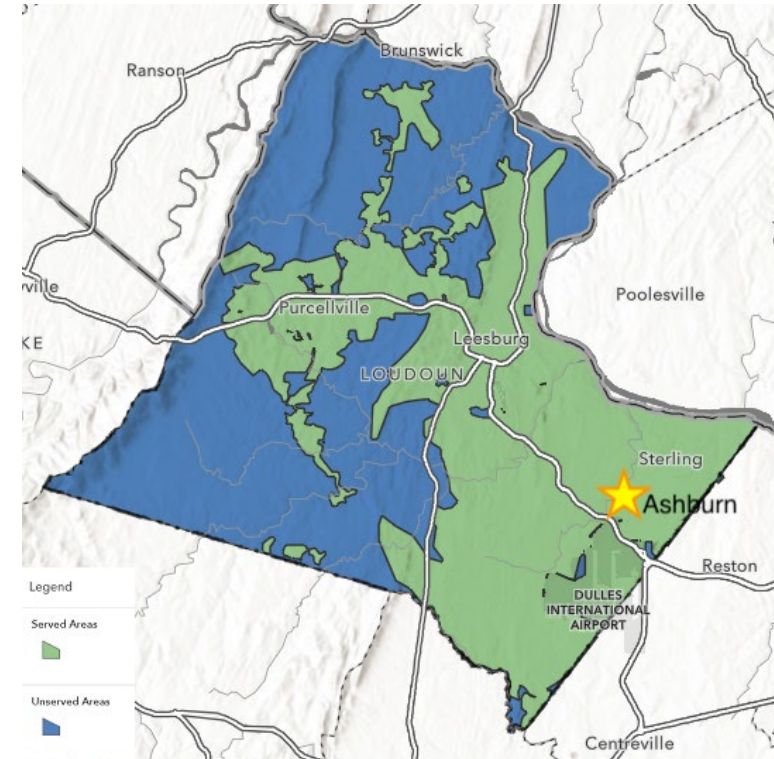
FCC Form 477



Shows complete coverage with 25/3Mbps or better

Maps Courtesy of: NTIA Indicators of Broadband Need

Actual Coverage



~ 8800 households without broadband

Map Courtesy of: Loudoun Broadband Alliance
<https://loudounbroadbandalliance.org>

Employment, Economics

- 80% of Americans use the Internet to search for and apply for employment [1]
- 14M to 160M do not have access to broadband
- 90% of those live in rural areas [2]
- Rural areas are already disadvantaged (low income), so lack of broadband has a compounding effect

1. <https://www.pewresearch.org/internet/2015/11/19/searching-for-work-in-the-digital-era/>
2. <https://www.census.gov/data/tables/2021/demo/hhp/hhp32.html>

Education, Health

- ½ letter grade – advantage for students with access to broadband Internet at home [1]
- 2.5 million – American households with school-age children but no broadband at home [2]
- “Broadband internet connectivity not only provides a means for social connection, but internet-based cognitive behavioral therapies help overcome limitations in brick-and-mortar mental health services in rural areas” [3].[4]
- “Given broadband’s growing role as a super-determinant of health, digitally isolated communities may risk worse health outcomes resulting from the effects of limited broadband access on educational and economic opportunities as well as access to high-quality health services.” [5]

1. https://quello.msu.edu/wp-content/uploads/2020/03/Broadband_Gap_Quello_Report_MSU.pdf.
2. <https://www.census.gov/data/tables/2021/demo/hhp/hhp32.html>
3. <https://www.rural.palegislature.us/documents/reports/Suicide-Trends-Prevention-2021.pdf>
4. Kumar, Vikram, Yasar Sattar, Anan Bseiso, Sara Khan, and Ian H. Rutkofsky. 2017. "The Effectiveness of Internet-Based Cognitive Behavioral Therapy in Treatment of Psychiatric Disorders." *Cureus* 9 (8):e1626-e1626. doi: 10.7759/cureus.1626.
5. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6661896/>

Why haven't operators built rural already?

- Technical and Logistical Reasons
 - Long distances and remote areas are difficult to maintain
 - Remote locations require remote equipment
- Financial Reasons
 - Solving the technical and logistical issues is expensive
 - Low revenue relative to level of investment required
 - Internal Rate of Return criteria can't be met



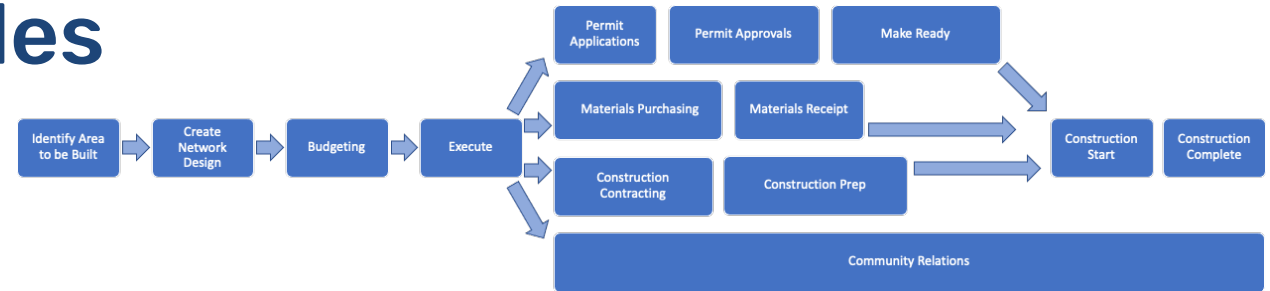
Utilities, Rights of Way, Easements, Safety

- The processes can be unique for each jurisdiction and agency
- Relationships: streamline the processes and paperwork
- Symbiotic opportunities: Partner with other utilities to make coordinated permitting requests and to share the cost of construction



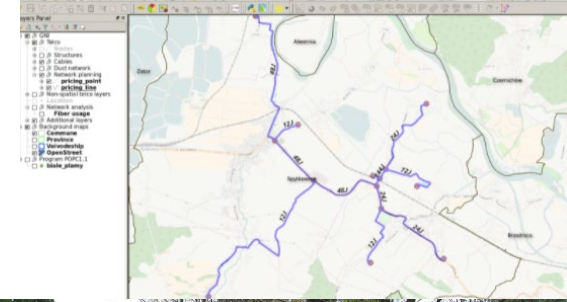
Short vs. Long Planning Cycles

One year planning cycles no longer work



- Cost sharing and minimized disruption
 - Be aware of infrastructure projects being planned
 - Typically, 2-5 year cycle for roads, water, sewer, etc.
- Skilled labor is in growing demand
 - Contract for long term retainers
- Materials are in high demand
 - Wait times can be 12 months or longer after order issuance

- Planning and Design previously required manual analysis from many sources
 - Data aggregators bring many sources together
 - Advanced software enables desktop-based mapping, inventory and project estimation (reduced field surveys)
 - Partner with localities to collect accurate data and mapping
- Modern Construction tools reduce manual labor and improve safety
 - Vacuum excavation
 - Directional boring with location systems and strike-avoidance/alerting



- Modern access architectures reduce space and cost and provide continuity for traditional services
 - DAA
 - RMAC-PHY/RPHY
 - R-OLT
 - IP-based video



Growth Opportunity

Cable has 4 paths for growth:

1. Better penetration, pull from competitors
2. Introduce new products
3. New home construction within existing footprint
4. Expanding footprint into underserved markets

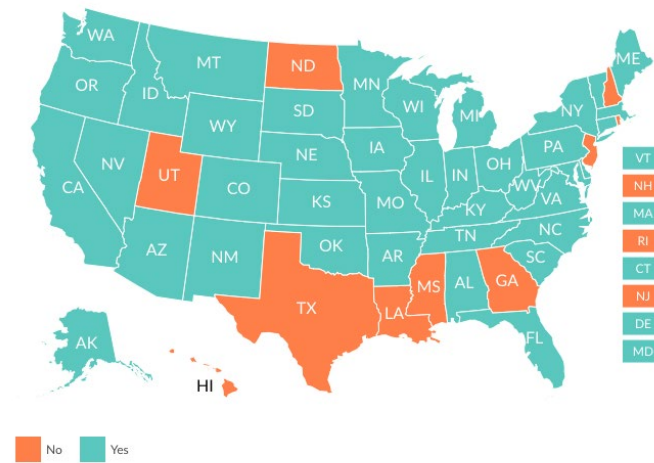
State, Federal and Private Funding

New money is available in the market for broadband expansion

- 38/50 states have broadband expansion funds
- \$20.4B – Rural Development Opportunity Fund (2020)
- \$100M – CARES act (2020)
- > \$20B – American Rescue Plan Act

- Many private investors are in the game

A 50-state overview of efforts to expand high-speed, reliable internet access



Show Data Table ▾

Source: Pew analysis of state data. This data is current as of May 31, 2021.

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Cable is Well Positioned, and Hurdles are Down

- Broadband is finally being recognized as a fundamental necessity of modern life, benefitting people through Education, Employment, Healthcare, Social Connections, and more
- Cable has a long history of building broadband networks
- Cable has the expertise to build rural broadband
- Cable has the relationships to streamline rural network builds
- Cable has the tools and personnel to build rural networks
- Cable has the motivation to expand footprint into rural areas
- Advances in tools and technology have helped reduce the cost
- Availability of public and private funding is lowering the required investment
- Cable is well positioned to close the Broadband Gap in rural America



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Thank You!

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