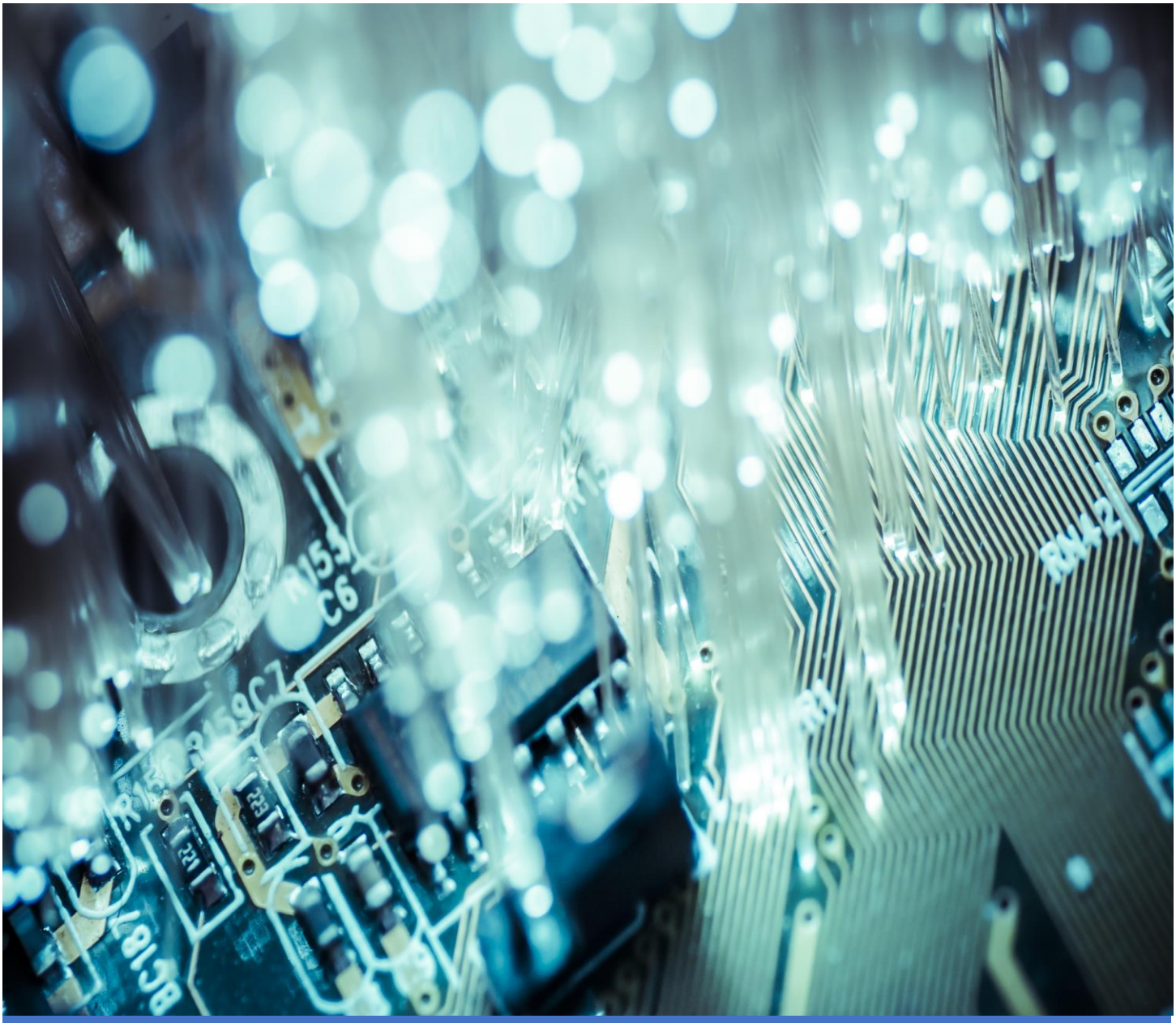

Blueprint for Broadband

Expanding Broadband into Rural Virginia

Virginia Association of Counties 5/21/18

Virginia Association of Counties

Connecting County Governments since 1934

May 21, 2018

The Honorable Ralph S. Northam
Governor
Commonwealth of Virginia
Patrick Henry Building
Richmond, Virginia 23219

Dear Governor Northam:

Thank you for your commitment to making the Commonwealth work better for everyone. Your support for universal access to broadband highlights one of various policy solutions where it's clear that every Virginian matters.

According to the 2018 Broadband Deployment Report, 28.9 percent of rural Virginians lack access to fixed wireless at the federal threshold for high-speed Internet service. To ensure all Virginia communities are competitive in the 21st century economy, connectivity is both a vital tool for economic development and necessary services ranging from education and healthcare to emergency services.

The Virginia Association of Counties (VACo), in consultation with the VACo Board of Directors and the Virginia Rural Broadband Coalition, discussed pathways to address universal access to broadband that preserve local authority and increase connectivity. Striking this balance among local governments, cooperatives, authorities, state-level stakeholders, and telecommunications providers is imperative for a way forward.

Through this collaboration, VACo presents a common sense, community-based, and cost-effective approach to deploying broadband into every corner of the Commonwealth. In addition to this *Blueprint for Broadband*, VACo submitted a resolution to the National Association of Counties that urges Congress to strengthen long-term federal funding, simplify the funding application process, and make funding more accessible for rural broadband initiatives.

Closing the digital divide is an important economic development initiative of VACo, and the Association looks forward to partnering with you on this issue.

Sincerely,

Dean A. Lynch
Executive Director

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Table of Contents

Blueprint to Expand Broadband into Rural Virginia

Executive Summary:

This blueprint provides the Commonwealth with an approach to rural broadband deployment. The blueprint provides historical context at the state and federal level for universal access to broadband, defining what access means by speed and service, and expanding broadband to hard-to-serve areas. In response to pending state legislation that preempts local authority in the negotiation process between providers and municipalities, the time is now to provide a blueprint to provide universal broadband to all areas of the Commonwealth.

To do this, the blueprint outlines six recommendations supported by evidence and potential resource avenues for implementation. For the purpose of the summary, the three priority recommendations are the following:

> ***The first recommendation is to ensure universal access to broadband.*** *In the 21st century, broadband is as necessary as electricity and water.*
>
> ***The second recommendation is to set the minimum state standard for service as access to high-speed Internet at reasonable costs with no data caps.*** *In this blueprint, high-speed Internet means 25 megabits per second (Mbps) for downloads and 3 Mbps for uploads with a goal of reaching 1 gigabits per second (Gbps) for downloads and 1 Gbps for uploads.*
>
> ***The final recommendation is to provide additional state support for partnerships.*** *This recommendation emphasizes state support of public-private partnerships (P3s) deploying broadband across the Commonwealth. Fully funding the $14 million Virginia Department of Housing and Community Development (DHCD) budget request for the Virginia Telecommunications Initiative (VATI), and the creation of a revolving loan fund, administered by VATI, will provide critical funding for localities lacking initial investment capital*.

Universal access to high-speed Internet levels the playing field by bringing communities across the Commonwealth into the 21st century.

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Overview:

The impact broadband networks have had in communities since the development of electricity has generated discussion around viewing broadband as critical infrastructure for economic development. Access to broadband, for all communities, strengthens quality of life from education opportunities and business capacity to healthcare provision, emergency services, and much more.

Specify that Broadband is Critical Infrastructure
Ensuring universal access to broadband provides flexibility for funding an increased amount of broadband deployment projects with more diverse partners.

Service Areas and State Definitions
Data for the state map determining access to broadband comes from the Federal Communication Commission (FCC), who receives data from broadband providers on a biannual basis. Unfortunately, the FCC data underlying the map overstates service provided due to federal reporting requirements for unserved and underserved areas. Collecting accurate data on unserved and underserved areas across the Commonwealth continues to lack meaningful and accurate forward movement without setting a state definition for unserved and underserved areas.

Site-Ready Infrastructure
Electricity, transportation, radio, and water infrastructure streamline construction and costs, serving as fiscally responsible pathways for broadband infrastructure.

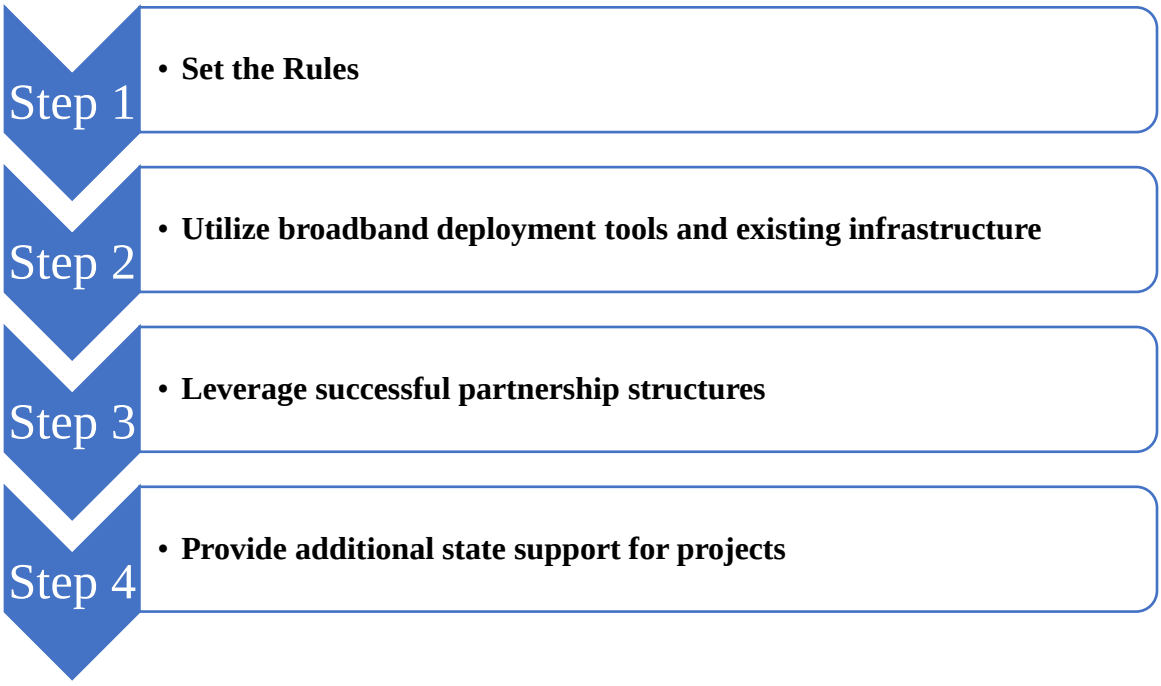
Successful Project Structures
Looking at successful rural broadband projects will help develop practical solutions for universal broadband in Rural Virginia.

State Support
State funding is essential for successful partnerships. Eligible projects must serve rural Virginia, and have the capacity to scale up services beyond current minimum high-speed internet standards.

Step-By-Step:

Attracting capital investment to Rural Virginia is difficult when businesses of the 21st century require high speed Internet to conduct daily operations. Based on state efforts to collect service information and address broadband access, broadband project statuses, and existing policies, procedures, and resources, this blueprint aims to bring the "last mile" of broadband to those who need it most. The blueprint uses a community-based approach to universal broadband.

Figure 1: Blueprint for Broadband



Recommendation 1: Ensure universal access to broadband.

Recommendation 2: Set the minimum state standard for service to high-speed Internet at reasonable costs with no data caps. High-speed means 25 Mbps for downloads and 3 Mbps for uploads with a goal of reaching 1 Gbps for downloads and 1 Gbps for uploads.

Recommendation 3: Define unserved and underserved areas by more rigorous standards.

Recommendation 4: Determine usable infrastructure for deploying broadband.

Recommendation 5: Evaluate successful broadband P3 structures across the Commonwealth.

Recommendation 6: Provide additional state support for broadband P3s.

The first recommendation is an informal policy, and does not require adopting legislation. The second and third recommendations require updating the Broadband Availability mapping data thresholds and DHCD project criteria, with the option of defining such terms in the Code of Virginia. The fourth recommendation is administrative, and offers information to consider when initiating such projects. The fifth recommendation endorses a P3 structure. And, the final recommendation requires additional state support for such partnerships.

The Current Argument

As an essential service, bringing broadband to rural communities mirrors how electricity gained entrance into rural America. Backed by Rural Electrification Administration loans, cooperatives built the distribution network for the electricity to be purchased from utilities to resell to

members.[1] Within a five-year period, 50 percent of rural America had access to electricity by 1942, and 10 years later virtually all were on the grid.[2]

Context for Universal Access to Broadband

Under Universal Service, the principle that all Americans should have access to communications services, high-speed Internet is essential communications technology.[3] The key law underlining this principle is the Communications Act of 1934 which helped expand telephone service.[4]

In 1996, the Telecommunications Act expanded universal service to include increased access and speeds of such services, provided at reasonable rates.[5] Additional principles expanded high-speed Internet into schools, libraries, and rural health care facilities.[6] In 2009, Congress directed the FCC to develop the National Broadband Plan that ensures every American has equal access to broadband capability.[7]

In 2014, the FCC adopted a $100 million budget for rural broadband experiments and put in place procedures to review applications.[8]

Complying with Section 706 of the Telecommunications Act, the FCC issues a Broadband Progress Report. Most notably, in the 2015 report, the FCC updated the minimum broadband speed requirements to 25 Mbps for downloads/3 Mbps for uploads.[9] The report found that 17 percent of the population, with over half of all rural Americans, lacked access to such advanced broadband services.[10] Through a Notice of Inquiry, the FCC took public comments on developing a strategy to deploy services faster.[11] FCC rules resulting from the report classified broadband as a utility and put in place net neutrality consumer protections which were affirmed by a federal appeals court in the District of Columbia Circuit a year later.[12]

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[1] The News & Advance, Rural Co-ops and a Path to Broadband Access (January 28, 2018), available at www.newsadvance.com/opinion/editorials/rural-co-ops-and-a-path-to-broadband-access/article_93d54fa4-02e3-11e8-82a5-93b3a69ab903.html.
[2] Ibid.
[3] FCC, Universal Service (March 20, 2018), available at https://www.fcc.gov/general/universal-service.
[4] Ibid.
[5] Ibid.
[6] Ibid.
[7] FCC, National Broadband Plan Executive Summary (March 17, 2010), available at https://www.fcc.gov/general/national-broadband-plan.
[8] FCC, Rural Broadband Experiments (April 25, 2014), available at https://www.fcc.gov/general/rural-broadband-experiments.
[9] FCC, 2015 Broadband Progress Report (February 4, 2015), available at https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2015-broadband-progress-report.
[10] Ibid.
[11] Ibid.
[12] New York Times, Court Back Rules Treating Internet as Utility, Not Luxury (June 14, 2016), available at https://www.nytimes.com/2016/06/15/technology/net-neutrality-fcc-appeals-court-ruling.html.

The 2018 Broadband Deployment Report retained the minimum speed definitions set in 2015, and indicated that the net neutrality rules slowed deployment of advanced telecommunications. [13] This precipitated the vote to repeal net neutrality this year.

High-speed Internet should be accessible and affordable. Local governments, public bodies, and nonprofits entering the telecommunications market stimulates competition, driving down costs and increasing access, providing more choices for customers at better, more affordable prices.

Recommendation 1: Ensure universal access to broadband.

Terminology

For the purpose of this blueprint, broadband is defined as the general term used to describe high-speed Internet access, and includes the 25 Mbps download/3 Mbps upload bandwidth requirement. Broadband utilizes different types of transmission technology including: digital subscriber line (DSL), cable modem, fiber, wireless, satellite, and broadband over powerlines (BPL).[14]

Types of broadband covered in this report

Cable provides broadband through the same coaxial cables that deliver pictures and sounds to a resident's television.[15]

Fiber technology converts electrical signal carrying data to light and sends the light through glass fibers. The fiber can run from a home to a business, to the curb, or a location between the provider and the customer.[16]

Wireless is a type of broadband that "connects a home or business to the internet" with a radio link between the location and the provider.[17] This means the connection to the Internet does not require a cable, but requires an external antenna for longer ranges.

Broadband over Powerlines (BPL) goes over existing low- and medium- voltage electric power distribution network.[18]

Served or Unserved: State and Federal Definitions

One of the tools the Commonwealth uses to determine broadband access is RUOnlineVA. The campaign, established by Governor McAuliffe, uses crowdsource data on broadband demand from citizens. The Center for Innovative Technology (CIT), in partnership with Virginia Tech's Center for Geospatial Information Technology (CGIT) and the Virginia Geographic Information

[13] FCC, National Broadband Plan (February 2, 2018), available at https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2018-broadband-deployment-report.
[14] FCC, Types of Broadband Connections (June 23, 2014), available at https://www.fcc.gov/general/types-broadband-connections.
[15] Ibid.
[16] Ibid.
[17] Ibid.
[18] Ibid.

Network (VGIN), updated the Virginia Broadband Availability Map in 2016. With over 15,000 responses from residents and businesses by August 2016, data indicated that almost one quarter of respondents, which could equate to almost 782,745 homes, had no options for fixed Internet access.

As previously stated, the data used for the map relies on federal reporting requirements for underserved and unserved areas. Under 42 CFR 54.312, Phase I of the Connect American Funding for Price Cap Territories, unserved areas are census blocks in the National Broadband Map with fixed Internet access speeds of 3 Mbps download/768 kilobits per second (kbps) upload.

Locations are deemed served by Internet access with speeds of 768 kbps download/200 kbps upload. Also, if there is no other entity than one carrier or its affiliate providing Internet with speeds of 3 Mbps download/768 kbps upload or greater, the location is served. If that location receives slower speeds via a copper-fed digital subscriber line access multiplexer, that area is served.

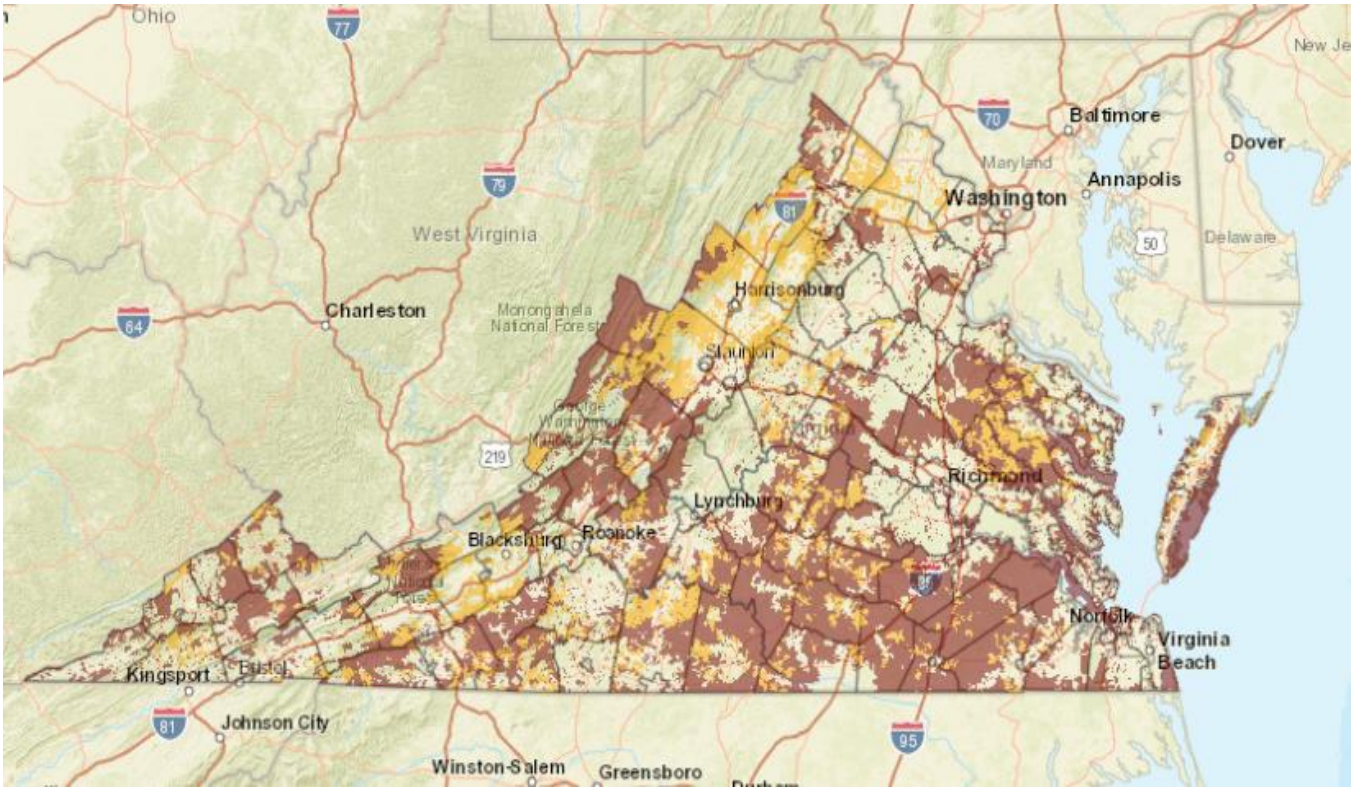
In the 2017 Fairpoint Communications, Inc. case before the FCC, the provider used the federal definitions of served and unserved in drawing down Connect America Funding Phase I round two dollars to bring broadband to those areas.[19] The case also defines underserved areas as those unserved by Internet speeds of 3 Mbps download/768 kbps upload.[20]

In 2017, VATI defines underserved areas as those where broadband service is not available from a wireline or wireless facilities-based provider at speeds less than 10 Mbps download/1 Mbps upload. In the key for the Virginia Broadband Availability Map, unserved areas are defined as those with Internet speeds below 10 Mbps download/1 Mbps upload. The map defines underserved as areas with access to speeds greater than 10 Mbps download/1 Mbps upload but less than 25 Mbps download/3 Mbps upload. Below, is the most updated Map for broadband availability.

[19] FCC, Fairpoint Communications, Inc. Petition for Limited Waiver of Section 54.312(c) of the Commission's Rules, 47 C.F.R. §54.312(c) Notice Requirements of the Connect America Fund, Phase I, Round 2 (March 30, 2017), available at https://ecfsapi.fcc.gov/file/10330308070016/FairPointpercent20Waiverpercent20Petitionpercent20CAFpercent20Ipercent20Roundpercent202percent20Locations.pdf.

[20] Ibid.

Figure 2: Unserved and Underserved Areas in the Commonwealth



Recommendation 2: Set the minimum state standard for service to high-speed Internet at reasonable costs with no data caps. High-speed means 25 Mbps for downloads and 3 Mbps for uploads with a goal of reaching 1 Gbps for downloads and 1 Gbps for uploads.

The FCC collects data on broadband deployment, which was previously the responsibility of the National Telecommunications and Information Administration (NTIA).[21] When NTIA collected broadband availability data through the State Broadband Initiative, the FCC collected broadband subscription data through its semi-annual Form 477.[22] In 2014, data collection efforts consolidated into Form 477.[23] For the form, bandwidth and speed information is based on advertised speeds, maximum for fixed and minimum for mobile.[24] For Fixed Broadband Deployment, providers must submit census block level data that shows Internet access service is

[21] FCC, Changes to the Form 477 Data Collection in 2014 (October 29, 2013), available at https://www.fcc.gov/general/changes-form-477-data-collection-2014.
[22] Ibid
[23] Ibid.
[24] Ibid.

"available."[25] Providers must also submit census tract level data for Fixed Broadband Subscribership, which had been the case before the 2014 consolidation.[26]

Definitions in the Form

Broadband connections are wired lines or wireless channels that enable an end-user to receive or send information to the Internet at transfer rates exceeding 200 kbps in at least one direction. [27]

Advertised speeds can be described at a point of sale or a rate charged to a customer for a particular level of service in an individual's area. The quality of service can be determined by download and upload bandwidths the user expects.[28]

Available describes fixed broadband connections in a census block where a provider, within a service interval typical of the connection without an extraordinary commitment of resources, provides transmission of data to and from the Internet with advertised speeds exceeding 200 kbps in at least one direction.[29]

Census tracts are geographic boundaries that can be aggregated to counties and are aggregated census blocks.[30]

Census blocks are small geographic areas bound by visible features, like streets, streams, and railroad tracks, and nonvisible features like property lines.[31]

In August 2017, the FCC, through proposed rule 82 FR 40118, sought to modernize the Form 477 Data Program. The proposed rule reviews the collection of voice and broadband subscription and deployment data including how to best use geospatial data to find the number and location of unserved areas.

Current Form 477 submission data incentivizes providers to overreport service information by census blocks considered served and with the handling of empty census blocks.[32] Accurate broadband availability mapping is imperative to determining demand for broadband.

Recommendation 3: Define unserved and underserved areas by more rigorous standards.

[25] FCC, Changes to the Form 477 Data Collection in 2014 (October 29, 2013), available at https://www.fcc.gov/general/changes-form-477-data-collection-2014.
[26] Ibid.
[27] FCC, Fixed Broadband Deployment Terms (December 5, 2016), available at https://transition.fcc.gov/form477/FBD/definitions_fbd.pdf.
[28] Ibid.
[29] Ibid.
[30] Ibid.
[31] Ibid.
[32] Grubesic, T. (2012), The U.S. National Broadband Map: Data limitations and implications. *Telecommunications Policy*, 36, 113-126.

The "Digital Divide"

According to the FCC's 2018 Broadband Deployment report, 92.3 percent of all Americans have access to fixed terrestrial broadband at speeds of 25 Mbps download/3 Mbps upload, up from 89.4 percent in 2014.[33] Over 24 million Americans still lack fixed terrestrial broadband, with approximately 14 million being rural Americans.[34] Deployment growth is slower in rural areas at a flat rate of 70 percent in comparison to a 10 percent growth rate in urban areas. [35]

Providers across the nation continue to say that providing broadband to rural communities yields little investment profitability. For installation purposes, installing communications lines in a highly dense area equalize the sharing of such costs. With fewer customers per mile, costs often outweigh benefits to construction.

Rural Customers

Methods to address profitability concerns focus on increasing the Internet customer base. Two methods addressed in the blueprint include providers initiating campaigns for subscribership and digital literacy courses. Such courses involve partnerships with local community hubs like workforce centers, schools, and social service entities to understand the benefits of broadband from a quality of life and business perspective.

In addition, rural customers trend toward higher take rates for such critical services. According to the NTCA 2016 Broadband/Internet Availability Survey Report, 29 percent or 172 members stated that take rate for broadband service remains at 72 percent.[36] In comparison to the previous year, for broadband services of 25 Mbps or greater, subscriptions were up by 9 percent totaling 17 percent; and, for service of 4 Mbps or greater, subscriptions were up by 5 percent totaling 60 percent.[37] Take rates are higher for higher speed Internet in rural areas. Faster take rates reduce churn, which is how often a customer leaves a carrier.

Commonwealth by the Numbers

Deployment data for the year 2018 shows that 90.8 percent of Virginians have access to fixed terrestrial broadband at speeds of 25 Mbps download/3 Mbps upload in 2018.[38] Comparable data in 2016 only measures how many Virginians did not have access to fixed advanced

[33] FCC, 2018 Broadband Deployment Report (February 2, 2018), available at https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2018-broadband-deployment-report.
[34] Ibid.
[35] Ibid.
[36] NTCA – The Rural Broadband Association, 2016 Broadband/Internet Availability Survey Report (July 2017), available at https://www.ntca.org/sites/default/files/legacy/images/stories/Documents/Advocacy/SurveyReports/2016ntcabroadbandsurveyreport.pdf.
[37] Ibid.
[38] FCC, 2018 Broadband Deployment Report (February 2, 2018), available at https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2018-broadband-deployment-report.

telecommunications capabilities.[39] For that year, 11 percent or 925,477 Virginians did not have access.[40] The rate of adopting such capabilities came to 53 percent.[41]

In 2015, 21 percent of Virginians, comprised of 64 percent of rural Virginians, did not have access to fixed 25 Mbps upload/3 Mbps download, which had a 47 percent adoption rate.[42] For fixed 3 Mbps download/768 kbps upload, seven percent of Virginians lacked access, and for 10 Mbps upload/768 kbps download 11 percent lacked access.[43] For these respective speeds, Virginia had an adoption rate of 69 percent and 61 percent.[44]

Between the years of 2016 and 2018, access to Internet with speeds of 25 Mbps upload/3 Mbps download increased from 79 percent to 90.8 percent. Yet, rural communities still lag behind their urban counterparts by over 25 percent expressed in Figure 3. Figure 3 demonstrates, in millions, how many Virginians in rural and urban areas have access to standard high speed, minimum advertised speed, and median speed Internet for 2018.

Figure 3: 2018 Broadband Deployment Report on the Commonwealth of Virginia

	Pop. Evaluated	Fixed 25 Mbps/ 3 Mbps		Mobile LTE 5 Mbps/ 1Mbps		Pop. Evaluated	Mobile LTE 10 Mbps/3 Mbps	
		Pop. With Access	% of Pop.	Pop. With Access	% of Pop.		Pop. With Access	% of Pop.
Virginia	8.387	7.617	90.8%	8.347	99.5%	7.457	5.549	74.4%
Rural Areas	2.053	1.459	71.1%	2.014	98.1%	1.372	0.340	24.8%
Urban Areas	6.334	6.158	97.2%	6.334	100.0%	6.085	5.209	85.6%

Case Studies Utilizing Available Infrastructure

The blueprint outlines partnerships between localities, Internet service providers, electric co-ops, and wireless authorities across the Commonwealth utilizing existing electric, rights-of-way, emergency communications, and water utility infrastructure. Each case study reviews the entity and partnership structure, project funding, and Internet service outcomes. Refer to “Appendix A: Overview of Highlighted Projects” on page 28 for a roadmap to case study comparisons.

[39] FCC, 2018 Broadband Deployment Report (February 2, 2018), available at https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2018-broadband-deployment-report.
[40] Ibid.
[41] Ibid.
[42] FCC, 2015 Broadband Progress Report (February 4, 2015), available at https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2015-broadband-progress-report.
[43] Ibid.
[44] Ibid.

Electric Infrastructure and Co-ops

With a lack of investor-owned utilities extending services to rural areas as telecommunications infrastructure arose, rural groups formed cooperatives, or co-ops, to provide for electrical and telecommunications services. Because co-ops are owned and controlled by their users, co-ops operate on a service-at-cost basis. This imbeds the provider in the local community as a generator of economic development.

Electric co-ops are consumer-owned utilities classified as 501(c)(12) nonprofits for the purpose of tax-exemption under 7.25.12 of the Internal Revenue Code. To maintain such a status, co-ops charge cost-based rates for services. The Internal Revenue Service in 7.25.12.9.2 (08-09-2006) determined that telecommunications services are exempt because providing communications capability at a cooperative level is similar to a two-way radio system.

The Federal Energy Regulatory Commission has oversight over the Electric Reliability Organization which enforces mandatory electric reliability rules for unregulated entities like co-ops and government-owned utilities.[45] In 2007, the North American Electric Reliability Corporation set the standards.[46] The FCC exempts public power utilities and rural electric co-ops, via Section 224 of the Communications Act of 1934, from poles and attachments regulation .[47] Currently, regulation occurs at the state and local level. Though, since 2016, there are three open dockets that address the FCC's desire to repeal the exemption.[48]

The Commonwealth is a "Dillon Rule" state, meaning that localities only have powers expressly granted by state law. In the Code of Virginia, § 15.2-1500 allows a locality, electric commission or board, industrial development authority, or economic development authority to lease fiber, and permits the selling of such infrastructure and equipment.

For localities operating electrical distribution systems, § 15.2-2160 provides that those systems may also provide telecommunications services, including the Bristol Virginia Utility Authority. To do this, a locality must obtain a certificate from the State Corporation Commission (SCC) to operate a telephone utility as described in § 56-265.4:4. Upon the SCC granting the certificate, the locality shall: (i) comply with the relevant laws and regulations for providing such services, (ii) have the same duties of such providers, (iii) account for revenues, expenses, property, and source of investment associated with the services, and (iv) ensure that there is no unfair advantage in taxing authority and land owned by the government. Under this section, the SCC may also approve a subsidy providing such services if in the public interest. The approval process is outlined in rules published by the SCC. Localities with the certificate are required to provide nondiscriminatory access to telecommunications providers on a first-come, first-served

[45] Edison Electric Institute, Federal Regulation, available at http://www.eei.org/issuesandpolicy/Pages/FederalRegulation.aspx.
[46] Ibid.
[47] American Public Power Association, Preserving Municipal Exemption from Federal Pole Attachment Rates Issue Brief (January 2018), available at https://www.publicpower.org/system/files/documents/preserving_the_municipal_exemption_from_federal_pole_attachment_regulations.pdf.
[48] Ibid.

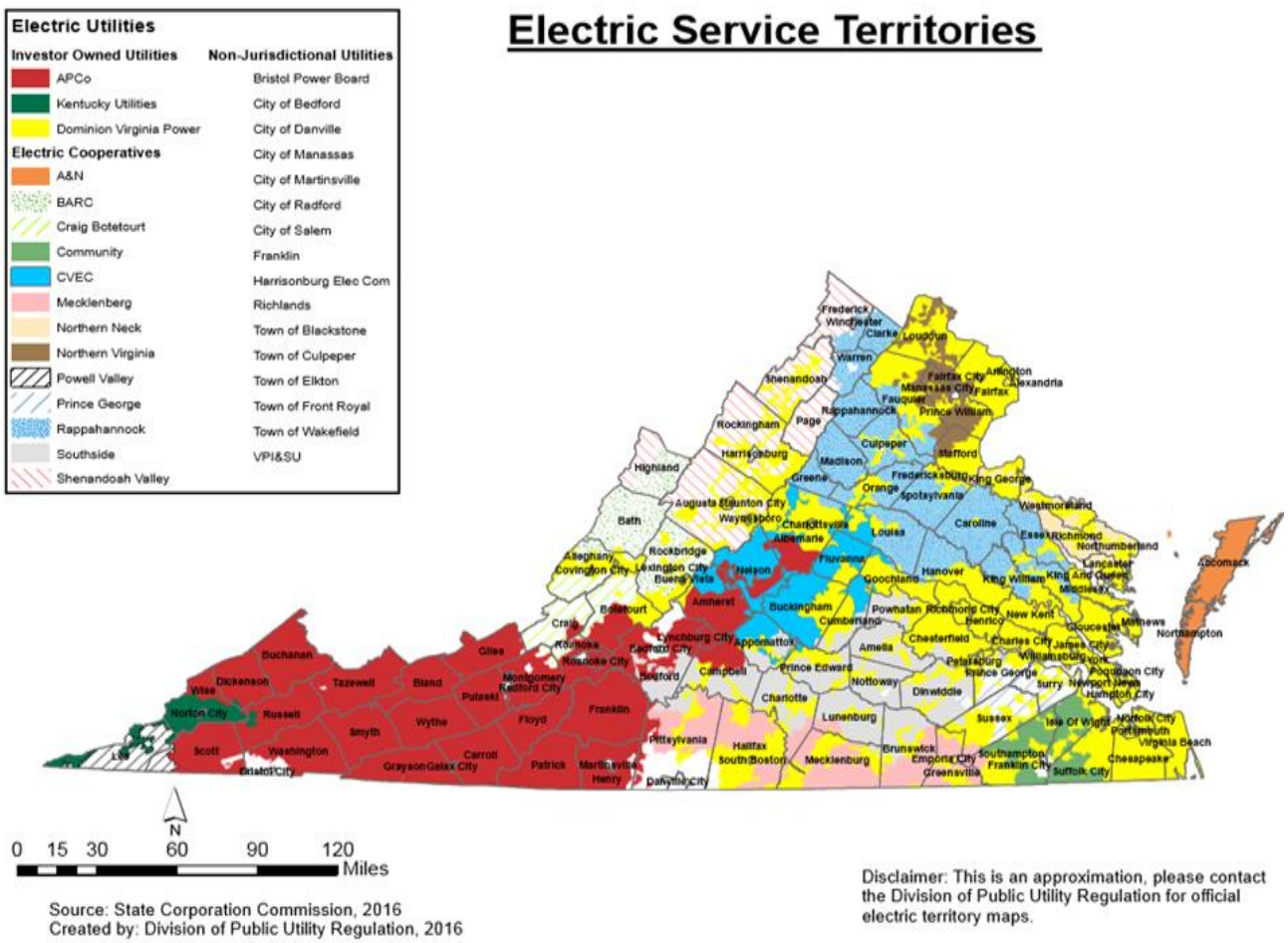
basis regarding rights-of-way, poles, conduits, or other facilities owned, leased, or operated by the locality.

Chapter 9.1 of the Code governs Utility Consumer Services Cooperatives and Utility Aggregation Cooperatives. Specifically, § 56-231.34:1 addresses how the SCC regulates subsidiary activity of a cooperative when those activities are considered unregulated business.

Title 20 of the Virginia Administrative Code provides that the SCC regulates public utilities and telecommunications with the assistance of the Divisions of Utility Accounting and Finance, Energy Regulation, Communications, Public Services Taxation, and Utility and Railroad Safety.

According to the State Corporation Commission (SCC), the independent agency the regulates electric utilities, there are 13 electric co-ops in 2016. To date, four of the co-ops are providing broadband services in addition to electricity. The co-ops are BARC Electric, Central Virginia Electric, Mecklenburg Electric, and Prince George Electric. See Figure 4 for the distribution of electric service territories.

Figure 4: Map of Electrical Utility Service Providers



Member-Owned Electric Utility with a Subsidiary

BARC Electric

For example, BARC Electric Cooperative is a member-owned electric utility and is the first electric co-op in the Commonwealth to offer telecommunications services to customers.[49] The co-op formed in 1937 to electrify the County of Bath.[50] After receiving guidelines on organizing a co-op, making a loan, and surveying members for the service from the Rural Electrification Administration (REA), the Bath County Agent contacted representatives of Harrisonburg and Big Island who had personal experience with such matters.[51] For the purpose of obtaining a REA loan, the co-op formed a board of directors comprised of paid members and proposed the project.[52] A year later, REA contracted with the Counties of Bath, Alleghany, and Rockbridge.[53] The co-op then issued applications for service, membership fees, easements, an attorney, incorporation, and financing.[54]

After incorporation approval, the co-op received additional REA funding to build 182 miles of line providing service to farmers in the Counties of Bath, Alleghany, Rockbridge, Augusta, and Highland.[55] To date, BARC connects over 12,500 meters.[56]

In August 2016, BARC moved forward with a $66 million fiber-to-the-home (FTTH) project with the first phase covering over 400 miles of fiber serving 4,100 homes and businesses. BARC Electric won $239,918 in Connect America Funding as part of the loan for the project.[57] The board approved the remaining loan amount from the BARC lender.[58] The co-op contracted with S&N Communications to build the fiber "core ring" to connect electrical substations to a high-speed backbone.[59] The ring-shaped backbone of networks has "jumping off points" where service drops to connect to subscribers, just like the process for electricity.[60]

To ready the electric network to attach the fiber, BARC took three months to adjust the height of 70 poles and address 250 other adjustments.[61]

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[49] BARC Electric, Broadband Project Moving Forward (August 22, 2016), available at http://barcelectric.com/announcements/broadband-project-moving-forward.
[50] BARC Electric, About Us, available at http://www.barcelectric.com/aboutUs.
[51] Ibid.
[52] BARC Electric, Broadband Project Moving Forward (August 22, 2016), available at http://barcelectric.com/announcements/broadband-project-moving-forward.
[53] BARC Electric, About Us, available at http://www.barcelectric.com/aboutUs.
[54] Ibid.
[55] Ibid.
[56] Ibid.
[57] Rural Electric Magazine, Broadband Service: The New 'Greatest Thing,' (November 2, 2015), available at http://remagazine.coop/broadband-the-new-greatest-thing/.
[58] BARC Electric, Broadband Project Moving Forward (August 22, 2016), available at http://barcelectric.com/announcements/broadband-project-moving-forward.
[59] BARC Electric, Construction Update: Day 30 (November 9, 2017), available at http://barcelectric.com/announcements/construction-update-day-30.
[60] Ibid.
[61] BARC Electric, Make Ready Work Begins (March 17, 2017), available at http://barcelectric.com/announcements/make-ready-work-begins.

BARC launched a campaign among its customers to subscribe for the broadband through an online application called "CrowdFiber."[62]

In March 2018, BARC Electric and BARC Connects announced the selection of Calix Mesh Enhanced Carrier Class Wi-Fi and Calix Cloud to extend the FTTH project network built on the Calix E7-2 Intelligent Modular Systems to all 13,000 members in the five-county area.[63] BARC is also in the process of leveraging the Calix GigaCenters, 804Mesh satellites, and Calix Cloud to position for "smart homes of the future."[64]

BARC provides Internet through its subsidiary, BARC Connects, which allows for the co-op to provide Internet service to non-members.[65] BARC Connects provides Internet with no data caps via a fiber optic network, landline phone service, and television.[66] For the residential Internet packages, the "Ultra" level provides 500 Mbps download/250 Mbps upload at $150 a month.[67] For businesses, the fastest package is 1 Gbps download/1 Gbps upload.[68]

Rights-of-Way Infrastructure and Telecommunication Installation

Federal code, 23 CFR Part 645, Subpart B and 23 CFR Part 710, Subpart D enable utility and resource sharing programs, like the installation of broadband along highway right-of-way. In 1996, the Federal Highway Administration (FHWA) and the FCC recognized the mutual benefit of resource sharing between Departments of Transportation and telecommunications providers, issuing guidance documents.[69] In 2001, FHWA distributed guidance documents for Longitudinal Telecommunications Installations on Limited Access Highway Right-of-Way.[70]

Virginia Code also allows for such resource sharing via regulations. Regulations cover shared agreements for use of and access to rights-of-way in 24 VAC 30-151-30; outlines requirements for the installation process in rights-of-way in 24 VAC 30-151-310; and, establishes compensation methods in 24 VAC 30-151-740.

Depicted in Figure 5, the Virginia Department of Transportation (VDOT) demonstrates that 1,000 of the 3,708 miles of resource sharing routes across the Commonwealth have use potential. Building fiber infrastructure along the rights-of-way would cost VDOT between $200,000 to $260,000 per mile, and providers put $1,800 in per mile to maintain the shared fiber route.

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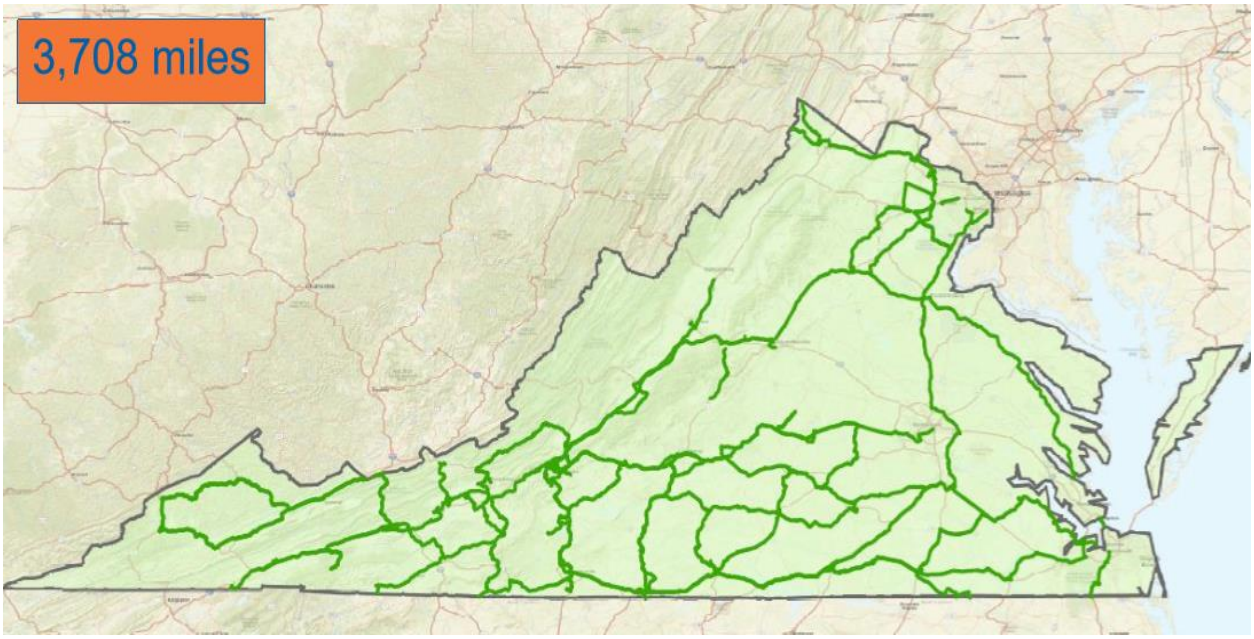
[62] BARC Electric, BARC Electric Cooperative Delivers World-Class Broadband Experience with Calix (March 26, 2018), available at http://barcelectric.com/announcements.
[63] Ibid.
[64] Ibid.
[65] BARC Electric Cooperative News, Broadband Q&A (October 2016), available at file:///C:Local/Packages/Microsoft.oct16_barc_CL%20.pdf.
[66] BARC Connects, Internet Products, available at http://www.barcconnects.net/products_internet.
[67] Ibid.
[68] Ibid.
[69] FHWA, Executive Order: Accelerating Broadband Infrastructure Deployment (May 2013), available at https://www.fhwa.dot.gov/policy/otps/successprac.cfm.
[70] Federal Register, Guidance on Longitudinal Telecommunications Installations on Limited Access Highway Right-of-Way (January 22, 2001), available at https://www.federalregister.gov/documents/2001/01/22/01-1644/guidance-on-longitudinal-telecommunications-installations-on-limited-access-highway-right-of-way.

Figure 5: Fiber Resource Sharing Routes



In February 2018, the VDOT Office of Public-Private Partnerships made a presentation to the Commonwealth Transportation Board about the Fiber Optic Opportunities Initiative. Their six-step process: 1) reviews the existing legal framework and identifies opportunities; 2) assesses needs in the Commonwealth; 3) compiles data sets to evaluate VDOT right-of-way asset capabilities; 4) develops an initial framework to maximize capabilities; 5) establishes a framework for commercial opportunities based off market findings; and, 6) develops potential procurement options. By June 2018, the Office plans to make recommendations.

Member-Owned Electric Utility with a Subsidiary

Prince George Electric Cooperative (PGEC)

PGEC is a member-owned electric co-op that serves 1,300 powerlines in six counties.[71] The co-op entered into an agreement offering FTTH.[72] The SCC approved the co-op's formation of a subsidiary, PGEC Enterprises, LLC, to offer connectivity to members.[73] In May 2017, the pilot project connected 49 homes, businesses, and county facilities along West Quaker Road to Prince George Drive (Route 156), which equated to 1,000 feet of VDOT-maintained road.[74]

[71] PGEC, PGEC History, available at https://www.pgec.coop/content/pgec-history.
[72] Institute for Local Self-Reliance, Electric Cooperative, County Collaborate to Expand Fiber-to-the-Home in Rural Virginia (June 16, 2017), available at https://ilsr.org/electric-cooperative-county-collaborate-to-expand-fiber-to-the-home-in-rural-virginia/.
[73] Ibid.
[74] Government Technology, Successful Pilot Prompts Fiber Optic Expansion in Prince George County, Va." (May 30, 2017), available at http://www.govtech.com/network/Successful-Pilot-Prompts-Fiber-Optic-Expansion-in-Prince-George-County-Va.html.

Under a performance agreement with the County Board of Supervisors, the co-op, and the Industrial Development Authority (IDA), the County allocated $1 million in IDA bond funding to expand the network.[75] The co-op is committing an additional $5 million to the project.[76]

The agreement, which requires ratification by the IDA, provides that the co-op has four years to connect 500 locations.[77] For every location falling short of that 500 threshold, the co-op pays the IDA $2,000.[78] Government locations connected to the network pay the residential rate.[79] The IDA meets to discuss the agreement July 19th; and, once approved, construction begins within 60 days.

Cost for service is $82 per month for 30 Mbps with no data cap with a potential for speeds to increase due to using fiber optic cable versus coaxial cable.[80]

Independently-Operated Wholesale Telecommunications Provider

Mid-Atlantic Broadband Communities Corporation (MBC)

In the late '90s, the Old Dominion Electric Cooperative provided infrastructure, leadership, and funding for business planning and seed capital to establish MBC. Currently, MBC operates 1,800 miles of open access fiber optic network in 31 counties in Southern Virginia.[81] The network includes a fiber backbone with armored sheath protection, and 80 percent of the network is underground. [82] MBC owns the fiber sheath, the colocation facilities, and the electronics.[83] The network allows retail private telecommunications providers to use the network to provide service in Southern Virginia.

Under the Warner Administration, MBC was formed to manage the $27 million agreement with VDOT to complete the Regional Backbone Initiative that allowed for the installation of fiber-optic lines within highway rights-of-way.[84] MBC received $12 million in capital grants from the United States Department of Commerce and state funds from a 1998 multistate settlement with tobacco manufacturers to build the first phase of the open-access fiber network in 2004.[85] To

[75] Institute for Local Self-Reliance, Electric Cooperative, County Collaborate to Expand Fiber-to-the-Home in Rural Virginia (June 16, 2017), available at https://ilsr.org/electric-cooperative-county-collaborate-to-expand-fiber-to-the-home-in-rural-virginia/.
[76] Ibid.
[77] Government Technology, Successful Pilot Prompts Fiber Optic Expansion in Prince George County, Va." (May 30, 2017), available at http://www.govtech.com/network/Successful-Pilot-Prompts-Fiber-Optic-Expansion-in-Prince-George-County-Va.html.
[78] Ibid.
[79] Ibid.
[80] Ibid.
[81] MBC, Fiber Network, available at http://www.mbc-va.com/network/.
[82] Ibid.
[83] Ibid.
[84] The Roanoke Times, Broadband deal gets green light (April 13, 2005), available at http://www.roanoke.com/webmin/business/broadband-deal-gets-green-light/article_ddca95f4-3d1b-538f-8b57-de7d7e5d8eab.html.
[85] Ibid.

finish the first phase, MBC received $24 million from the Tobacco Commission in 2005 and 2006.[86]

The co-op contracted with two firms to install the fiber-optic cable, made available on a competitive wholesale basis. Installations occurred on limited-access segments in 11 areas including parts of U.S. 220 and U.S. 58 in the City of Martinsville.[87] The agreement allowed VDOT to gain free access to the fiber for "smart traffic" technologies like highway cameras and traffic sensors.[88]

The fiber-optic network connected five cities, 20 counties, and 56 industrial parks between the Counties of Franklin and Sussex.[89] The 700 miles extended high-speed Internet to roughly 700,000 residents and 19,000 businesses.[90] Using grants to pay for capital expenses, and revenue from the private sector providers on the network covering operation and maintenance, operating revenue exceeded expenses by June 2008.[91]

Initial speeds offered by the advanced, open-access, fiber-optic SONET system with an OC-192 backbone and OC-3 connections, were 155 Mbps for downloads and uploads.[92]

In 2007, TRRC directed MBC to begin soliciting proposals to expand broadband into rural Virginia.[93] Providing about $1 million with a 50 percent match rate, the TRRC capital funding encouraged private sector investment for serving "the last mile" via wireless broadband and wireline DSL.[94] EMBARQ was selected to provide DSL to Stuart in Patrick County and Brookneal and Altavista in Campbell County.[95] The pilot project expanded access to about 3,000 residences and businesses, providing broadband at prices as low as $19.95 per month and with speeds of 768 kbps, 1.5 Mbps, 3 Mbps, 5 Mbps, or 10 Mbps.[96] EMBARQ invested an additional $250,000 to the project.[97]

In 2010, MBC received $32 million for three projects under the United States Department of Commerce's Broadband Technology Opportunities Program (BTOP).[98] Of the amount, $16 million connected K-12 schools, $10 million expanded connections to community institutions

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[86] The Roanoke Times, Broadband deal gets green light (April 13, 2005), available at http://www.roanoke.com/webmin/business/broadband-deal-gets-green-light/article_ddca95f4-3d1b-538f-8b57-de7d7e5d8eab.html.
[87] Ibid.
[88] Ibid.
[89] Ibid.
[90] Ibid.
[91] Ibid.
[92] Adesta, Mid-Atlantic Broadband Cooperative Promoting Economic Development in Rural Southern Virginia, available at file:///C:/Local/Adesta_Mid-Atlantic_Broadband_Cooperative.pdf.
[93] Public-Private Partnerships – EMBARQ and Mid-Atlantic Broadband/Tobacco Commission Invest in Rural Virginia, available at https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.wired.virginia.gov%2Fsites%2Fdefault%2Ffiles%2FEmbarq-Patrick-case-study.doc.
[94] Ibid.
[95] Ibid.
[96] Ibid.
[97] Ibid.
[98] Ibid.

and telecommunications providers, and the remaining $6 million built a fiber route from Blacksburg to Bedford in a partnership with the Virginia Tech Foundation.[99]

The member-owned co-op amended its Articles of Incorporation in 2012 to become a nonprofit to continue expansive broadband work.[100] MBC is currently requesting tax relief from the County of Halifax in February.[101]

MBC also has a subsidiary, MBC Towers Inc., established after acquiring the Tower Services Division of Gamewood Technology Group, Inc.[102]

In 2015, MBC and Microsoft partnered to provide wireless broadband to Southern Virginia.[103] TRRC contributed $300,000 for the construction of six towers and related capital expenditures contingent on localities seeking funding from Southside Economic Development and other funding.[104] The network operates as an open-access wholesale wireless network with the schools of the Counties of Halifax and Charlotte serving as hubs.[105] The project uses a new technology, referred to as "TV White Spaces." The spaces are gaps between broadcast channels in delivering wireless internet access.[106]

Recognizing its role in rural Virginia economic development, MBC formed Local to International Transport (LIT) Networks to enable other fiber network providers to connect with the MBC network. Those joining become a part of the revenue sharing business model.[107]

Radio Infrastructure and Wireless Service Authorities

Enacted in 2003, §15.2-5431.1, known as the Virginia Wireless Services Act, provides that counties, cities, and towns can form their own Wireless Service Authorities to provide certain

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[99] Public-Private Partnerships – EMBARQ and Mid-Atlantic Broadband/Tobacco Commission Invest in Rural Virginia, available at https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.wired.virginia.gov%2Fsites%2Fdefault%2Ffiles%2FEmbarq-Patrick-case-study.doc.
[100] Ibid.
[101] The Gazette-Virginian, Mid-Atlantic Broadband, developers eye tax relief (February 5, 2018), available at http://www.yourgv.com/news/local_news/mid-atlantic-broadband-developers-eye-tax-relief/article_2ba6d450-09ca-11e8-ab9d-436a6b58df23.html.
[102] MBC, MBC Acquires the Tower Services Division of Gamewood Technology Group, Inc. (June 224, 2015), available at http://www.mbc-va.com/news/mbc-acquires-the-tower-services-division-of-gamewood-technology-group-inc/.
[103] The Gazette-Virginian, Wireless Internet project moves forward for the region (September 4, 2015), available at www.godanriver.com/work_it_sova/news/wireless-internet-project-moves-forward-for-region/article_8a91a506-5349-11e5-aeab-af89c4242f7f.html.
[104] Ibid.
[105] Ibid.
[106] Ibid.
[107] The Roanoke Times, Broadband deal gets green light (April 13, 2005), available at http://www.roanoke.com/webmin/business/broadband-deal-gets-green-light/article_ddca95f4-3d1b-538f-8b57-de7d7e5d8eab.html.

communications services including Internet.[108] Multiple localities can also form a regional authority.

Such authority is a separate entity from the locality and is a public body.[109] Authorities can borrow money and issue revenue bonds that do not add to a local governing body's debt.[110] The structure allows for flexibility to acquire, construct, operate, and extend communications services projects.[111] And, authorities can own and operate their own facilities.[112]

According to § 15.2-5431.34, the Commonwealth must consent to the use of state land for the purpose of construction, improvement, or maintenance of an authority project. If such land is within the right-of-way of a primary or secondary highway, the authority must have the approval of the Commissioner of Highways.

Wireless Service Authorities are not limited to just wireless technologies, authorities have the discretion to utilize other broadband transmission types.[113] Authorities may both own and operate a system that delivers communications services or partner with a private entity to deploy, operate, and maintain a system.[114] A board provides oversight for the authority, while the SCC certifies the authority's Articles of Incorporation or charter.[115]

Provision § 15.2-5431.35 states that upon the locality making rights-of-way, poles, conduits or other such permanent facilities available to an authority, the authority is required to make those facilities available to private providers of communications services on a nondiscriminatory basis. Exceptions to this provision occur when such facilities do not have capacity.

County Wireless Authority and Internet Service Provider

King and Queen County Wireless Services Authority

In 2012, King and Queen County established the King and Queen County Wireless Services Authority as a solution to a lack of high speed Internet in the County.[116] Ineligible for federal grants due to proximity to a metropolitan area, the County partnered with Gamewood Technology Group Inc.[117] The King and Queen network utilized the existing public safety

[108] Hefty & Wiley, P.C., Wireless Service Authorities and The Virginia Wireless Service Authority Act (2008), available at http://www.vaco.org/AnnualConferenceFiles/08ACFiles/Wireless%20Authority%20FAQs%20jsg%202008%20Jeff%20Gore.pdf.
[109] Ibid.
[110] Ibid.
[111] Ibid.
[112] Ibid.
[113] Ibid.
[114] Ibid.
[115] Ibid.
[116] Virginia Association of Counties Achievement Awards, King and Queen Application (June 1, 2016), available at http://www.vaco.org/AchievementAwards/Entries2016/KingQueenBroadband/KingQueenBroadband.pdf.
[117] Ibid.

communications network to expand broadband through a linear microwave backhaul.[118] The system consisted of four radio towers that run like a spine down the middle of the County.[119]

Excluding the cost of the microwave network, the County spent $300,000 to connect over 70 percent of residents.[120] Over a three-year period, the County recouped costs through switching both its government phone system to Voice over Internet Protocol (VoIP) and the school system from T1 lines to broadband saving $2,500 monthly and $70,000 annually.[121]

The fastest residential speed available is 6 Mbps for both downloads and uploads at $89.99 per month with no data caps.[122] A unique package offering includes an e-mail only account costing $5.[123]

To overcome the issue of underutilized Internet services with only 300 residents online, the County partnered with CIT.[124] CIT conducted a state-funded six-month survey on behalf of the County.[125] The survey identified barriers to services due to price (41 percent), computer literacy (22 percent), and availability (16 percent).[126] And, the survey determined forty-three percent of residents were still offline.[127]

CIT suggested various local partnerships to increase digital literacy, from the local library partnering with the County's Business Assistance Center to offer courses, and local tech schools providing computer-refurbishing training.[128] Also, given that a large portion of the County's population is elderly, courses focus on the quality of life benefit of broadband from ordering prescriptions online to increasing accessibility to social services.[129] In addition, CIT developed an action plan for the County.[130]

Water Infrastructure and Public Utility Districts in Washington

Non-Profit Wholesale Telecommunications Provider

In Washington state, county Public Utility Districts (PUDs) sell broadband wholesale, and cities provide retail. The county PUDs build fiber networks to serve their residents, and lease the fiber

[118] Virginia Association of Counties Achievement Awards, King and Queen Application (June 1, 2016), available at http://www.vaco.org/AchievementAwards/Entries2016/KingQueenBroadband/KingQueenBroadband.pdf.
[119] Ibid.
[120] Ibid.
[121] Ibid.
[122] KQvA.net by King and Queen County Wireless Authority, Internet Products (2018), available at https://kqva.net/internet.aspx.
[123] Ibid.
[124] Daily Press, Addressing the digital gap in King and Queen (July 10, 2014), available at http://www.dailypress.com/tidewater-review/va-tr-byline-kq-broadband-0709-20140708-story.html.
[125] Ibid.
[126] Ibid.
[127] Ibid.
[128] Ibid.
[129] Ibid.
[130] Ibid.

to private sector retailers, who sell Internet access to consumers. This model allows for competition and brings in private partnerships.

The PUDs are governed by locally-elected Commissioners, and 27 of the 28 PUDs are represented by the Washington Public Utility Districts Association (WPUDA).[131] The PUDs provide electricity, water and wastewater services, and wholesale telecommunications to over 1 million customers.[132] As of 2016, 14 PUDs installed over 6,500 miles of fiber-optic cable to more than 37,000 customers.[133]

In an effort to enhance Internet connections and expand broadband across the state, ten of the PUDs formed the Northwest Open Access Network (NoaNet).[134] The nonprofit serves as a wholesale provider of broadband, connecting the local PUD networks to each other and to the major carrier connection points in Seattle, Spokane, and Portland serving over 260,000 people with 1,800 fiber miles.[135]

One of the successes occurred in 2012 along the Columbia River, where fiber lines run along cheap hydropower.[136] The project brought Microsoft, Yahoo, and other firms in to build large server farms.[137] The project was funded by a $140 million federal grant from BTOP to expand to 3,000 fiber miles.[138] Over $500 million in public and private dollars has been invested in Washington's broadband network, with another $400 million planned.[139]

Other projects associated with NoaNet include leveraging the concept, "Fiber to the People" where the City of Anacortes, in partnership with NoaNet, is connecting over 30 pump stations, reservoirs, and water treatment plants to deploy fiber conduit in abandoned water lines and some active pipes.[140] The estimated total cost of the project is $500,000 with the installation of the fiber in the pipes at $265,000.[141] Continued expansion of the city-wide FTTH network, including fiber through water lines and over telephone poles, cost the City $1.7 million.[142]

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[131] WPUDA, About Washington PUD Association, available at www.wpuda.org/about-us.
[132] Ibid.
[133] WPUDA, PUDs providing telecommunications services (2016), available at www.wpuda.org/index.php?option=com_content&view=article&id=41:telecommunications&catid=20:site-content&Itemid=127.
[134] The Spokesman-Review, Need for speed: Broadband comes to rural areas (September 16, 2012), available at www.spokesman.com/stories/2012/sep/16/need-speed/.
[135] Ibid
[136] Ibid.
[137] Ibid.
[138] Ibid.
[139] Ibid.
[140] Go Anacortes, City moves ahead with fiber network, reviews costs (January 24, 2018), available at https://www.goanacortes.com/all_access/article_4be22a8e-0098-11e8-8fd3-cf77c008234c.html.
[141] The Western Front, Anacortes to get fiber optic network (March 14, 2018), available at www.westernfrontonline.com/2018/03/14/anacortes-to-get-fiber-optic-internet/.
[142] Go Anacortes, City moves ahead with fiber network, reviews costs (January 24, 2018), available at https://www.goanacortes.com/all_access/article_4be22a8e-0098-11e8-8fd3-cf77c008234c.html.

The next phase of the project wires two neighborhoods, with an estimated cost of $300,000. But, customers pay a heavy upfront cost of $1,000 to overlay fiber to the home.[143] Internet speeds for this project are up to 1 Gbps download/1 Gbps upload.[144]

Anacortes is the first city in North America to install a fiber optic network through their water pipes.[145] Utilizing a patented method from England, the City installed the network throughout the regional water system.[146]

Recommendation 4: Determine usable infrastructure for deploying broadband.

Recommendation 5: Evaluate successful broadband P3 structures across the Commonwealth.

Here, the suggested bidding process is a two-step method with the first round of bids addressing the backbone of the broadband infrastructure, and then building to the homes. Under the blueprint, fiber continues to be the preferred broadband type due to reliability and durability.

As recently as April 27, 2018, AT&T Chief Technical Officer John Stephens found that to get fixed wireless to residential areas, it makes more sense to deploy traditional fiber to customer homes from the fiber backhaul for mobile 5G.[147]

Financing the Future of Rural Broadband

The blueprint provides an overview of state and federal funding frequently used in P3 broadband deployment projects. Utilizing a two-tiered approach, the blueprint offers potential pathways for increased state investment.

Examples of Federal Funding

The four programs established by the FCC under Universal Service Fund include the Connect America Fund, Lifeline, Schools and Libraries (E-rate), and Rural Health Care.[148] The Fund is paid for by contributions from telecommunications providers based on their interstate and internation of end-user revenues.[149] The Universal Service Administrative Company administers the programs and collects the monies for the Fund under the direction of the FCC.[150]

The United States Economic Development Administration invests in projects that strengthen sustainable regional economic growth and diversification.[151] Of the six evaluation criteria, the

[143] Go Anacortes, City moves ahead with fiber network, reviews costs (January 24, 2018), available at https://www.goanacortes.com/all_access/article_4be22a8e-0098-11e8-8fd3-cf77c008234c.html.
[144] Ibid.
[145] The Western Front, Anacortes to get fiber optic network (March 14, 2018), available at www.westernfrontonline.com/2018/03/14/anacortes-to-get-fiber-optic-internet/.
[146] Ibid.
[147] DSL Reports, AT&T Thinks Fiber Makes More Sense Than Fixed 5G (April 27, 2018), available at http://www.dslreports.com/shownews/ATT-Thinks-Fiber-Makes-More-Sense-Than-Fixed-5G-141708?mc_cid=6afda21f9f&mc_eid=771aa08db7.
[148] FCC, Universal Service (March 29, 2018), available at https://www.fcc.gov/general/universal-service.
[149] Ibid.
[150] Ibid.
[151] EDA, Investment Priorities, available at https://www.eda.gov/about/investment-priorities.htm.

third, "National Strategic Priorities," includes projects that assist and/or support information technology infrastructure like broadband or smart grid.[152]

NTIA administers two broadband grant programs, the BTOP and the State and Local Implementation Grant Program (SLIGP), investing almost $4 billion to bridge the digital divide, create jobs, and improve education, health care, and emergency services across the country.[153] BTOP is funded by the American Recovery and Reinvestment Act of 2009.[154] Projects funded through BTOP deploy broadband, strengthen public computer centers, and encourage the sustainable adoption of broadband.[155] SLIGP is a $121.5 million, formula-based, matching program assisting regional, state, local, and tribal government entities for public safety broadband deployment.[156]

The United States Department of Agriculture's Rural Utility Service (RUS) administers programs providing or strengthening critical infrastructure in rural communities.[157] Eligible projects include water and waste treatment, electric power, and telecommunications services.[158] Under the Telecommunications Program, available grants and loans are: Community Connect Grants, Distance Learning and Telemedicine Grants, Farm Bill Broadband Loans and Loan Guarantees, and Telecommunications Infrastructure Loans and Guarantees. [159]

Examples of State Funding

Established in § 2.2-115, the Governor's Development Opportunity Fund Program provides grants or loans to localities for the creation of new jobs and capital investment. In relation to broadband, funds may be used for the public and private installation, extension, or capacity development of high-speed or broadband Internet access.[160]

Under DHCD, the Community Development Block Grant provides support to localities for strategies that identify and address their greatest community development needs. Here, Telecommunication Planning Grants are available for system development and implementation when a locality has a community-based telecommunications plan.[161] VATI supplements

[152] EDA, Investment Priorities, available at https://www.eda.gov/about/investment-priorities.htm.
[153] NTIA, Grants, available at https://www.ntia.doc.gov/category/grants.
[154] NTIA, Broadband Technology Opportunities Program, available at https://www.ntia.doc.gov/category/broadband-technology-opportunities-program.
[155] Ibid.
[156] NTIA, Grants, available at https://www.ntia.doc.gov/category/grants.
[157] USDA, Rural Utility Services, available at https://www.rd.usda.gov/about-rd/agencies/rural-utilities-service.
[158] Ibid.
[159] USDA, Telecom Program, available at https://www.rd.usda.gov/programs-services/all-programs/telecom-programs.
[160] CIT Broadband, Virginia Broadband Funding Options (July 2015), available at https://www.wired.virginia.gov/sites/default/files/2015%20Virginia%20Broadband%20Funding%20Options_0.pdf.
[161] Ibid.

construction costs by private sector broadband providers to extend services to areas presently unserved by a broadband provider.[162]

The Virginia Economic Development Partnership's strategic plan for the Commonwealth includes three strategies to achieve the following five transformational goals: 1) robust state growth, 2) every region wins, 3) the best state for business, 4) top state economic development organizations, and 5) super collaborator.[163] One of the strategies aims to improve the state's economic competitiveness by leveraging P3s that strengthen infrastructure like broadband. [164]

There are several opportunities for funding through the TRRC. Since TRRC was established in 1999, it has dedicated over $150 million to create fiber infrastructure across Southern and Southwest Virginia.[165] TRRC launched the "Last Mile Broadband Program," setting aside $10 million in its Research & Development Committee Budget to assist in constructing "last mile" connections.[166] Also, the TRRC Loan Fund, in partnership with the Virginia Resources Authority, funds revenue-generating economic development projects in the tobacco region. Priorities include broadband, which extends to "last mile" funding and telecommunications pilot projects.[167]

Increasing State Support for Rural Broadband Deployment

Budget Amendment

The blueprint provides that meeting DHCD's Agency Operating Budget Request of $14 million over the biennium demonstrates state commitment to universal broadband.

On March 21, 2018, Governor Northam introduced a new biennial budget that reduced Item 106 L.1. back to Governor McAuliffe's introduced VATI funding levels of $4 million over the biennium. The original request would allow DHCD to fund 32 projects annually.[168] DHCD cited demand for broadband in rural communities "far exceeds" available funding.[169] During the 2017 VATI application cycle, 17 applications made requests of $39 million.[170]

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[162] VATI, 2018 Program Guidelines and Criteria, available at www.dhcd.virginia.gov/images/VATI/2018%20Virginia%20Telecommunication%20Initiative%20Guidelines%20and%20Criteria.pdf.
[163] Virginia Economic Development Partnership, Strategic Plan for Economic Development of the Commonwealth, available at http://www.yesvirginia.org/strategicplan.
[164] Ibid.
[165] TRRC, Strategic Plan (May 2016), available at https://www.revitalizeva.org/wp-content/uploads/2017/05/Strategic-Plan-2016.pdf.
[166] Ibid.
[167] Ibid.
[168] DPB, Agency Operating Budget Requests (October 2, 2017), available at https://solutions.virginia.gov/pbreports/rdPage.aspx?rdReport=OB_DocView&Param1=41317469.
[169] Ibid.
[170] Ibid.

State Loan Program

In addition, a loan provides critical investment to initiate work on such projects. This blueprint supports establishing a loan program rather than a matching grant.

One potential structure could be a state revolving loan fund. Modeled after the TRRC Revolving Loan Fund, the low-interest loan program is a long-term funding mechanism that provides support for broadband projects, and recycles repayments for future projects.[171]

Additional components of the proposed loan program require tailored eligibility criteria and loan guidelines. Eligibility criteria for projects must include expanding access to high-speed Internet into rural localities. Other criteria to consider for projects may require loan repayment plans and use of broadband infrastructure with capacity to support speeds of 1 Gbps download/1 Gbps upload. Also, localities providing capital for such projects may be eligible for reimbursement.

Guidelines for the loan cap the term at 20 years, and provide low interest payments along the life of the loan. As an incentive, short-term loans below five years require no interest payments. Loans beyond that term will be based on AA Go Tax-Exempt spot rate and loan term found in the TRRC Revolving Loan Fund.[172]

Recommendation 6: Provide additional state support for broadband P3s.

The Way Ahead

Access to reliable and high-speed Internet should not be a privilege in the 21st century, and should not depend on where you live. Defining areas with lack of service and/or speed help target efforts in expanding the critical service to the areas that need it most.

The benefits of broadband are easily felt. Expanding broadband to all corners of the Commonwealth is vital to economic development from critical education tools to capacity-building for current and future businesses. Broadband also provides access to telemedicine, especially important to areas without access to a hospital, and emergency services support.

Rural Virginia continues to lag behand its urban counterparts in the Commonwealth, and Governor Northam has the opportunity to close the "digital divide" with a common sense, community-based, and cost-effective approach. The decision on how to expand depends on available infrastructure and resources, P3s, and community needs.

The time is now to increase state support in innovative P3s in rural Virginia.

[171] TRRC, TRRC Revolving Loan Fund (January 2018), available at https://www.revitalizeva.org/wp-content/uploads/2018/01/TRRC-Revolving-Loan-Fund-Jan2018.pdf.
[172] Ibid.

Appendix A:

Overview of Highlighted Projects

Name	Type	Subsidiary	Size	Infra-structure	Project	Network Type	Network Service	Project Cost	Grants	Posted Speed	Price
BARC	Electric Co-op	Yes	12,500 meters	Electric	Fiber Optic FTTH	Fiber core ring connect to electric substations	400 miles for 4,100 homes + businesses	$66M	BARC lender + $240K CAF	500/250 Mbps + No caps	$150
PGEC	Electric Co-op	Yes	1,300 powerlines	Roads	Performance Agreement with BOS + co-op + IDA for FTTH VDOT free access to fiber	Fiber optic cable along VDOT-maintained road	1,000 ft of roadway for 49 homes + businesses + county facilities	$6M	$1M IDA + $5M co-op	30 Mbps + No caps	$82
MBC	Nonprofit Wholesale Telecom Provider	Yes	1,800 miles of fiber	Roads	VDOT free access to fiber	Fiber optic system with open access	700 miles for 5 cities + 20 counties + 56 industrial parks	$27M	$12M USDC cap grants '04 + $24M TRRC '05/'06 + rev from private telecom providers	155 Mbps	N/A
King & Queen	Wireless Service Authority	N/A	70% of the County	Radio	Wireless	Wireless on radio towers + microcell for 2 gaps	4 towers + 300 residents	$300K	Savings related to broadband recoup cost over 3 yrs	6 Mbps + No caps	$89.99
NoaNet	Nonprofit Wholesale Telecom Provider	N/A	260,000 people + 1,800 fiber miles	Water	Fiber to the People	Fiber conduit connects over 30 pump stations + reservoirs + treatment plants	City-wide	$2.2M	$500K 1st phase construction + $1.7M Anacortes	1 Gbps	$1,000