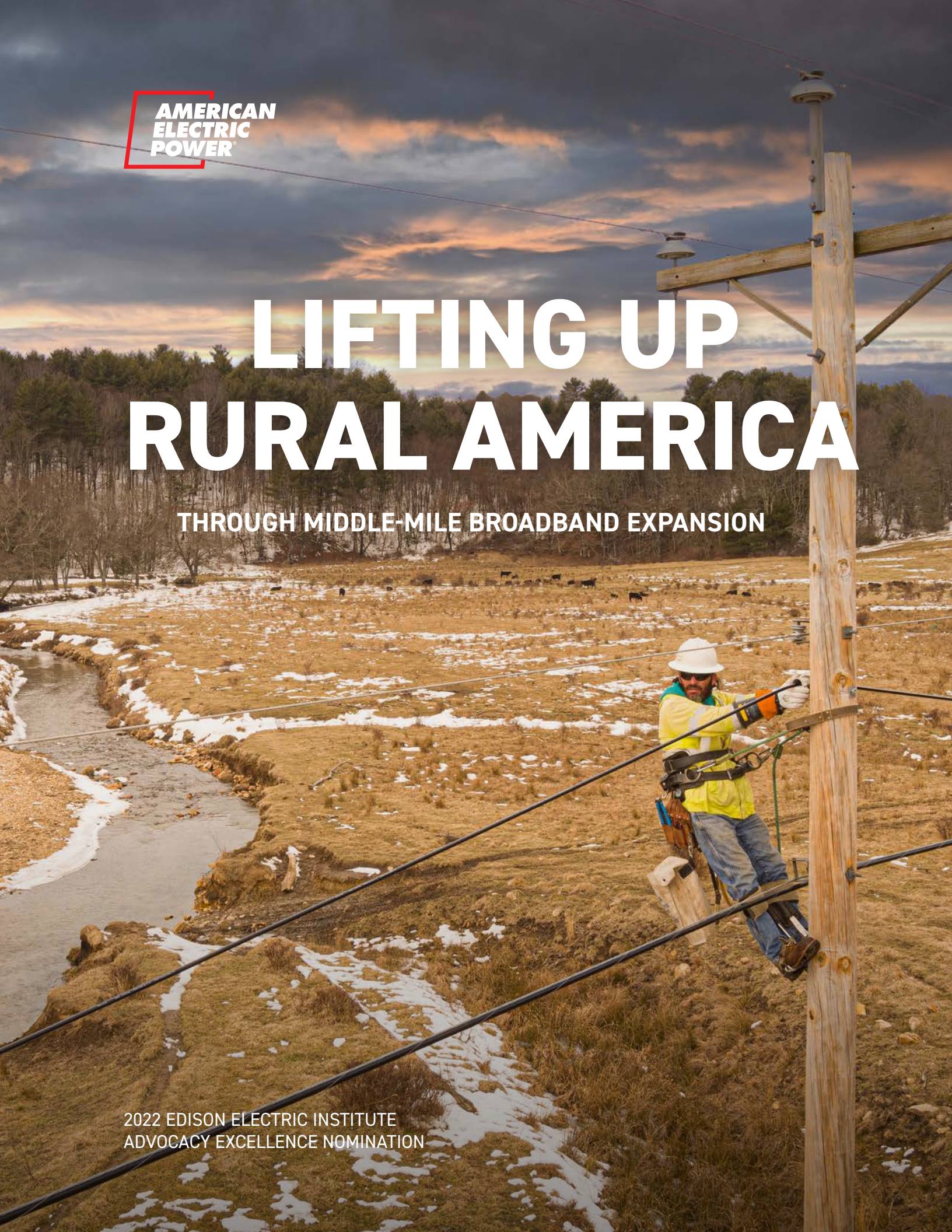

LIFTING UP RURAL AMERICA

THROUGH MIDDLE-MILE BROADBAND EXPANSION

2022 EDISON ELECTRIC INSTITUTE
ADVOCACY EXCELLENCE NOMINATION

EXECUTIVE SUMMARY

In the 1930s most urban people in the U.S. had electric service, but rural America, including nearly 90 percent of farms, did not. Companies simply could not make a business case for extending infrastructure deep into rural areas.

With passage of the Rural Electrification Act in 1936 the tide began to turn, and within 15 years nearly 80 percent of farms had electric service.

Today the urban-rural divide is digital – the high-speed flow of information via broadband. Telecommunications companies have built broadband infrastructure where it makes business sense to do so. But much like with electricity in the 1930s, companies can't justify the vast "middle-mile" fiber optic investment needed to reach rural homes and businesses.

Appalachian Power utilizes a fiber optic network of more than 3,000 miles to operate our electric system. Built largely along our transmission line routes, the network traverses hundreds of small communities left behind by a broadband-powered economy.

With our network already in many places where middle-mile fiber is needed, we knew we had an opportunity to help bring broadband to unserved communities in a way others could not.

We developed a solution to install additional fiber capacity in rural areas and lease that capacity for middle-mile broadband to a telecommunications partner, who would then add last mile connections and provide broadband to unserved rural customers.

To implement our solution we needed legislation that enables electric utility participation, as well as a regulatory process for approval of projects. We also needed an internet service provider (ISP) partner to install last mile connections and provide broadband service.

The work we were doing was groundbreaking, and our greatest advocacy challenge was to convince legislators and regulators that our plan would work.

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60%

OF FIRE AND EMS SERVICES ARE UNDERSERVED

Grayson County Supervisor at Large John Fant says around 57 percent of the county's residents lack access to a broadband connection. "The lack of access is really preventing the county and its people from participating in the modern economy," says Bill Shepley, a Grayson County administrator.

Our core team of believers set out to build a network of support. Externally we recruited committed influencers at local and state levels who carried our message and pushed to achieve results. Internally we tapped expertise from at least 10 departments to implement our legislative, regulatory and operational plans.

From 2018 through 2020 Appalachian Power achieved passage of three pieces of legislation in Virginia and another two in West Virginia that ultimately enabled us to construct, own and lease middle-mile fiber.

In 2020 the Virginia State Corporation Commission granted approval and cost recovery for a 238 mile, $25 million project in Grayson County, Virginia, where our partner GigaBeam Networks is now bringing high-speed internet service to homes and businesses. Another partner, Meta (formerly Facebook), is enhancing the project with access to its long haul fiber routes.

With another project under construction in Logan and Mingo counties in West Virginia, and three more planned projects that were awarded a combined $30 million in grant funding, our model is proving successful.

The global pandemic in 2020 exposed how essential broadband access is, and how vulnerable rural areas are without it. Appalachian Power, and parent company AEP, believe middle-mile broadband is a right-now issue for all of rural America, for which we, and our industry, have an answer.

Our path to rural broadband success in Virginia*

2018

3/2018
VA Grid Transformation & Security Act passes: directs IOUs to conduct feasibility study

12/2018
Feasibility study submitted to VA Legislature

2019

5/2019
VA HB 2691 passes: allows IOUs to seek SCC pilot project approval

2020

3/2020
VA SCC approves Grayson pilot project

7/2020
VA HB 1280 passes: allows IOUs to lease dark fiber

12/2020
Construction begins on Grayson project

2021

4/2021
VA HB 2304 passes: makes IOU broadband projects normal part of business

12/2021
First Grayson project customer connected

12/2022
Expected completion of Grayson project

*We achieved similar legislative and regulatory milestones in West Virginia. Construction on our first project there began in 2021.

THE SITUATION

LACK OF BROADBAND ACCESS IS LEAVING RURAL AMERICA BEHIND

As electrification was beginning to transform life in rural America, our then company president, George Tidd, authored a company creed in which he stated, "We prosper only as the community prospers, so we help it thrive in every way we can."

Today many of America's rural communities are no longer prospering. In areas like Grayson County, the least connected county in Virginia, a large part of the problem is a lack of broadband access. Population has declined and opportunities for business growth and economic development are few.

Rural broadband expansion is this century's version of electrification, and once again electric utilities have an opportunity to help their communities thrive.

Appalachian Power, and parent company AEP, believe we are well-positioned to expand broadband access in unserved areas and lift up rural communities that are being left behind. We believe the infrastructure that brought electricity deep into rural areas last century can and should be utilized today to carry the middle-mile fiber needed for broadband expansion.

Most Fire Stations are Without – Around 6 in 10 fire and rescue stations in Grayson County have no internet access. Chief Brian Billings is thankful Elk Creek Volunteer Fire Department was the first in the county to get broadband from the Grayson project.

Tele-Health is not an Option – Cassie Grubb's daughter Lydia was born with a serious medical condition. Without reliable internet service needed for tele-health visits, the two have to make eight-hour road trips to see a specialist.

Remote Learning is Nearly Impossible – "There's very limited cell phone service and internet access within much of the county," said Karen Shelton, Mt. Rogers Health District Director. "We know that in Grayson County, going virtual is not really an option."

Businesses Suffer Without Internet – "If we don't have a way to contact our customers, we have no business," Dawn Rhudy said of her Mountain Memories Farm in Elk Creek, Va. "We're gonna have to quit if we don't have some better internet."

THE SOLUTION

LEVERAGE UTILITY FIBER FOR MIDDLE-MILE BROADBAND

Appalachian Power provides electric service to a million customers in eastern Tennessee, southwest Virginia and West Virginia. We're no stranger to fiber optic cable. We own and maintain more than 3,000 miles of it for system operations, a number that grows significantly each year as we rebuild aging transmission infrastructure. Fiber also provides a robust communications platform on distribution circuits for grid modernization projects that improve service reliability.

For telecommunications companies the greatest obstacle to providing broadband service to rural homes and businesses is building the costly and lengthy middle-mile infrastructure needed to connect them to the greater internet.

We knew if we could leverage our fiber networks to include middle-mile fiber we could help eliminate this longstanding barrier.

ENABLE ELECTRIC UTILITY PARTICIPATION

Installing middle-mile fiber for broadband expansion is outside a regulated electric utility's scope of work. Bringing our solution to life required eliminating some barriers to entry within our states' respective legislative and regulatory frameworks.

OUR MIDDLE-MILE BROADBAND SOLUTION

- Install additional dark fiber capacity as we expand infrastructure through rural areas.
- Lease the dark fiber capacity for middle-mile broadband use to telecommunications partners, who would then add last mile connections and provide broadband to unserved rural customers.
- Recover project costs through electric rates.
- Credit fiber lease revenue to our cost of service.

OUR PATH TO RURAL BROADBAND PARTICIPATION

- Pass legislation that enables electric utility participation.
- Create a regulatory path to recover project costs and credit fiber lease revenue back to customers.
- Develop partnerships with internet service providers to provide broadband service to unserved customers.
- Pursue state and federal middle-mile funding opportunities to further offset costs.

THE PLAN FOR SUCCESS

Rural broadband as an issue itself is almost universally supported. Yet, as service providers have made broadband widely available in more populated areas over the past two decades, areas like Grayson County have seen little improvement.

Our greatest advocacy challenge – and our plan – was to convince legislators and regulators that electric utilities could find success where telecommunications companies have not.

Armed with a solid solution, a feasible path forward and our industry's record of success in solving rural electrification, our core team of believers set out to build a network of support committed to turning ideas into reality.

POLICY ENGAGEMENT

With major legislative changes needed to become involved in rural broadband expansion, finding officials and legislative leaders to champion our cause was a top priority.

At the local level we worked closely with project organizers, encouraged letter-writing to legislators and scheduled individuals to speak at key General Assembly committee meetings. The Virginia Tobacco Commission committed $325,000 in funding toward last mile connections. During the time of COVID-related school closures the AEP Foundation provided $70,000 for wi-fi hotspots as a stopgap measure.

In both Virginia and West Virginia we recruited passionate state-level influencers who carried the message and pushed relentlessly for results.

In Virginia, Republican Delegate Israel O'Quinn (right), who represents Grayson County, and Democrat Governor Ralph Northam (seated) strongly advocated for universal broadband in the state. Together they won overwhelming bipartisan support for three key pieces of legislation that enabled our rural broadband participation.

Carl Caudill, Grayson County IT Director gathered more than 1,000 handwritten survey responses, in which residents and business owners pleaded their case for broadband access.
"Having Appalachian Power come in cut our original timeline in half. If they can do this project in Grayson County, they can do it anywhere in Virginia."

THE PLAN FOR SUCCESS

PARTNER ENGAGEMENT

We developed partnerships with companies to deliver broadband to end-use residents and businesses.

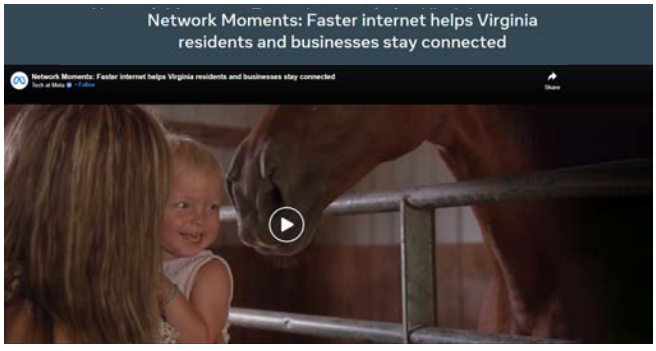
GigaBeam Networks
Broadband Internet Access

GigaBeam, a regional internet service provider (ISP), is connecting to our middle-mile fiber and serving homes and businesses for our Grayson project in Virginia, and will soon do the same for our Logan and Mingo County project in West Virginia.

CEO Michael Clemons conducted media interviews, worked with project organizers and advocated for needed legislative changes.

Meta

Meta (formerly Facebook), whose backhaul fiber is helping power the Grayson project, worked to define standards between Appalachian Power and GigaBeam Networks, which allowed for the faster finalization of network design and enabled everyone to start building sooner.



Tech at Meta produced and promoted a video in which Grayson County residents tell about how lack of broadband access affects their lives.

EMPLOYEE ENGAGEMENT

Internally at least 10 departments are committing resources to the broadband effort. External Affairs, for instance, rallies support for projects and legislation. Regulatory and Legal draft oversight language and file cases for project cost recovery. Telecom develops our fiber installation plans. Transmission sites Point of Presence connection buildings in substations. Right of Way updates utility easements.

Crews take time for a media appearance as they prepare to begin middle-mile fiber installation.

FUNDING ADVOCACY

We are petitioning state and federal broadband grant funding agencies to incorporate guidelines that allow middle-mile projects like ours to be considered, and are engaging on panels with groups such as EEI, UTC and NARUC to broaden support for electric utility participation.

Since 2020 Appalachian Power's leadership has participated in more than 20 industry panel discussions on rural broadband expansion.

THE RESULTS

From 2018 through 2020 Appalachian Power successfully pushed an astounding five pieces of enabling legislation – three in Virginia and another two in West Virginia – that enabled us to construct and own middle-mile fiber.

In 2020 our Regulatory team achieved Virginia State Corporation Commission (SCC) approval and cost recovery for the 238 mile, $25 million project in Grayson County, Virginia, where partner GigaBeam Networks is now bringing high-speed internet service to homes and businesses.

In 2021 the Public Service Commission of West Virginia approved the project and cost recovery for a $61 million, 400-plus mile project now under construction in Logan and Mingo counties that will make broadband available to more than 15,000 unserved customers.

Confident in the success of our model, communities and state leaders are seeking our involvement with additional projects. We've secured nearly $20 million in state-level funding for two additional projects in Virginia, and another $10 million in funding for a project that runs through abandoned mine lands in five West Virginia counties.

Other states are taking notice. This year Texas lawmakers are considering enabling legislation backed by an AEP sister company, which is modeled after a bill passed in West Virginia.

THE GREATER OPPORTUNITY

The global pandemic in 2020 exposed how essential broadband access is, for education, health care and employment – and how vulnerable rural areas are today without it. That recognition is bringing about massive levels of infrastructure funding, a growing portion of which is targeted at middle-mile expansion.

This entry is not a one-company or one-state issue. It is a *right-now* issue for all of rural America, for which our industry has an answer. Using plans like the one outlined here, Appalachian Power and other like-minded investor-owned utilities and cooperatives are lighting up fiber in project after rural project.

Success from legislative changes in states like Alabama, Mississippi, Virginia and West Virginia is encouraging other states to follow.

Appalachian Power and other electric utilities that are pursuing rural broadband expansion are creating greater opportunities for business growth, customer retention and economic development – and, as with rural electrification decades before, are making fans in every community their transformational work touches.

PART OF THE PLAN

PLANING CHECKLIST

Local organizers are using the checklist we developed to prepare for broadband projects and secure funding. In December the Virginia Telecommunication Initiative (VATI) awarded a combined $20 million in funding for Appalachian Power's second and third rural broadband projects in planned in the state.

In response to the announcements of Appalachian Power Company's (APCo) broadband projects in Grayson County, Virginia, and Logan and Mingo counties in West Virginia, APCo put together this checklist of planning activities that interested communities can use to assist them in preparing for potential APCo broadband projects in their areas.

The gathering of information outlined below will assist communities in their planning for expanding broadband access within their boundaries, as well as save valuable time getting broadband service deployed. The interest we have received from communities to expand broadband access for their citizens has shown the need for us to prioritize future project locations by communities that have prepared for such projects.

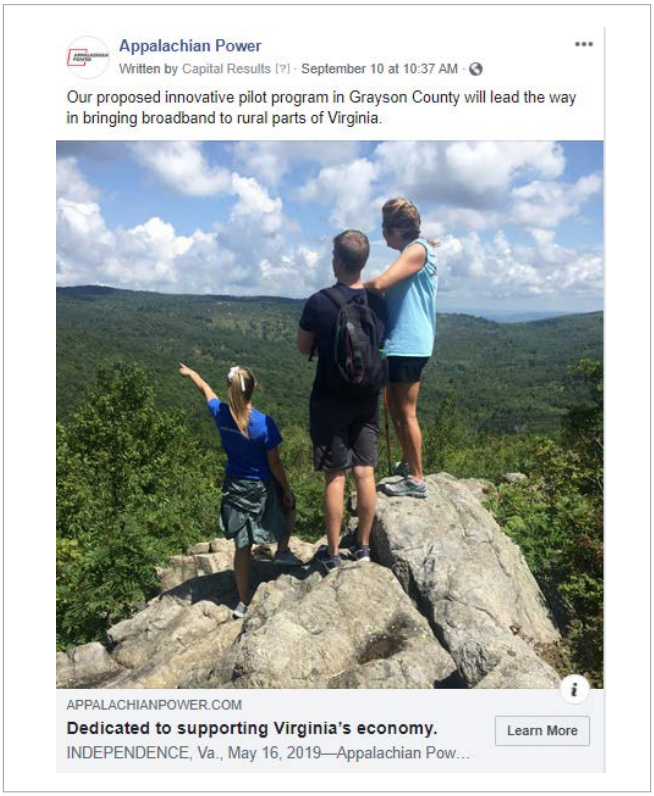
1. Briefly **describe goals for the community** as they relate to broadband connectivity **and the vision of the future** related to needed service improvements.
2. **List local resources with contact information** that are available in planning and coordinating a broadband project.
3. **Compile a connectivity report** showing area connectivity across the population spectrum for speeds of above and below 25/3 Mbps for the following:
   - **Residential** — percentage unserved (below 25/3 MMbps)
   - **Schools and Libraries** — bandwidth - national goals vs. existing service
   - **Public Safety** — what percentage is unserved by FCC definition in which areas
   - **Business** — percentage unserved
4. **Portray the connectivity information on an area map** showing where broadband access needs to be provided.
5. **Compile a report, with accompanying mapping, of existing broadband service infrastructure** in the area. Include areas covered and number of customers served by cable, DSL, fiber optic cable, fixed wireless structures and cellular service.
6. **Rank your community's connectivity** in comparison to neighboring communities and the rest of your region in terms of connected households, schools and libraries.
7. **List challenges for the locality,** such as limited fixed wireless vertical assets (cell or radio towers), area terrain and citizen income limitations.
8. **List opportunities for the locality,** such as business development, tele-health and education program expansion. Include businesses that might be interested in leasing available middle mile fiber for their communication needs.
9. **Provide demographic information,** such as number/percentage of households with school age children, average income of residents, average age of residents or age demographic spectrum, number of businesses in the area, business sectors in the area, and area public services available along with the number of public service buildings needing to be served.
10. **Report on available financial grant opportunities in your area,** such as FCC maps that show unserved areas, similar grant opportunity areas from HUD, USDA, ARC, or state grants. Understand the contacts to apply for such funds as well as the procedures to apply. List the local resources available in applying for grants, gathering needed information or educating grant partners on available opportunities.
11. **Keep community survey reports and information on citizen connectivity,** such as speed tests, door-to-door surveys, student surveys, or similar studies that verify the developed maps in item 3.
12. **Develop a prioritized broadband deployment plan** based on demand, existing assets and community service needs. The plan should be dynamic and updated at least annually based on changing circumstances or priorities.
13. **Identify all Internet Service Providers (ISPs) operating in your community and surrounding communities.** Categorize the ISPs per technology provided,such as Fiber To The Premises (ITTP) or Wireless Internet Service Provider (WISP), along with their community infrastructure. Determine if these ISPs have expansion plans or proposals for your community. Provide references, complaints and recommendations related to the ISP's service performance in areas such as reliability, service restoration and plan costs using local citizen comments, feedback from community officials and national service rankings.
14. **List prior, existing or potential future broadband projects** in your community. **List any potential flexibility with ordinances, leases and policies** that might be of assistance to future broadband project construction or broadband network operation.
15. **COLLECT FEEDBACK OF CITIZEN DEMAND FOR INTERNET SERVICE. Establish a communication network to update citizens of progress towards the community's broadband goals, and keep the communication interactive in case feedback or information is needed from local citizens.**

PART OF THE PLAN

SOCIAL MEDIA POSTS

PART OF THE PLAN

SOCIAL MEDIA POSTS



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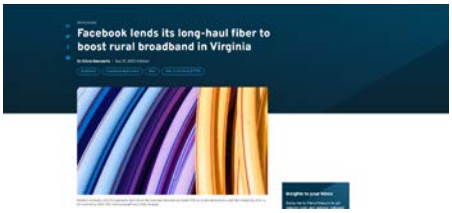
MEDIA OUTREACH

Galax Gazette
Grayson broadband project approved
Partnership with APCo and GigaBeam will transform Grayson from the least-connected to one of the most-connected rural counties in the U.S.
by Shaina Stockton, Thursday, May 28, 2020
Link: https://www.galaxgazette.com/content/grayson-broadband-project-approved

FIERCE Telecom
Facebook lends its long-haul fiber to boost rural broadband in Virginia
by Diana Goovaerts, Sept. 27, 2021 11:56am
Link: https://www.fiercetelecom.com/telecom/facebook-lends-its-long-haul-fiber-to-boost-rural-broadband-virginia



Cardinal News
No more going to the cemetery to get wi-fi
by Brian Funk, Sept. 28, 2021
Link: https://cardinalnews.org/2021/09/28/facebook-joins-grayson-countys-broadband-roll-out/

The Roanoke Times
Broadband bonanza: Infusion of money to help across Southwest Virginia
by Luke Weir, Dec. 14, 2021
Link: https://roanoke.com/news/local/govt-and-politics/broadband-bonanza-infusion-of-money-to-help-across-southwest-virginia/article_e80bc942-5c60-11ec-b76c-6f670b03208c.html

WSLS-10
High-speed internet coming to Grayson County
Irisha Jones, May 15, 2019
Link: https://www.wsls.com/news/2019/05/15/high-speed-internet-coming-to-grayson-county/

PART OF THE PLAN

MEDIA OUTREACH

WSLS-10
As schools go virtual, Grayson County is sticking with in-person education
Taj Simmons, December 7, 2020
Link: https://www.wsls.com/news/local/2020/12/07/as-schools-go-virtual-grayson-county-is-sticking-with-with-in-person-education/

WDBJ-7
First customer in Grayson County receives high speed internet access
by Brittany Morgan, Dec. 14, 2021
Link: https://www.wdbj7.com/2021/12/14/first-customer-grayson-county-receives-high-speed-internet-access/

WFXR-10
First fiber optic cables installed on Appalachian Power utility poles in Grayson County
by: WFXRtv.com Digital Desk
Link: https://www.wfxrtv.com/news/local-news/new-river-valley-local-news/first-fiber-optic-cables-installed-on-appalachian-power-utility-poles-in-grayson-county/

Tech at Meta (formerly Facebook)
Network Moments: Faster internet helps Virginia residents and businesses stay connected
by Boh DuPree, Michele Kohler, September 23, 2021
Link: https://tech.fb.com/network-moments-virginia/

PART OF THE PLAN

LEGISLATION PASSED

Virginia Grid Transformation and Security Act of 2018 (March 2018)
Directs Investor-Owned Utilities (IOUs) to conduct feasibility study on ability to participate in a rural broadband solution

Virginia House Bill 2691 (May 2019)

Allows companies to seek Virginia State Corporation Commission (SCC) approval for a pilot project

Virginia House Bill 1280 (July 2020)
Allows investor-owned utilities to lease dark fiber

West Virginia Senate Bill 3 (March 2019)
Allows electric utilities to submit broadband feasibility studies

West Virginia House Bill 4619 (June 2020)
Enables electric utilities to develop broadband infrastructure as regulated by the W.Va. Public Service Commission of West Virginia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