Skinny Wire

A Publication of WALKER POWERED BY USTC

Volume XVI Issue 1 walkerfirst.com/skinny-wire Insights for ICT Professionals

Emerging Broadband Service Providers:

- New Contenders
- New Strategies
- New Funding Programs

PLUS:
USTC Corp Founder, CEO, and Chairman of the Board, Cédric Varasteh, New Vision For Providing Customer Value

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Editor's Letter

While 2020 may be the year we will always want to forget, 2021 may easily be the year we, as members of the ICT community, will always remember. The collective voices of community members, community leaders, and industry associations at last caught the attention of elected officials at local, state and federal levels in ways that prompted action. The digital divide debate reached its peak, and this conversation resulted in what has shaped as the largest investment in broadband infrastructure in history. Not since the Rural Electrification Act of 1936 has our country seen this collective investment into technological infrastructure. This once in a generation opportunity is now reshaping the ICT industry in remarkable ways, and this issue of Skinny Wire highlights some of the results already at play - the emerging service providers who are focused on delivering community broadband.

Whether it's WISPs, page 45, FISPs, page 34, REMCs, page 20, PUDs, page 8, PPPs, page 30, Tribal Nations, page 18, or non-profits, page 41, the work is already paying off for communities, their residents and their businesses. And, this is just the tip of the iceberg of what we can expect to see as tens of billions of dollars are slated for allocation at local, state and federal levels in coming years.

I daresay none of this would have been possible apart from the solid work and leadership of our industry's member associations. Whether it was the state and regional associations who have their ears closest to the ground as they respond to individual carrier member voices, or the national associations who provide amplification of those voices through their lobbying efforts, these organizations proved their worth. It certainly wasn't a single year's worth of work, however. The smiles on the faces of leaders like Shirley Bloomfield, Chip Pickering, Gary Bolton, Claude Aiken, Sheryl Osiene-Riggs, Jim Matheson and others represent years of focus, organization, determination, tenacity, and boldness. I hope you'll join me in a collective standing ovation for these powerful leaders who championed investment into bridging the digital divide.

The looming challenges of supply chain issues and labor shortages cannot be overlooked. Cathy Cash's article on page 46 highlights what it means to stand in line for materials in a world flush with spendable resources. The demand for materials is monumental. As John Badal points out in his article on page 18, it could represent a "perfect storm."

The work is not finished, and has merely begun. Innovation in our industry continues escalating. Technology advances. As we barely scratch the surface of 5G deployment at the end of 2021, the conversation on 6G is well underway. An opportunity to do good work in this industry is easily found. Cheers to a healthy, prosperous, and digitally united, broadband connected 2022, regardless of where you live or work.

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Closing the Digital Equity Gap For Good

By Gary Bolton
President and CEO
Fiber Broadband Association

In 2022, there is a huge opportunity for our industry to close the digital equity gap for good, especially if the right future-proof technology is deployed. The pieces are finally coming together after years of legislative efforts to make broadband funding a priority in the Infrastructure Investment and Jobs Act, with $65 billion available for projects.

COVID's silver lining was highlighting high-speed broadband access as a fundamental necessity for today's society, no matter who you are or where you live. Funding is now available to start lighting up communities and it's time to go to work by securing project funds and starting the physical labor of putting in conduit and stringing lines on poles to reach residences and businesses.

The Infrastructure Act along with other federal programs such as the FCC's Rural Digital Opportunity Fund (RDOF) and this year's American Rescue Plan have opened the doors for new entrants to deliver broadband services. Tribal nations, municipalities, public-private partnerships, rural electric cooperatives, and more are tapping in the billions of dollars in funding now available.

Fiber is the only way you get a 21st Century broadband network that will last for a generation, period, full stop. It's scalable and upgradable at minimal capital costs, providing a long-term solution for delivering services that can grow and adapt as people and businesses develop new applications.

The cable industry is migrating to fiber because the physical medium and basic network elements can only be jury-rigged so much beyond their original specifications to reach to gig speeds for residences, and they are much less unable to support symmetrical services above gigabit rates for business use. Cable's goal to provide 10G services doesn't happen without fiber and you can see the strategic value of fiber by the ongoing announcements by service providers migrating from coax.

Last-mile technologies like second-generation fixed wireless and cellular 5G solutions need fiber to get to the last mile in the first place. Wireless distribution points providing speeds of up to 100 Mbps and need gigabit-speed fiber to support multiple residences without delays and delivering multi-gigabit speeds with 5G will require 100Gbps middle mile support.

Fiber is the long-term future-proof investment path for broadband delivery, supporting 5G and fixed-wireless in those situations when necessary. We can clearly see a path to 100G symmetrical speeds on the last mile and terabyte speeds on the mid-mile – something you just can't say for any other technology.

FBA helped guide the industry through the passing of the 2021 Infrastructure Bill which allocates $65 billion for broadband investment. Our work now shifts from the federal level to the states, getting the $42.5 billion in NTIA funding moving into local projects. There's a lot of steps involved in accessing funding. States need to understand their next moves and requirements in both the short and long term.

In partnership with NTCA – The Rural Broadband Association, we announced we will be publishing a Broadband Infrastructure Playbook to assist State governments as they implement their broadband projects and put funding to the best possible use. The Playbook will be a comprehensive guide to best practices and the federal infrastructure funding process. It will provide a detailed overview of the statutory requirements associated with the new broadband infrastructure law, recommendations for best structuring a State broadband program, the benefits for consumers and communities of directing funds towards reliable future-proof fiber networks, and templates for State funding applications and the subsequent subgrant competitive award process. This guide will be published in early 2022 in advance of the National Telecommunications and Information Administration's (NTIA) Notice of Funding Opportunity, which is expected by May 2022. The Broadband Infrastructure Playbook will leverage lessons from successful, established broadband programs and deployments to provide the following elements of best practices including overall program plan, sequencing and timing of activities; recommendations on how States can best incorporate federal grant programs; key process and information requirements (e.g., in the mapping of underserved areas, the management of the award process and post-award monitoring); organizational structure, scale and distribution of responsibilities and; interfaces with other State government departments and external bodies.

But there's still plenty of work to be done once the money is allocated. Rights-of-way and permit management will be a challenge. Pole access is still difficult and we're hoping for changes at the federal and state level to expedite putting fiber up. You can have up to 13 federal agencies involved in permitting, with the permit process adding 20 to 30% or more to the cost of a project in terms of delays if organizations don't proactively examine and anticipate regulatory needs up front and hold regulators accountable during the process.

Supply chain issues are going to have to be carefully watched over the next twelve 12 months as manufacturers and shippers alike work through disruptions. Having a trusted relationship with key suppliers and understanding their challenges is vital. Smaller organizations will have to be especially cognizant about how and when to order, since larger carriers are using their buying clout to be at the head of the line. Our manufacturing members recognize the importance of increasing

" We can clearly see a path to 100G symmetrical speeds on the last mile and terabyte speeds on the mid-mile . . ."

supply for the long-term and are investing in new facilities to meet the country's needs for broadband gear in the months and years to come.

But fiber can't splice itself. The need for a highly trained workforce has never been greater with a shortage of qualified fiber workers today. Communities and service providers will need skilled technicians to do the work of new installation and ongoing maintenance when necessary. FBA launched its Optical Telecom Installation Certification (OpTIC) Program in July 2021, with unique curriculum designed by leading experts in the fiber community to quickly scale technical education, fill existing fiber skills gap and accelerate fiber deployments across North America.

Currently being piloted at Wilson Community College in Wilson, N.C., the OpTIC program will be offered nationwide through vocational schools, community colleges and veteran training programs. It consists of 144 hours of combined class and lab courses followed by a 2,000 apprenticeship fully approved and recognized by the U.S. Department of Labor. The program will include technical content for today's fiber technician as well as plenty of hands-on practice with the goal of compressing the time needed to equipment to be safe and productive in the field. Participants that complete the OpTIC program will be certified as an FBA Accredited OpTIC Technician.

Service providers and everyone supporting the fiber ecosystem should recognize that having to tackle problems such as rights-of-way, permitting, supply chain, and adding more fiber technicians are the type of problems we want to have. We have a generational opportunity to build a national broadband network for all that will support the needs of ourselves, our children, and our grandchildren. The funding is available and it's time to start building in earnest.

Gary Bolton
President and CEO
Fiber Broadband Association

Gary Bolton serves as president and CEO of the Fiber Broadband Association — the largest trade association in the Americas dedicated to all-fiber-optic broadband. With more than three decades in the telecom industry, Bolton joined the Fiber Broadband Association as president and CEO in 2020 after serving on the association's board as vice chairman, treasurer and vice chairs of public policy and marketing committees.

Building America's Rural Broadband

By CommScope Staff Writers

Did you know that now is the best time to tap Washington, D.C., for broadband grants? Through the NTIA's Broadband Infrastructure Program (BIP), American Rescue Plan Act, and the Infrastructure Investment and Jobs Act, Congress is committing billions to helping even the most rural communities achieve high-speed internet for its residents. Over the next decade, the U.S. federal government is expected to award up to $1 trillion in federal funding to help small and rural communities upgrade their infrastructures.

WHAT SHOULD YOU DO?
If you are a rural municipality with limited broadband access and/or low internet speed, chances are you qualify. Your next step would be to take stock of your current infrastructure, decide the ideal way to update it, and make goals as to when and how you want to achieve this.

Another way is to seek answers from your neighboring municipalities or a membership association to learn how they optimized their broadband. However, not all communities have the same challenges or needs. So, using their design, process, or solution may not work for your specific situation.

Because seeking grant monies from the federal government can be confusing, intimidating and overwhelming, CommScope wants to partner with you to make the application process run as smoothly as possible. We can help you devise the perfect solution that's as unique as your community's needs.

NAVIGATING YOUR NETWORK'S DESIGN
Designing a best-fit broadband network begins by breaking it into its three main parts: central office (CO) cabling and connectivity, the feeder and distribution network, and your on-premises drop strategy for single family units (SFUs) and multi-dwelling units (MDUs). Of course, all three are interdependent and must be designed within the context of the others. That being said, a number of larger trends are affecting broadband network designs. Here are a few of them:

- There is a strong preference among operators for passive optical networks (PON) to handle residential and business services. This same PON architecture continues to evolve to the point of supporting 5G backhaul.
- Network operators are turning to newer PON technologies that have evolved from GPON. These include XGS-PON and NG-PON2. Two additional technologies, 25G and 50G PON, are now in development and will be ideal for 5G cross-haul.
- Wave division multiplexing (WDM) is enabling operators to get more out of their existing networks. WDM options include passive, active and a mix of semi-active or semi-passive. The widening variety of solutions will enable operators to choose a best-fit solution for their specific applications.
- A growing number of rural providers are considering fixed wireless as a way to answer the ubiquitous demand for faster (read 1 Gbps) broadband.

CommScope created the FTTH ePlanner (http://communication.walkerfirst.com/commscopeftthnetworkeplanner) to help you navigate and understand the broadband landscape. It explains the pros and cons of each architecture strategy and topology solution set, providing helpful resources and product information along the way. It enables you to compare a range of architectures and topology solution sets. With today's federal government awarding grants to help rural communities build a substantial broadband network, now's the best time to partner with us to get your grant proposals written.

Broadband Infrastructure: New Networks, New Customers, New Jobs

By Chip Pickering
CEO
INCOMPAS

Standing on the White House lawn, flanked by Republicans and Democrats, President Biden put pen to paper, signing the largest broadband investment in our nation's history into law. It was historic, it was bipartisan, and for families and small businesses stuck without broadband access, slow speeds, and terrible service, it was a sign of hope.

Moving the Infrastructure Investment and Jobs Act (Infrastructure Act) through Congress was a monumental achievement. INCOMPAS and its members worked with leaders like Senator Michael Bennet (D-CO), Senator Angus King (I-ME) and Senator Rob Portman (R-OH) to produce a framework for universal connectivity and preparing our economy for future success.

The Infrastructure Act includes $65 billion designated for broadband deployment and affordability assistance to help connect all Americans to the internet. Combined with other COVID recovery programs, policy makers in Washington have stepped up to the challenge. Plus, the law includes language that prioritizes investment in future proof networks that also can support the deployment of 5G (something only fiber can do).

This is important. The future of our broadband networks will determine the future of our nation's ability to compete and attract the jobs of the future. Self-driving vehicles, connected cities, advanced manufacturing and telemedicine are just a few of the fields that are desperate for more bandwidth. Other nations have taken note, including China, Great Britain and the EU who have all set bold gigabit speed goals and are making massive investment into fiber construction that supports wired and wireless growth.

The Infrastructure Act can help place the United States in a position to lead the world with its future proof, higher speed preferences that will also support 5G capability. But only if we make a strong and serious commitment to fund the networks that are better, faster, and more affordable. The good news is we already know what works: competition.

We are now 25 years since the Telecommunications Act of 1996 changed the world. That law, which I was proud to work on as a Senate staffer, helped give the United States a jumpstart in the internet innovation economy. The '96 Act made competition the law, and while competitive networks have always had to fight through incumbent roadblocks to reach consumers, it's undeniable that the number one bi-product of competition is innovation, and our innovations over the past 25 years have changed the industry and the world.

Think about it. Ethernet is a competitive innovation. VOIP is a competitive innovation. Nationwide, one-stop communications service is a competitive innovation. Cloud is a competitive innovation. And streaming, yup, is brought to you by competition.

Done right, and implemented with competition principles, the Infrastructure Act has the power and potential to be even more transformative for our economy. Here is a look at where key competition policy decisions will be critical:

NTIA

The National Telecommunications and Information Administration (NTIA) at the Department of Commerce will be responsible for administering the Infrastructure Act funding to the individual states. In addition to Secretary of Commerce Gina Raimondo, internet advocate Alan Davidson was nominated by President Biden to lead the NTIA, and he brings a tremendous amount of experience and energy to the job. We've urged the Senate to confirm him ASAP.

NTIA should rely on two principles in its implementation: competition and consistency.

Competitive opportunity and access for new, smaller, and local providers has always been the leading driver of new network growth. It also has the added benefit of giving consumers lower prices, attracting private investment, and delivering more innovation.

For consistency, NTIA should look to the recent guidelines from other federal agencies, including the Treasury Department and Department of Agriculture. Both have invested a great deal of time and effort in 2021 administering other broadband programs and recommend funding faster, future proof options that promote sharing and network growth.

State and Local

I truly believe that the success or failure of the entire Infrastructure Act (not just the broadband dollars) depends on the ability of our friends and partners in state and local government to build and deploy smart new networks in the fastest way possible. It won't be easy, monopoly interests – from older internet service providers to railroads - will work to stop and slow new competition. And if faster, high-speed broadband gets stopped (or unduly delayed), other infrastructure plans for transportation projects, connected cities, and other jobs that depend on broadband (all of them) will be in trouble.

The good news is that several smart, forward-looking communities, both urban and rural, have deployment strategies that give their families and small business access to fiber and faster competitive alternatives. In these communities, consumers pay less and get more. Plus, the National Association of Counties and the National League of Cities have both advocated for building gigabit speed fiber in the Infrastructure Act.

In addition, for the first time many localities will have "dig once" and "one-touch make-

ready" policies that INCOMPAS has long-championed and fought for, be in place and be ready to go. It just makes common sense: if you're going to put in a road or bridge, be sure to add future proof broadband infrastructure at the same time.

FCC

The Federal Communications Commission (FCC) remains a bedrock institution for defining broadband growth, access, and affordability. A full slate of commissioners is needed and necessary, and we hope the United States Senate will move as quickly as possible to make that happen. The new Chairwoman, Jessica Rosenworcel, brings experience and a track record of success. We were pleased to hear her say competition was at the core of the FCC's mission during her confirmation hearing. And her continued support for a competitive E-Rate program not only helps students and teachers, but it also transformed communities by bringing better broadband where it was needed most.

"It just makes common sense: if you're going to put in a road or bridge, be sure to add future proof broadband infrastructure at the same time."

Of utmost importance to implementing the Infrastructure Act will be the quick release of broadband maps that will help guide resource allocation decisions. It's well known and documented that the current maps, based on Form 477 data, are deeply flawed, and fail unserved customers, families, and small businesses.

Fixing the maps will help speed deployment, but the FCC needs to have a real and substantive conversation about broadband speed benchmarks. The United States' current 25 /3 Mbps speeds are woefully inadequate for families, students, and creators. Slow speed benchmarks are an embarrassment for our nation, and we simply cannot afford to fall behind other countries in the race to a faster future. Chairwoman Rosenworcel's commitment to reviewing the benchmark and raising our goals is much needed to ensure that the U.S. doesn't fall further behind our peers.

Look, our bandwidth demands are growing. This was true before COVID-19 and will remain a central priority to our economic reality for a long time. This is a good for jobs, this is good for deployment. Now is our chance to build future proof networks faster, and to shape a better future for tomorrow.

About the Author

Chip Pickering has been CEO of INCOMPAS since January 2014. During that time, INCOMPAS has achieved significant growth with leading internet, backbone, business broadband, wireless, and international companies. Under his leadership, INCOMPAS has led numerous public policy campaigns promoting competition through an open internet and in the business broadband market.

Pickering was a six-term Congressman representing Mississippi's Third District. During his time in the House, he served on the Energy & Commerce Committee, where he was vice chairman from 2002 to 2006 and a member of the Telecommunications Subcommittee.

He also was co-chairman and founder of the Congressional Wireless Caucus and an assistant minority whip of the House. Previously, Chip worked for Sen. Trent Lott (R-Miss.) and served as a staff member on the Senate Commerce Committee, where he helped shape the Telecommunications Act of 1996.

Because of his role in drafting the 1996 Act, he became well known as a Congressional leader on telecommunications issues. While in Congress, Chip served as chair of the subcommittee overseeing the transition to the commercial internet, the establishment of domain names, registries, and internet governance. He also successfully led a bipartisan legislative effort to codify net neutrality principles through the House in 2006.

INCOMPAS represents Internet, streaming, communications and technology companies large and small, advocating for laws and policies that promote competition, innovation and economic development. Throughout the year, INCOMPAS also and provides opportunities to learn, grow business and network at annual events, including The 2021 INCOMPAS Show, taking place October 25-27 at The Cosmopolitan in Las Vegas.

A Dual Path Forward:
How A Public Utility District Delivered A Community-Based Broadband Network

By Doug Dawson
President, Founder
CCG Consulting

As the owner of a telecom consulting firm, I've worked with several hundred communities that want better broadband. Cities hire me in response to complaints they routinely hear from citizens. Cities hear that local ISPs didn't deliver the needed upload speeds during the pandemic to support working and schooling from home. Cities also field complaints about broadband networks that aren't reliable and that regularly drop service. Probably the most common complaint in cities is that citizens want more broadband choice – they are coming to view the local cable provider as a monopoly.

The rural communities that seek me out are looking for broadband that works. Their citizens are commonly saddled with broadband options that are not sufficient for today's broadband needs. Homes are limited to choosing between slow rural DSL, fixed wireless, cellular hotspots, or GEO satellite broadband.

Open Access Network Challenges
Practically everybody that comes to me now wants fiber. They've done enough research to know that a new fiber network will bring faster speeds, reliable service, and fresh competition. Most communities that seek me out are intrigued by the concept of open-access – where a community builds a fiber network and invites multiple ISPs to compete for service. The idea of having multiple ISPs competing with price and service is a magnet for communities that are hungry for choice.

Unfortunately, the reality of operating an open-access ISP is far different than the appealing ideal. Being successful as a facility-based ISP requires economy of scale. The greater the number of customers, the easier it is to cover overheads and repay the cost of building the fiber network. Economy of scale is harder to achieve for an open-access network owner. It costs almost as much to build an open-access network as it does a retail fiber network, but the revenue stream for open-access is much smaller. This is easy to understand. An open-access network owner might charge $35 to $40 to ISPs for a wholesale fiber loop, which is far less than the average revenue charged by a retail ISP selling directly to customers. While there are some savings from not having to operate the retail part of the ISP business, the cost savings are not nearly as great as the difference in revenues. While most open-access networks generate enough revenue to cover operating expenses, it's nearly impossible for a small open-access network to ever recover the cost of building the fiber network.

There are other challenges with open-access networks. Perhaps the biggest challenge of an open-access network is that the multiple ISPs are often not driven to aggressively market. The ISPs have made no capital investments in the network and don't feel any pressure to sign up as many customers as possible. Instead, it's common to see ISPs only selling to the low-hanging fruit and cherry-picking the customers willing to buy a premium suite of services. There are also regional challenges for creating an open-access in parts of the country where there are not enough local ISPs willing to join a network. It's hard to be an open-access network if ISPs don't come to the network, particularly ISPs willing to sell to residential customers.

An Alternative Solution
This article is about a community that loves the idea of open-access but recognizes the financial challenges and is willing to try something different. Jefferson County PUD (Public Utility District) is the countywide electric and water utility in Jefferson County, Washington. Like most electric companies, the PUD has built some fiber to connect electric substations. And like many municipalities, the PUD has also connected fiber to schools, firehouses, and other government facilities.

Jefferson County is like many counties in the U.S. in that rural customers have poor broadband choices. The public has been asking the PUD for several years to build fiber. Building fiber throughout the county will be a challenge. The county is bordered on one side by the Olympic National Park, with miles of jagged Puget Sound shoreline on the other. It has rough terrain, is heavily wooded with nearly no flat ground. The soil in the county is not conducive for burying fiber, and many of the PUD's older pole lines need a lot of work before adding fiber.

Jefferson County PUD is somewhat unique in that it has only been in the electric business since 2013. After the previous commercial electric utility closed local service centers and outsourced outage response to contract crews located hours away, the citizens of Jefferson County voted to buy out the electric company. In 2013, after years of negotiations, the county's small public water and sewer district borrowed $115 million from the USDA's Rural Utility Service to buy an aging electrical grid with seven substations and 20,000 customers.

The PUD wants to respond to customer demand and is interested in bringing fiber broadband to the county. In doing so, the PUD is pursuing a unique business model where it will build last-mile fiber and offer open-access fiber to other ISPs while also providing retail ISP services directly to customers.

Legislative Issues
The option for a public electric utility in Washington to be a retail ISP is new. PUDs were prohibited from offering retail ISPs services through the 21-year-old code 54.16.330. Earlier in 2021, in a bizarre legislative action, the legislature passed two competing bills that opened the door for PUDs and Port Districts to become a retail ISP. The governor ended up signing both bills simultaneously, literally with a pen in each hand. One bill allows PUDs and Port Districts to provide ISPs only to unserved customers, and the other has no restrictions. The Secretary of State has ruled that the less restrictive bill takes precedence, but no one is sure if her ruling will hold up to a legal challenge.

The recent entry of the PUD into the electric business was good practice for entering the broadband business. The PUD has expanded substations, added reclosers, replaced regulators and transformers, built a SCADA system, moved electric wires underground, and replaced many miles of old electric lines each year. This has already resulted in a huge improvement in electric reliability and restoration times. But it also means that as a new utility spending millions on existing infrastructure upgrades, that cash reserves are tight, and there is a reluctance to add to the PUD's existing debt from the purchase of the electric grid.

Making the Case for Retail ISP
The PUD's elected Board of Commissioners recognizes the need for better broadband in the county but insists that a new fiber busi-

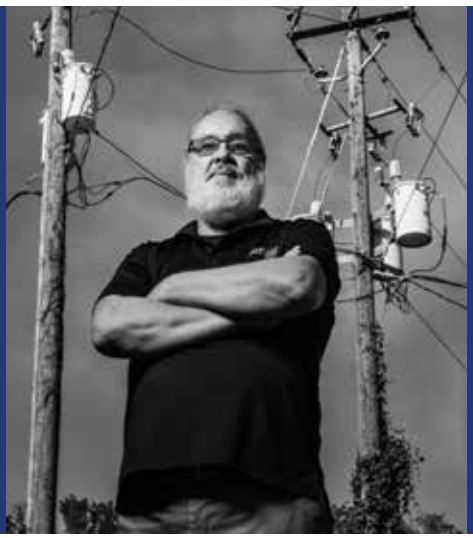
" . . . the PUD is pursuing a unique business model where it will build last-mile fiber and offer open-access fiber to other ISPs while also providing retail ISP services directly to customers."

ness must pay for itself. The PUD doesn't have the cash reserves needed to subsidize a new fiber business during the start-up years and can't take a chance on launching a fiber business that needs long-term subsidies. That is why it is key for the PUD to look at all options for maximizing the return on any investment in fiber. The requirement to be self-sufficient is what drove the decision to become a retail ISP. It's also driving the PUD to aggressively pursue federal and state grant funding to help pay for fiber construction.

Another reason why the PUD is pursuing retail services is that there are not many existing ISPs on or near the peninsula that are obvious candidates to jump onto a new network. The PUD has heard the stories from other PUDs in Washington that operate open-access networks that warn about the challenge of finding and keeping ISPs on their networks. They hear how ISPs prefer to sell to businesses and not residents. They hear that ISPs won't market to customers in the more remote parts of a county to save money on dispatching trucks. They hear that many ISPs won't sell to low-income households.

The PUD wants a fiber network that will benefit every citizen and business in the county, and that made it an easy decision to take the dual-path forward. The PUD understands it will have an interesting balancing act to handle both roles at the same time. The PUD must set wholesale open-access rates at a level that gives other ISPs a decent chance to compete.

The PUD is still at the start of the dual-track journey and hopes to start serving retail customers in early 2022. Now that the business model decision is behind them, the PUD is off and running on the next step of finding grants to help build rural fiber. It's a journey I look forward to following.



Doug Dawson is the President and founder of CCG Consulting – a full-service telecom consulting firm with over 1,000 clients since 1997. CCG offers a full range of telecom services including engineering, regulatory compliance, business planning, strategic planning and implementation services. One of Doug's areas of emphasis is helping clients find financing for network expansion.

Doug has worked in the telecom industry since 1978 and has both a consulting and an operational background. Doug writes a daily blog called Pots and Pans by CCG.

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USTC Corp Founder, CEO, and Chairman of the Board, Cédric Varasteh, Offers New Vision For Providing Customer Value

By Lindsay Hittner
Director of Marketing
USTC Corp

In 2021, Walker and Comstar Supply, a national distributor of materials and equipment powering the broadband industry, were acquired by USTC Corp, a leading one-stop shop for all materials, distribution, and supply chain management solutions for telecommunications, HFC, FTTH, FTTx, wireless, and data center technologies. Together, the three complementary organizations have created a unique one-stop shop offering with ten logistics & distribution centers across the U.S.

Cédric Varasteh, the Founder of industry powerhouse ETC Group, now serves as Chairman of the Board, Founder and CEO of USTC Corp, which includes Walker and Comstar. Cédric's steadfast focus on valued customer and partner relationships has propelled the growth of his global enterprise and he employs the same approach as USTC, Walker, and Comstar move forward together. He aims to assure customers that they can continue to depend on these companies for the quality they're known for while also anticipating exciting enhancements. Cédric's view is "our customers and partners expect consistency and continuity as much as they expect and deserve an expanded portfolio of end-to-end products and state-of-the-art solutions."

BACKGROUND

After several years in sales and business development roles in the telecommunications distribution industry, most notably as Chief of Product & Director of Sales, Cédric founded ETC Group in France in 1993. ETC Group is a global leader in distribution, logistics, technical expertise, and product design supporting tier 1, 2, and 3 cable operators, telecommunications service providers, and contractors. Since its inception, the global organization has expanded to support thousands of customers around the globe with more than 30 locations across 12 countries including France, Portugal, Israel, Dominican Republic, the UK, Qatar, Oman, UAE, Hong Kong, and Morocco. Cédric moved to the U.S. and founded USTC Corp in 2017 as part of the ETC Group family. USTC, as an extension of the Group, provides its customers unique advantages of global purchasing power that helps drive costs down while providing best-in-class value-added services offerings.

Reflecting on the launch of ETC Group, Cédric comments "I was the first employee, and in the early days, I handled everything on my own from procurement to finance to customer service and sales, which is why I have a deep level of respect and attention-to-detail for every aspect of the business inside and out." Today, employees will rarely find Cédric at his desk, as he can be found all over the company, meeting with the technical teams, human resources, finance, marketing, and even in the warehouse where Cédric evaluates the quality of products and oversees every step of new product design from specification to sample assessment and validation of compliance all the way to customer delivery. "As our customers go to work building, maintaining, and growing the backbone of their community networks, it's our mission to make sure they get what they need, when they need it, exactly how they need it. And we honor the trust they have placed in us. It's a trust that is not taken lightly."

As USTC's headquarters and primary distribution center was built from the ground up in Edison, New Jersey, Cédric personally designed, selected, specified, and purchased each and every component of their state-of-the-art facility from the product displays, furniture, and racking, to creating their operational flow and unique open layout that reflect the Group's professionalism, quality, and contemporary energy. The level of care and detail is what differentiates Cédric and USTC. "The commitment, hard work, and heart put into the work was built into our company culture from Day 1."

ALL IN

Customers and partners can expect to hear, see, and experience the company's motto: "We're All In." This showcases Cédric's and the company's commitment to customers, partners, their fellow employees, the future of technology, and the communities they operate in and serve. Connections and strong relationships remain an integral part of USTC's culture, translating into familiar territory for Walker and Comstar customers.

USTC truly values the people who do the work and the work that they do, as they are devoted to inclusivity, and dedicated to employees' well-being. These commitments result in a powerful workforce that relentlessly focuses on creating customer value. As an organization, USTC believes that the materials and services they provide are about so much more than the network they create. It's about the people who use it - helping them make better connections with the things and people they love. Because they want the brightest, most connected future possible.

USTC's VALUES

Cédric and USTC value giving back to the world in which they operate. The company devotes substantial funds to assist educational opportunities, diversity and inclusion initiatives, protecting the world's ecosystems, and connecting with their local communities through partnerships and philanthropy.

At its core, USTC is driven to provide world-class quality products, customized service

solutions and most importantly, valuing the customer relationship. In addition, expect a culture that reflects an entrepreneurial approach, balanced with innovation, integrity, fairness and respect. Finally, customers and partners will experience a company guided by the ideals that a team with determination and the right values can make anything possible.

WHAT'S IN IT FOR THE CUSTOMER?

With ten locations for the combined entities across New Jersey, North Carolina, Pennsylvania, Texas, Oklahoma, and Nevada, they are perfectly positioned to serve customers quickly across the country with the flexibility and reliability needed to support regional and national customers' active and passive equipment needs for network deployments, upgrades, and maintenance, while enhancing their supplier relationships.

Greater scale and supply continuity will support tight integration timelines during peak construction times, and customers will have access to a comprehensive and expanded portfolio of solutions. Telecommunications service providers, electric cooperatives, critical infrastructure, and rural broadband service providers will benefit from additional distribution services, increased network infrastructure design capacity, technical services, and supply chain management and logistics solutions including planning, product design, kitting and home delivery, as well as enhanced engineering capabilities.

THE BOTTOM LINE

Together, USTC, Walker, and Comstar can help solve their customers' toughest problems with their combined world-class distribution capabilities, technical and engineering expertise, and best-in-class logistics solutions needed to quickly support the marketplace. The force behind this drive is the belief that customers deserve customization.

Cédric concluded, "our company began with just one employee – myself – and a dream nearly 30 years ago. Today, I'm proud that with great determination, strong partnerships, and an entrepreneurial spirit, our vision for a new, successful global organization and one-stop shop has not only come to life, but is thriving and growing. As I reflect on all our achievements over the years, the one thing that has not changed is our commitment to our Values. We're dedicated to new ideas, a diverse and respectful family-oriented culture, and a relentless customer focus. And in this ever-changing world, that commitment will remain unchanged."

Learn more about USTC Corp. at https://ustc-corp.com/

Introducing Chad Punchard: New President of Walker and Comstar Supply

By Dan Clifton
VP, Marketing
Walker and Comstar Supply

Soon after USTC Corp's acquisitions of Walker and Comstar Supply, Chad Punchard, Comstar Supply President, was also named President of Walker by Cédric Varasteh, Chairman of the Board, Founder, CEO of USTC Corp.

Chad is far from a new face in the ICT industry. Comstar was founded in 1994, in Collegeville, PA, as a family-owned distribution business serving the broadband industry. Since then, Comstar achieved numerous accomplishments. From adding product lines, to experiencing tremendous employee growth, to expanding into new geographic locations, to celebrating its 25th anniversary in 2019 - each milestone adding significantly to the company's story under Chad's leadership.

"Comstar's incredible growth started with the idea of building a company with the right people, and believing in one common goal," said Chad. "We wanted to exceed customer expectations. Period. Every order, no matter the size or scope – would be treated the same. If there was an issue – we'd fix it. If there was a need, then it's all hands-on deck. As a distribution partner to some of the largest broadband providers in the country, trust and communication has played a huge part in the company's ability to build strong, lasting relationships."

The company's growth story can be traced to how it differentiated itself in terms of flexibility and being a nimble company focused on customers. Today, nothing is more important, especially with the combined synergy and power of USTC, Walker, and Comstar, than having a flexible partner that understands how to navigate the relationship between manufacturer, distributor, and customer.

"Over 25 years ago, we set out at Comstar to build a company with a set of morals and ethics that continue to guide and shape who we are today, and I'm proud that USTC's values and culture align beautifully with Comstar and Walker," commented Chad. "Together, our organizations are guided by the same relentless pursuit of customer satisfaction, and with our extensive customized solutions, together we're uniquely positioned as a true and trusted distribution partner to serve our customers across the country."

Chad is eager to help lead the group under Cédric's direction. Upon announcing the new "powered by USTC" branding for Comstar and Walker, he stated to the organizations, "We're excited to share a new branding transition for both Comstar and Walker as we move forward together with USTC. The goal with this brand identity is to honor and maintain the incredible reputations and legacies that have been built, while simultaneously moving the us forward together as part of our enlarged organization, including our enhanced one-stop shop offering of an expanded portfolio of core-to-edge products and state-of-the-art solutions from a world-class team."

Join us in welcoming Chad Punchard as Walker's new president! To learn more about Chad and Comstar Supply's storied history, click here. (https://walkerfirst.com/uploads/files/literature/Comstar_History_book_07A.pdf)

True Believers Providing Broadband Service Are Simply Awesome

By Broadband Communities Editorial Staff

We at Broadband Communities are longtime true believers that the successful delivery of high-speed broadband is essential for a thriving, viable community. So it's been a delight to witness the American public's becoming true believers, too, along with a sense of awe at the ingenuity being displayed by the many players it takes to get communities connected.

We hope a few of the standout examples we've covered both in the pages of our magazine and at the 2021 Broadband Communities Summit will delight and awe you as well.

UPSCALE AND UNDERSERVED

Los Altos Hills, California, in the heart of Silicon Valley, is the fourth richest town in the United States. Populated by tech company executives living in palatial estates, it's an idyllic place to live, except for one thing: terrible internet service. The lack of a commercial center, along with the wide expanses between houses, has made wiring the town uneconomical for providers.

So the town government decided to do something about it. Next Level Networks responded to the town's RFI with a proposal to install and manage a community-owned fiber network. Interested residents in turn formed Los Altos Hills Community Fiber (LAHCF), which owns the open-access network that Next Level is now constructing on a neighborhood-by-neighborhood basis.

LAHCF, says President Scott Vanderlip, recruits, coordinates and supports broadband champions in each neighborhood who in turn recruit their neighbors to join the network. Next Level works with the community organizers, generating interest and assessing participation levels and costs. When a neighborhood reaches a critical mass of committed subscribers, LAHCF collects installation fees and turns over a payment to Next Level so it can begin engineering and building that neighborhood. Next Level is also the service provider, although residents will have other choices. If all goes as planned, the entire town – about 3,800 households – will have access to the network in the near future.

And although Los Altos Hills is not a typical underserved town, Next Level Networks believes its model will work in many other situations, especially with the addition of new federal funding. "It's just not going to happen unless people take it on themselves," says Vanderlip. "There's nothing crazy about fiber that communities couldn't take on a project like this."

ON A WIN-WIN MISSION

Since 2018, Greenlight Networks has brought high-speed fiber internet to nearly 50,000 homes in western New York State. One awesome project is the partnership it formed in Buffalo with 716 Ministries, a faith-based nonprofit that provides a host of services, including job training, housing for young adults doing a summer or a year of service, a preschool, a local community health center's Parent-Child Home Program, and a 400-seat church used by Puerto Rican and Burmese congregations. It's all located on the campus of the former Our Lady of Loretto Church, where 716 Ministries is hosting Greenlight's network equipment in its preschool building in exchange for free gigabit internet service.

"Six nonprofit organizations benefit from being Greenlight's first community partner in Buffalo," says Stephanie Smith, member of the Buffalo Urban Mission Partnership (BUMP) Leadership Team, who introduced 716 Ministries and Greenlight. And Greenlight says that the partnership has helped it forge other community partnerships and build service to six more areas within Buffalo. "We're proud of the community commitment," says Lori White, government, community and public affairs manager at Greenlight Networks. "We're identifying other communities to hook up with internet." Greenlight's work in Buffalo is part of a broader effort to expand its FTTH footprint. The provider can simultaneously lay fiber in multiple neighborhoods to double its presence to 80,000 homes next year.

PLANNING AND PERSEVERANCE

Three desires drove Bristol, New Hampshire, which fit the FCC definition of unserved or underserved with broadband, to build its own FTTP network: provide adequate residential broadband, attract new business and improve cellular service. When it became clear the incumbents were not interested in helping, the town took matters into its own hands.

The first step was pursuing grant funds from the Northern Border Regional Commission (NBRC), a federal-state partnership for economic and community development in northern Maine, New Hampshire, Vermont and New York. First success: Bristol received $260,000.

When the state launched the Connecting New Hampshire – Emergency Broadband Expansion Program, funded by the Coronavirus Aid, Relief and Economic Security (CARES) Act, the town received an additional $1.52 million to build a 24-mile fiber route that connects to the Network NH system at Plymouth State University. In August 2020, Bristol issued an ROI for the design, engineering and construction of the network, which would have to be completed by the end of the year, to meet CARES Act regulations. It was "an interesting challenge," notes Jay Jorgensen, COO of eX^2 Technology, the company Bristol chose to build its project. "We had a 90-day cycle to build 24 miles of fiber in New Hampshire, where winter obviously becomes an issue."

"When . . . the incumbents were not interested in helping, the town took matters into its own hands."

The next hurdle was gaining access to existing utility poles, which Bristol accomplished by forming a pole-attachment partnership with New Hampshire Electric Co-op (NHEC), the owner of most of the poles in town. With all its ducks in a row, Bristol completed its first phase that would connect about 400 of its 3,000 residents by its end of December 2020 deadline.

Phase two, providing the additional fiber backbone needed to connect all Bristol municipal, educational and commercial buildings, was completed by the end of the summer. Hub66, a Massachusetts based ISP that connects rural communities and businesses throughout New England, is providing internet service. "We have amazing equipment being put into action in preparation for the future in Bristol," said Andrea Vient, CEO of Hub66, after the town officially "flipped the switch" on Sept. 16. "This is the best, fastest internet you can get," added Town Administrator Nicholas Coates. "This project opens a lot of doors for our business community, enables opportunities like telehealth for residents and creates more learning opportunities for our students."

And there's a next step: Bristol Broadband Now has been awarded a grant to create the next leg of a regional high-speed internet corridor. This will be followed by a $26.2 million infrastructure investment to build the network to every town hall in Grafton County.

POWER OF THE UNEXPECTED

One of the most awesome experiences at the Broadband Communities Summit each year is meeting new broadband champions in places you might never have expected. This year's standout: LCRA, the Lower Colorado River Authority. While LCRA is not and cannot by law be an ISP, last May, the Texas legislature passed Senate Bill 632, which authorizes LCRA to provide middle-mile and backhaul fiber to third parties; build out fiber and related facilities to provide access points to connect middle-mile and backhaul customers; and provide ISPs with the necessary infrastructure to connect to customers. Now LCRA partners with ISPs who can connect to the authority's middle mile so they can deliver reliable, high-speed and cost-effective last-mile internet service to their communities. Just as LCRA contributed to electrifying the Texas Hill Country nearly a century ago, it is now helping bring broadband, vital for economic development, healthcare, government services and education, to rural Texas residents.

CORNING

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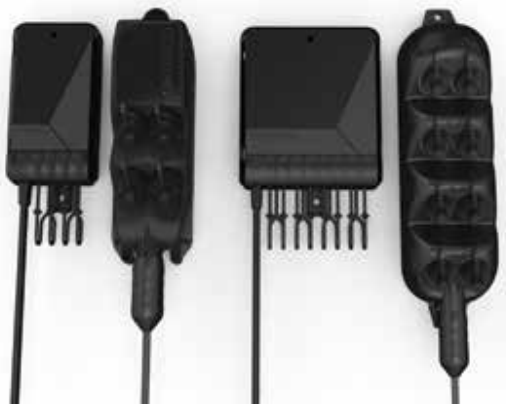


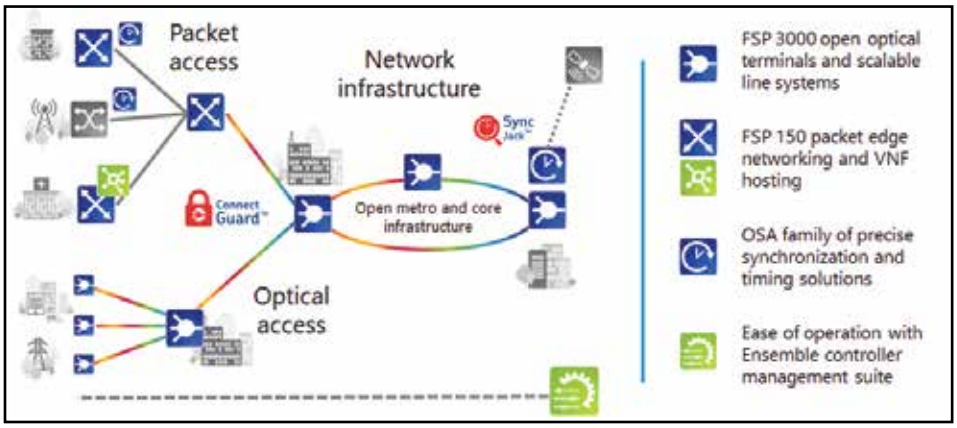
Profitable High-Bandwidth Services In Rural Areas – A Contradiction In Terms?

Ulrich Kohn
Director Solutions Marketing
ADVA

The business case for rural broadband is challenging. Low population density and long distances increase the cost of fiber installations. That's why many fixed network operators are reluctant to roll out high-bandwidth services in remote areas. But the lack of quality internet access makes those underserved communities less attractive to a society with an increasing need for connectivity. Governments understand the need for action to keep a heathy balance between lively metropolitan areas and remote living spaces. And governments worldwide are driving ambitious funding projects for network investment in rural areas.

As we leverage government money, we need to make sure that we create the most value for our society but also our businesses. We need solutions optimized for low density areas but able to scale in speed and functionality. This means simple, open and flexible technology such as disaggregated optical transport and standards-based packet network devices, featuring hosting and synchronization capabilities.

In addition, network architectures need to support a range of topological options. If fiber can be made available at reasonable cost (e.g., using micro-trenching technologies) FTTH/P is a very attractive, future- proof solution. PON-based fiber sharing technologies are applicable when the construction costs are higher. Initially these might be TDM-PON solutions, which can migrate over time to DWDM-PON technologies.



How do you find solutions that meet this broad range of requirements for speed, functionality, features and cost? ADVA and Walker can help.

The ADVA product portfolio has specifically been optimized for scalability, openness and ease of operation. The FSP 3000 open optical transport platform is optimized for backhauling of aggregated traffic. And our FSP 150 Ethernet switches for traffic routing and switching are a reliable and proven foundation for any rural broadband network. What's more, our unique, market- leading timing technology meets the need of even the most demanding mobile and IoT applications for existing and future requirements. With G.metro capability, even extremely bandwidth-hungry edge applications can be satisfied. What's more, this technology is a sensible intermediate step when migrating from TDM-PON to DWDM-PON and finally FTTH/P.

ADVA and Walker offer a one-stop solution from planning, design, implementation, maintenance and further professional services. It is our mission to make the rollout and operation of rural broadband a positive experience and an attractive business proposition for our customers, and to serve people and businesses in densely populated areas.

The Pew Research Center found that 43% of adults with incomes below $30,000 a year report not having home broadband services, in comparison to 7% of adults with household earnings of over $100,000 a year. When schools switched to distance learning in March 2020, around 15 million students found themselves without broadband internet, worsening a "homework gap" between school age children with and without high-speed internet at home.

https://www.pewresearch.org/fact-tank/2021/06/22/digital-divide-persists-even-as-americans-with-lower-incomes-make-gains-in-tech-adoption/

TOP 3 REASONS FOR Combo PON

1

Combo PON Simplifies XGS-PON

- "Zero" operational impact – same splitters, same optical budget, no jumper changes, no truck rolls, no swivel chair operations.
- "Zero" additional space – swap out existing GPON cards with the Combo OLT cards.
- "Zero" customer disruption – PON inheritance automatically reconfigures GPON; no customer visits to swap out ONUs/ONTs.

Combo PON Delivers More

- More subscribers, better services – Deliver gigabit or multigigabit residential and business service over the same ODN.
- More resilient network - Eliminates points of failure associated with CEx, related cabling and fiber connections.
- Seamless brownfield upgrades:
  - Migrate to XGS-PON at any time, not as subscribers upgrade their services.
  - Reuse existing GPON cards anywhere in the network on day one.
- Future-proof greenfield network
  - Start with cost-effective GPON and migrate to XGS-PON based on capacity needs or business case.

2

3

Combo PON Offers Better ROI

- Lower capex – up to 50% less*
- Lower space requirement – up to 75% lower*
- Lower power requirement – up to 66% lower*
- Increased revenue – up to 20% higher** gigabit service area coverage

**Compared to GPON/XGS-PON Coexistence approach*

*** No link budget loss with integrated CEx, resulting in increased PON service area reach, increased addressable market, increased take rate, and increased subs.*

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Now the Real Work Begins!

By Shirley Bloomfield
CEO
NTCA

For many years now, there's been a running joke in Washington about "Infrastructure Week." Infrastructure is an easy subject for politicians to talk about, and there seemed to be agreement that an infrastructure bill was important, but every time "Infrastructure Week" came about, it always got sidelined.

NTCA used this time of perpetual "Infrastructure Week" to educate policymakers on the importance of including broadband in any investments in our country's infrastructure, along with roads, bridges and water systems. We used every opportunity we had to help shape the Infrastructure Investment and Jobs Act, which provides $65 billion in funding for broadband. Those efforts paid off. We were pleased to see many NTCA priorities included, such as a priority for scalable networks that meet evolving consumer needs, funds directed to unserved areas first, a challenge process to avoid overbuilding existing networks, a vetting system to ensure applicants can provide the services promised, program/agency coordination, and the ability to align funds across programs. NTCA also worked to ensure that the statutory text for the new Broadband Equity, Access, and Deployment (BEAD) program puts cooperative and commercial companies on equal footing so that all NTCA members can participant in these new programs.

When the day came for the legislation to be signed into law, I was thrilled to not only be inviting to the signing ceremony, but to be invited onstage with President Biden as he signed the bill! Ten years ago, broadband being considered one of the most important pillars of infrastructure legislation would have been unthinkable. Now, local, community-based broadband providers are literally on stage with the President of the United States as he signs infrastructure legislation into law. Truly a sign of our times. I was so proud to represent NTCA in that moment.

After enduring almost two years of this pandemic, it is hard to argue against the necessity of broadband in everyday life, and NTCA members have led the way in bringing broadband connectivity to their own communities and beyond. Infrastructure like roads and bridges are certainly important, but it's the digital bridges that have connected communities over the last two years. Over 75% of NTCA member companies' customers can access speeds greater than 100 Mbps, and the same percentage of NTCA customers have access to fiber-to-the-home technology. Now that this landmark infrastructure investment has become law, the real work begins to grow those numbers, and to bring high-speed broadband connectivity to all corners of our country.

"I urge them to invest in future-proof, scalable technology like fiber, and to partner with small, community-based providers—regardless of their corporate structure—who have already proven their ability and commitment to build and maintain strong networks in rural areas."

As policymakers at the state and federal levels decide how to implement this landmark legislation, I urge them to invest in future-proof, scalable technology like fiber, and to partner with small, community-based providers—regardless of their corporate structure—who have already proven their ability and commitment to build and maintain strong networks in rural areas. The FCC must also finish its mapping efforts so that states can prioritize areas of need. Applicants for support must be properly vetted to ensure that providers are capable of fulling their promises. We must also address our ongoing supply-chain issues and find creative ways to build public-private partnerships.

At NTCA, we are ready to roll up our sleeves once again. We have ramped up the ways we support our statewide association colleagues and how we can support state actions and funding distributions. We are also thinking about how we can support our broadband providers and their efforts to create new partnerships and think also about adoption, digital inclusion, and affordability in the days ahead. And the battle to promote and sustain universal service will not go away simply because Congress has appropriated an historic sum of funding for broadband grants. While those grants should help significantly in deploying networks where service is lacking, NTCA ensure that the new grants and long-standing Universal Service Fund programs will work in concert to not just get people connected but also to keep them connected over time.

I have worked in this industry for many years, and there has never been more momentum to get the job done and connect all Americans to broadband. NTCA members, who are based in the communities they serve and have a long track record of connecting their neighbors, are up to the task.

Shirley Bloomfield is chief executive officer of NTCA–The Rural Broadband Association, the premier association representing nearly 850 independent telecommunications companies that are leading innovation in rural and small-town America. With more than 30 years of experience representing the country's smallest telecom operators, Bloomfield is an expert on the role of federal communications policies in sustaining the vitality of rural and remote communities and the benefits rural broadband networks bring to millions of American families, businesses and the national economy.

Managing the Opportunities Available Through Funding

By John Badal
CEO
Sacred Wind Communications

We don't have to repeat how the broadband prospects for rural areas in America have changed since the COVID pandemic. Broadband development is now viewed as a preventative measure against societal meltdowns caused by such health or other emergencies. Our federal government, complemented by state broadband programs, has displayed a commitment to build, once and for all, broadband infrastructures across our nation and is putting money where its mouth is. The question is for many rural areas: if this is not too little, too late, is it at least too uncoordinated to be successful?

Let's first of all look at the positive. To date, four (4) separate Acts of Congress have appropriated funding for broadband projects mainly in underserved rural areas of the country.

1. **March 2020 – the Coronavirus Aid, Relief & Economic Security (CARES) Act, allocating $150 Billion, including $8 Billion to tribes, for various relief programs including broadband development, and additional $100 Million to the USDA ReConnect program and $25 Million to the USDA Distance Learning & Telehealth Program.**
2. **December 2020 – the Consolidated Appropriations Act, allocating $1 Billion to NTIA for tribes, including broadband development grants; an additional $300 Million to the NTIA for other broadband projects; $81.8 Billion managed by the U.S. Department of Education to be allocated to States' governors' offices for economic development, health, etc, programs, including for broadband development; and $3.2 Billion to the FCC for its Emergency Broadband Benefit (EBB) program to provide affordable access to broadband to low income families.**
3. **March 2021 – the American Rescue Plan Act (ARPA), allocating $219.8 Billion to states and tribes over a five-year period for economic recovery initiatives, including broadband development and accessibility; an additional $120.2 Billion to local and county governments for their development, including for broadband development; and $7.17 Billion funding for USAC e-rate projects.**
4. **November 2021 – the Infrastructure Act, allocating among other things $65 Billion for broadband development and accessibility, of which $42.45 Billion is provided to the NTIA's Broadband Equity, Access & Development (BEAD) program for last mile improvements and $1 Billion to the NTIA for middle mile improvements; $14.2 Billion to the FCC to augment its former EBB broadband discount initiative, now termed Affordable Connectivity Program (ACP); and $2 Billion additional funding to the USDA for its ReConnect broadband grant/loan program and another $2 Billion to tribes for broadband development.**

The enormous amount of attention and funding dedicated to broadband development in rural areas of the country will contribute significantly to rural communities' equality of access to more efficient and affordable health care and education, to employment opportunities and to overall quality of life. Increased availability to financing infrastructural expansion and improvements will also be a boon to many telecommunications providers, particularly those operating in rural areas. For example, Sacred Wind Communications, operating in over 4,000 square miles of Navajo lands in northwest New Mexico, and having recently laid out plans to build broadband systems in an additional 5,000 square miles of tribal and nontribal lands in the northwest and southwestern part of the state, can now consider accelerating its growth to other underserved communities within New Mexico and adjacent states.

The opportunities are striking for rural telecommunications and rural electric providers. Among the several funding sources mentioned above, a rural and tribally significant state like New Mexico could conceivably have available to it over $1 Billion in federal and state programs for broadband development on tribal lands and no less than the same amount for nontribal rural areas in the state. Arizona and Colorado's numbers would be similar and possibly greater.

Let's step back, though, and consider the logistics of such broadband plans. While the FCC, USDA, and U.S. Department of Commerce (NTIA) have announced their intent to collaborate on the establishment of similar grant program requirements and objectives to ensure efficiencies toward the funding of broadband projects, there has been nothing but silence among other federal, tribal, and state agencies as to the coordination of build-out requirements. In short, the very federal, tribal, and state agencies authorized to permit the installation of broadband infrastructure have shown no indication that they "got the memo" from the President, their tribal leader, or their governor. If, in Sacred Wind's experience, it commonly takes two (2) years to obtain rights of way permissions for a fiber optic line or a communications tower, and four (4) years or more for larger projects, what are the prospects of multi-billion dollar broadband completions by the dates that the U.S. President, Tribal President or Governor, or State Governor have in mind?

Just in the last six or seven years, Sacred Wind worked four years on securing right of way for a USDA broadband grant project stretching over a mix of tribal, state, private, BIA and U.S. Forest Service managed lands; two (2) years to obtain easement permits from nearly 1,000 households for a fiber attachment to existing electric pole lines; 1 ½ years negotiating an easement with a tribe; two (2) years for a tower permit from the BIA on previously withdrawn land where archaeological and environmental studies had already been conducted.

Additionally, New Mexico's state governmental departments don't possess an easy mechanism for collaboration with the private sector. Their interpretation of a state constitutional "anti-donation clause" prevents them from devising creative ways for the state or its local governments to partner with the private sector on much needed rural broadband projects. Up till now, this has been an annoyance and impediment to local development. Now, it's truly a matter of life and death or equal access and deprivation.

" . . . only 46.6% of rural AI/AN communities have fixed broadband coverage."

- US Department of the Interior Indian Affairs

"The opportunities are striking for rural telecommunications and rural electric providers . . . a rural and tribally significant state like New Mexico could conceivably have available to it over $1 Billion in federal and state programs for broadband development on tribal lands . . . "

While a number within our industry have been working to participate in these greatly increased broadband funding programs, we have been actively engaged at the policy level of state and tribal offices, encouraging a change in administrative processes and behavior. We believe that partnering with the public sector and with tribes is, and will be, the key to arriving at a new way to do business in our state. As an example of such partnership opportunities, Sacred Wind has collaborated with the Navajo Technical University (NTU) on the development of a fiber-to-fixed wireless broadband network to reach its students' and faculty's homes located over a wide area of the Navajo Nation, utilizing the tribe's newly acquired 2.5 Ghz spectrum. That partnership with NTU led to a partnership with the Navajo Nation itself, expanding Sacred Wind's access to the tribe's ownership of the same spectrum over 9,000 square miles of tribal lands in New Mexico.

We are also engaged with a state and private sector consortium to provide the Governor a broadband expansion roadmap, capitalizing on the state's access to grant funding and our local talent. One of the several projects developed from this initiative contemplates a partnership among Sacred Wind for fixed wireless, a rural mobile wireless company, and a High Altitude Platform System (HAPS) operator, Sceye, Inc., for a combined wireless Middle and Last Mile solution for the more remote areas of the state and ultimately the rest of the Nation. Sceye's stratospheric platform, a remotely maneuvered airship, bears the promise of providing both Middle and Last Mile services to areas beyond the affordable reach of other systems.

Sacred Wind is also striving to establish similar partnerships with rural local governments for community broadband development projects in several areas of the state and is participating with other rural telecoms in the early stages of planning a statewide rural fiber Middle Mile network that could not only add more capacity across rural New Mexico, but could enable other rural telecoms to apply to the NTIA or USDA for grants or loans for more affordable Last Mile projects once the Middle Mile impediments are removed. These partnerships can improve a broadband project's prospects for success and facilitate pooling of labor and capital resources of each partner. If the public sector is invited into such partnerships, they can assist in the acceleration of public sector permitting and aid in compliance with other public sector requirements and reporting.

In sum, a perfect storm of opportunity has come to our industry and to our rural states: once-in-a-lifetime funding, an urgent public policy accessibility imperative, and increasing technological advancements. We must do whatever necessary to meet our communities' and our customers' expectations of us, and we have the opportunity to accelerate our growth plans, as we consider the federal, tribal and state programs before us. All of us should be looking to a hyperactive 2022 and beyond.

Interested in learning more about expanding broadband access to the American Indian and Alaska Native communities? Join us for a webinar in February as we more fully unwrap this topic with John Badal and others. Pre-register here (http://event.walkerfirst.com/sacredwindwebinar22)

Alcorn County Electric (ACE) Power Association Bringing high quality super-fast broadband to rural Mississippi and beyond

A Case Study
By Ciena

Established in 1934 with the aim of raising the standard of living in Alcorn County, Mississippi, ACE Power has been bringing electricity to the citizens of Alcorn County for nearly 90 years.

ACE Power was America's first rural co-operative and remains a vital part of the community to this day. Serving around 19,000 electric meters in the area, it is controlled by its members in a democratic governance model, where every member has a vote, and the sustainable development of the community is the number one priority.

RURAL BROADBAND IN THE UNITED STATES

High quality broadband has been limited in more rural areas of the United States. Around 10% of US households do not have broadband service (defined by the FCC as 25Mb/s or greater).

Yet, like many other places, people in these areas work from home, shop, consume entertainment, and access critical healthcare information and education
online. They have the same need for broadband, if not more, as those in more urbanized areas.

The Covid-19 pandemic has increased internet usage all over the world, including Alcorn County. High speed, reliable broadband is no longer an optional service, but one as essential as water or electricity.

Like the electricity gap in the 1930's, there is an imparity in rural America, where communities don't have access to broadband, and companies like ACE Power are stepping in once more.
Access to fiber internet opens up opportunities for rural communities in education, economic development, healthcare and more. Not only that, it helps the electric co-ops utilize the latest smart grid technology to improve the quality and reliability of their electric service.

ALCORN COUNTY ELECTRIC'S APPROACH

At its inception, ACE Power wanted to make sure that everyone in the community had access to electricity.

ACE Power was built by pioneers, not only in their actions, but in their way of thinking. The founders believed everyone should have access to the same service, whether in the city or more rural areas. Nearly 90 years later, that same ethos has led it to further help the community by creating one of the fastest broadband networks in the USA.

ACE Fiber was formed with one goal, to provide super-fast, reliable broadband of the highest quality in the USA, if not the world, and to use that broadband to improve the quality of life of Alcorn County and Mississippi residents.

To reach this goal, ACE Fiber knew it would need to expand its capacity, to build a network that not only works for today, but for the future.

Although ACE Fiber was set up as a 'for-profit' company, it is driven by the same principles as the co-operative. Increasing the fiber capabilities allows the company to serve more hospitals, schools and residents during a time where broadband traffic increased 38% in just three months.
Employing a 'build it once, build it right' philosophy, ACE partnered with Walker and Associates to create a 100G fiber middle mile backbone that would meet the needs of the community, while preserving fiber for planned future expansion.

KEY NETWORK CHALLENGES

ACE wanted its fiber to be leading edge, to be the best in rural America, if not the whole country.

As an electricity provider, ACE had legacy connectivity in place, but this existing middle mile infrastructure needed to be modernized to handle the planned extra traffic.

ACE wanted to offer its customers a choice of speed, from 200Mb/s through to a whopping 2Gb/s. The solution needed to support these speeds at their full potential, regardless of the amount of movies streamed or video games played.

With a goal of becoming an industry leader in Mississippi and Tennessee, ACE wanted its network to be technology for the future. It didn't want to just support its subscribers now, but any and all potential subscribers in the future, whether business or residential. The tagline says it all, 'Building tomorrow's network today'.

For this forward-looking project, a 100G middle mile aggregation solution was the clear choice. This infrastructure would allow ACE to extend its reach and create long-term partnerships with co-operatives in other areas who share its values, to compete with larger, international providers for businesses who span multiple areas.

WALKER EXPERTISE

Although the relationship between ACE and Walker was only a couple of years old, the two became solid partners throughout this project.

Walker's history of helping carriers solve economic challenges while increasing their ability to meet subscriber expectations meant it was a perfect fit for this project. From the very first meeting, the Walker team, including Ciena, impressed ACE with their knowledge and detail. The engineers involved went above and beyond other companies in preparing the bid, and this was the deciding factor for ACE in choosing Walker as its partner.

"We looked at this business and said, why don't we [Alcorn County] be the first, and that's when we decided to go 100% XGS PON, and provide 10G services throughout the territory." - Sean McGrath, CFO Alcorn County Electric Power Association

Walker's expertise in delivering projects of this nature proved invaluable, and its extensive industry knowledge allowed for a smooth integration of the increased capacity in the middle mile.

CIENA'S 6500 AND 5171 FOR 100G MIDDLE MILE

Ciena's 6500 packet optical platform delivers the capacity, flexibility and resiliency that ACE needs to build a market leading 100G middle mile. Utilizing WaveLogicTM 5, this means DWDM can be used to ensure scalability well into the future. Combining this with the 5171 next-generation 100G packet aggregation platform delivers high-density 10GbE aggregation that has allowed AC to rollout 10GPON right from the get-go. It is compact in size and temperature-hardened for the varied, remote, and often hostile environment, making it ideal for serving rural areas.

All of this is managed using Ciena's Manage, Control and Plan (MCP) domain controller for complete visibility and centralized software control of the network so that provisioning, monitoring and service assurance operations can be performed most efficiently.

ACE gets the performance it needs to fulfil its own business goals as well as the capacity and flexibility to build partnerships with other like-minded cooperatives.

ACE FIBER'S RESULTS

With grants from the Federal and Mississippi government (under the CARES Act and RDOF) combined with Walker's support and expertise, ACE was able to condense its planned 48 month build into an incredible 15 months. 100% of its members will now have access to super-fast, lightning speed broadband nearly three years earlier than planned.

As the first Mississippi provider to offer 2Gb/s speeds to residential customers, setting price points was a bit of a challenge, but with 75% of customers choosing the top two offerings, and 23% requesting the highest 2Gb/s speeds, ACE positioned themselves perfectly.

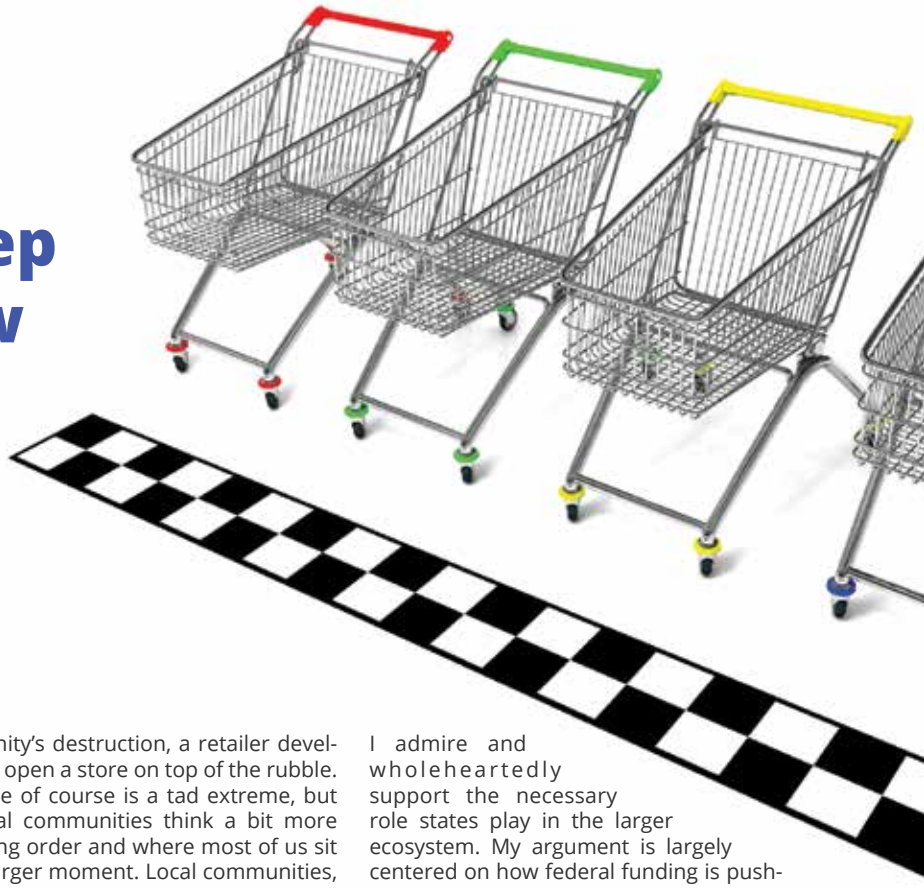
ACE Power has been the trusted electricity supplier in its community for nearly 90 years, and now ACE Fiber is on track to becoming the trusted broadband supplier.

Learn more by downloading the full case study at https://walkerfirst.com/uploads/files/literature/Alcorn%20County%20Case%20Study_11.21.pdf

Walker, along with Ciena, created a 100G middle mile aggregation solution for ACE Fiber that allows it to provide high quality, super-fast broadband for its community at a critical time, while ensuring the solution is scalable and fit for the future.

ACE Fiber started with the aim of being the trusted broadband provider for its community and state. With a projected 60% take rate over the next 20 years, the new middle mile infrastructure has definitely given it a good start.

Discount Digital Equity: How Supermarket Sweep Should Inform How America Thinks About The Infrastructure Bill



By Joshua Edmonds
Director of Digital Inclusion
City of Detroit

The classic game show Supermarket Sweep has had several returns to American television dating back to the 1960s. The basic premise has three teams of two people competing within a well-stocked grocery store to ultimately amass the highest price of goods within an allotted time. The rounds are comprised of trivia-based, grocery themed mini-games where participants can win money or extra time, which will help them during the actual supermarket sweep. The sweep itself is a timed challenge, where one member of each team frantically sprints down grocery aisles, filling their shopping cart with items from the shelves. The team with the highest priced cart wins.

Take this game show premise and expand it to the current digital inclusion landscape. Call this new game, "Discount Digital Equity", where the supermarket is the Infrastructure Bill, teams are formed by the federal government, grocery aisles are filled with metaphorically itemized interventions, and "winning" is largely dependent on who you ask, welcome to Discount Digital Equity.

THE DISCOUNT DIGITAL EQUITY SUPERMARKET

The supermarket as the Infrastructure Bill is fitting; the President signed this bill with the overarching promise of building back better undergirded by the bold commitment to bridge America's digital divide. The allocated $65 Billion is this country's largest broadband investment to date. This is a massive digital equity win. Local communities have been pleading for this level of investment for decades; ultimately, our pleas did not spur this investment, it was the pandemic that roared on our behalf, demanding community-based access and adoption support capable of positively shifting the digital equity needle.

The pseudo equivalent would be an under resourced neighborhood spending twenty years begging for critical investments to land a retailer, and then a tornado randomly decimating that community. Within short order of the community's destruction, a retailer develops plans to open a store on top of the rubble. This example of course is a tad extreme, but it helps local communities think a bit more about pecking order and where most of us sit within the larger moment. Local communities, our currency is the voice of our residents, the data we house, and the political will we wield. If you are missing any of those elements, your options within the Discount Digital Equity supermarket will be limited.

THE TEAMS

The Infrastructure Bill calls on states to craft or refine their digital equity plans. States will work with local communities to help with planning; therefore, for our Discount Digital Equity game, the teams will include states and local communities. In Supermarket Sweep, those teams were typically between two contestants with a history of working together. Childhood friends, married couples, siblings, etc. To highlight the obvious, they formed teams this way because they stood a better chance of building a winning strategy due to a clear sense of familiarity and an obvious history of joint problem solving. If, logically, we can understand the team forming strategy for a basic game show where participants walk out with less than $10k in winnings, how does that nuance take a backseat with $65BN on the line?

To clarify, I am not saying local communities and states are complete strangers, but from a local underserved community's perspective, we have spent over a decade observing states create funding pipelines made from inaccurate, cherry-picked data to exclusively invest in unserved communities. A questionable distinction that largely formulates the division based on the amount of internet providers operating in a community while simultaneously ignoring ballooning, unaffordable internet subscriber costs, poor customer service, and significant cases of digital redlining. States talk about digital inequity; local communities experience it.

I admire and wholeheartedly support the necessary role states play in the larger ecosystem. My argument is largely centered on how federal funding is pushing a historically distant, divisive, digital "equity" actor to the center of the moment, when that same actor has been absent from urban digital inclusion planning, accountability, community building and fundraising efforts, which in most cases, predate the pandemic. The FCC's Emergency Broadband Benefit is a perfect example of how local communities can, with great agility, and little to no support from states, build partnerships and systems to achieve meaningful results.

INTERVENTIONS

Our metaphorical supermarket is full of itemized interventions that appear to make the aisles go on for years. To be slightly more descriptive, and to our collective relief, the internet access aisle is long. The first shelf has a whopping $14BN worth of itemized broadband affordability boxes. These boxes are earmarked for residents in need of subsidized internet. The contents within these broadband affordability boxes will not expire until 2027! States and local communities need to work together to ensure no boxes are left on the metaphorical shelf in five years. Working together means acknowledging and diplomatically leveraging the dormant or visible strength each actor possesses. States can be helpful rallying political will within local government and local communities can be most effective crafting outreach strategies and facilitating enrollment.

I am excited about a longer-term broadband subsidy; however, with historic funding on the table, might this be the time when America realizes the consumer telecommunication landscape is not inherently competitive? We should, with relentless honesty, think about an internet ecosystem where $14BN is needed to subsidize a service we all deem critical. Does that really make sense? I am happy to

"Every digital inclusion advocate needs to take one step back and ask the question, 'am I giving people what they want, or what they deserve?' "

see affordability challenges addressed and am thankful for the leadership that successfully navigated bureaucratic obstacles that sought to remove this funding. That said, while we can coupon and subsidize our way to digital inclusivity, we should not be seduced into thinking we can do the same for achieving digital equity. Local communities need to be unyielding in enrolling qualified residents into the Affordable Connectivity Program while simultaneously demanding funding and cultivating political will that demands better broadband competition.

While the broadband subsidy boxes go on for a bit in our metaphorical store, the bulk of the aisle is devoted to "Broadband Equity, Access and Deployment" (BEAD). The $42BN worth of BEAD boxes are a great sign that teams can stock up on costly, yet effective, long-term interventions. Some of the BEAD boxes say FIBER, others say 5G, and a lot have the initials, CBRS. And apparently, these boxes offer consumer internet broadband nutrition labels. Nothing bad to say about this part of the broadband supermarket; however, there is a slight concern. It is difficult to understand if these BEAD boxes, when shipped to states, will make it to the communities who need them. Thankfully, there are $1BN middle aisle boxes that can help positively alter thinking. States need to directly engage local coalitions and communities who have an acute understanding of historic needs. From an urban, underserved perspective, most large cities already know what they need to do with the bulk of the funding and have built digital equity partnerships that span back to the BTOP days.

The last set of boxes read "Digital Equity Act", the contents within this box have been intentionally forged over two years ago. There are $1.3BN Digital Equity Act boxes that will support digital equity planning and competitive grant funding. While there are not as many Digital Equity Act boxes, somehow these boxes feel heavier than the others. To simplify, the Digital Equity Act provides competitive grant funding and supports states and local communities in aligning goals and priorities to establish nuanced digital equity plans. This is the time when states need to decide if they want digitally included communities, digitally equitable communities or digitally empowered communities. The distinctions will primarily be revealed when one correlates the strategic interventions with the desired outcomes at the intersection of residents served.

How does one truly differentiate digital inclusion, digital equity and digital empowerment? Circling back to the subsidized internet play, that intervention lowers the barriers for a household to access the internet. Combine that with an investment in digital navigators who serve as trusted community partners who can guide families to valuable digital resources, now we have a facilitative pathway for forming a basic, digitally included community. The digitally equitable community could take those same interventions, but the competitive grant allocations would flow from the state based on historic, unmet needs. Factors like poverty, educational attainment, employment status would inform resource flow and allow for more tailored investments. The digitally empowered community would still leverage the same resources, but above all, they would pursue infrastructure-based interventions that would seek to empower their communities beyond enrolling residents in temporary subsidies.
States and local communities need to engage in critical, actionable dialogue through the entirety of the planning process. Obsolete, pre-pandemic thinking needs to be harshly deconstructed, and every intervention needs to have clearly defined outcomes.

WINNING

Winning in Supermarket Sweep is simple, collect the highest cart total by the end of the episode. What does winning look like for the Infrastructure Bill? Locally, when the dust clears, winning looks like true broadband competition where residents have actual provider choice not dependent on obsolete infrastructure. Transparent consumer telecommunication pricing no longer relying on hidden fees to trap, mislead and overcharge residents. Tailored and responsive tech support guiding residents to digital services that work best for them. Establishing superior, locally owned datasets that empower communities with the ability to optimally allocate scarce resources.

Every digital inclusion advocate needs to take one step back and ask the question, "am I giving people what they want, or what they deserve?" A resident may want to have a subsidy that helps them pay for their internet bill, but they deserve a reliable and affordable internet experience that facilitates choice. A local government may want better broadband maps, but they deserve granular, digital equity datasets that allow them to effectively organize for impact. A local community may want a digital equity coalition, but they deserve a digital equity operation, capable of attracting external resources and building sustainable, local capacity.

Wanting and deserving is a manifestation of two separate, present-day digital equity camps. The wanting side is comprised of digital equity managers, those who would like to manage the issue. The deserving side is comprised of digital equity eradicators, those who are committed to eradicating the issue. There is no magical shortcut to facilitating residential and intragovernmental trust, evoking paradigm shifts and galvanizing political leadership to boldly act. Despite what the title states, discount digital equity is an oxymoron. We are unable to discount the value of something we have never had, but we should relentlessly pursue what we deserve. States and local communities, this is our moment; articulate, build and buy what we deserve.

ABOUT THE AUTHOR

Joshua Edmonds is the City of Detroit's inaugural Director of Digital Inclusion and is America's first municipal Director of Digital Inclusion. He is responsible for the creation of Connect 313 – Detroit's sustainable digital inclusion strategy designed to bridge the digital divide. While appointed at the City, Joshua has testified in front of Congress on the matter of digital equity, hosted Detroit's first Digital Inclusion Summit, Established the City's first Digital Equity Fund, and most recently, helped raise a combined $30 million for distance learning and telehealth initiatives for Detroit residents. Joshua also chairs the telehealth workgroup within the Federal Communications Commission's Intergovernmental Advisory Committee.

Prior to his current role, Joshua served as a Digital Inclusion Policy Fellow for the University of Michigan's Poverty Solutions Initiative, a Digital Innovation Fellow at The Cleveland Foundation, and a Public Service Fellow at the Cuyahoga Metropolitan Housing Authority working on President Obama's ConnectHome initiative. Among others, Joshua has been recognized by Forbes, the Federal Communications Commission, Next Century Cities, Government Technology, and the National Digital Inclusion Alliance for his contributions to the field.

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There's A NEW NORMAL – And There's No Going Back

By Prayson Pate
SVP Solutions Marketing and CTO Edge Cloud
ADVA

The combination of Covid, semiconductor shortages and trade wars have caused massive changes to our daily lives. We will recover from these, but some of the changes are going to be permanent. What's the likeliest scenario for the new normal? How will these changes affect technology and spending decisions? Let's look back at history, and then examine some changes that are likely to be long-lasting.

BIG PROBLEMS CAUSE BIG CHANGES – AND A NEW NORMAL

Societal changes often come in a burst that's triggered by disasters. For example, the bubonic plague in the 14th century had a horrific death toll, but it also created a fundamental shift in society. It ended feudalism, empowered laborers and started the growth of a middle class. Those changes did not go away with the ebbing of the plague.

World War II was a disaster for much of the world, and it transformed society. For example, women entered the work force due to labor shortages, and the age of the piston-powered airplane ended in favor of the jet engine.

The issues we face today are not nearly as deadly as the bubonic plague or WWII. But as with those cataclysms, the end of the problems won't mean a return to the old normal. I believe the following aspects of the new normal are here to stay.

Remote work. The lockdowns of the Covid crisis immediately spurred an explosion of people working remotely, and usually from home. Before this few businesses allowed remote work. There are good reasons for in-person work, but the impact of Covid made clear that many jobs could be done remotely. And many people (like myself) found that they like working from home. More importantly, many employers saw no loss of productivity, and some are offering flexibility to keep or attract workers.

Video instead of travel. The other side of the lockdowns was the impact on business travel and large events. Many companies eliminated visits from external people. And they replaced many in-person events (such as conferences and seminars) with virtual events. The upside of this was big savings on travel. Now many businesses will be taking a hard look at travel budgets to ensure that each trip is necessary. At the same time, businesses must find solutions for ensuring personal interactions.

The spread of the cloud. Remote work and video meetings create issues that are best addressed with the cloud. The movement of applications to public cloud infrastructure is not new. What is new is the expansion of the cloud beyond the data center. That's due to applications like 5G, IoT, AR/VR as well as regulatory restrictions such as data sovereignty.

IT in every department. For a while now IT has been moving from a necessary cost center to a strategic component. But the advent of remote work, video meetings, security threats and ubiquitous cloud access means that every department must include IT considerations in their planning and strategy.

Supply chains are strategic. The efficiency and success of global supply chains let us all get a bit lazy regarding ensuring continuity of supply. We overlooked the risk of single suppliers, trade bottlenecks, natural disasters and untrustworthy countries of origin. Now everyone's looking at how to minimize the impacts of these issues.

WHAT DOES THE NEW NORMAL MEAN FOR TELCOS?

Addressing the new normal means embracing some new ways of working and thinking.

More bandwidth everywhere. People working from home need fast and reliable internet. That could come from direct fiber to the home. Or it could come from new technologies like fixed wireless access, which also requires more fiber deployment. In either case, telcos need cost-effective ways to deploy fiber, ensure its proper operation and quickly resolve problems.

Security. We use secure VPNs today, but new concepts are emerging. Examples include SASE for remote work and quantum security for links.

Innovative services. Telcos have an opportunity to increase the value of their connectivity by offering new and sticky services. Examples include managed connectivity services like SD-WAN and SASE, edge hosting for applications, location services, timing services, private wireless access and wholesale access using network slicing. And with a network built on open and multi-vendor technology, they can quickly develop and deploy new services – without ripping out existing infrastructure.

Disaggregation for open and multivendor systems. Much of the existing telecom infrastructure is based on closed systems provided by a single vendor. These closed systems work, but there are drawbacks:

- The commitment and investment for these systems is very high, so their selection is a lengthy process.
- All components must come from the single supplier, giving them pricing power and increasing the risk of supply chain issues.
- A single vendor supplies all updates to hardware and software – and gates innovation.

The result: the systems are expensive and risky, and innovation is slow. In contrast, disaggregation opens the door for a multivendor system. Telcos can mitigate cost and supply chain issues by replacing one component with another. They can also take advantage of an open system to accelerate innovation and address the items listed above.

Compute everywhere. An essential aspect of disaggregation is the separation of hardware and software. That means the software must have a platform to run on. Telcos will need to deploy compute everywhere, including large data centers, medium-sized central offices, small edge locations and at customer sites. Some of this compute may be today's commercial-off-the-shelf servers. But some applications require hardened devices for outdoor deployment, or devices that support precise synchronization. All these are part of the mix.

A DOSE OF NORMALITY FOR AN ABNORMAL TIME

Embracing the new normal is necessary – but it may not be easy. The good thing is you don't have to do it alone. ADVA and Walker can help deliver a variety of modern networking solutions that meet today's needs, and which fit into the new normal. We equip our solutions with the latest technology to ensure future-proof growth – and to meet the impact of the next disruption to our lives.

A Perspective On Network Operator Strategies In 2022

By Randy Turner
Director, Marketing
Executive Editor, Skinny Wire
Walker, Powered by USTC

Skinny Wire recently sat down with Guy Were, Practice Leader for T2/T3 Service Providers & REC Broadband at Juniper Networks, to discuss hot topics among their users and at large trends within the ICT industry. A portion of responses are included in this article, but a deeper dive will unfold during an upcoming webinar "Strategies for Network Operators In 2022". (Digital subscribers can click on the link, or visit http://event.walkerfirst.com/juniper2022webinarpreregistration to pre-register for this important webinar.)

SW: There is agreement that the pandemic impacted the ICT market in significant ways. In retrospect at this point, how have those impacts made Juniper a stronger solution in the industry?
Juniper: Great question! Before the pandemic's impact, Juniper was already on a path to do more with less, championing applications such as AI, automation, and network assurance. The pandemic pushed the workforce to the limits. I believe the operators of networks, as a service, are starting to make decisions on expanding the workforce or introducing automation to do more with less. Juniper is recognized as a leader for service providers around the world, and most have been using Juniper routers for many years and relying on Juniper to deliver rock solid equipment. So, the pandemic allowed Juniper service providers to expand to meet the bandwidth needs easily. Because the Juniper equipment is built with simplicity and automation in mind, they are learning that it wouldn't be hard to implement automation, AI and network assurance.

All this results in a better end-user experience as well as a better operator experience.

SW: An ongoing impact from the pandemic is its interruption of the supply chain. How are supply chain issues affecting Juniper's ability to meet demand for product and what mitigation steps are you taking?
Juniper: This is on everybody's mind and it's impacting not only Juniper and our industry but nearly every industry in the world. We are open and honest with our customers and partners about the issue. We recently created a letter to keep everyone informed. Let me highlight some of the content:

- Juniper's normal lead time was in a range of 16-26 weeks and now it is moved out to 30-60 weeks
- Our staff works daily to address the impact on our customer's business
- The situation is closely monitored so we can react quickly to changes and take a proactive approach by investigating in upside potential to maximize decreases in lead times
- Create component buffers
- Ordering components early
- Juniper and supplier co-planning
- Increase order horizon by encouraging our customers to order early
- Focusing on a Customer-First Experience: By keeping a close eye on customer demands, reported through our sales teams, we gain insights to better guide prioritization and planning

SW: Given the advancement in AI technology in years leading up to the pandemic, how has the work of network operators been enhanced during the pandemic?
Juniper: As mentioned earlier, the pandemic affected the service provider workforce and we know that the work force has been "Slimmed" down. So, this is a natural question.

Let me use an example that is accurately documented. I want to use a case in which network operators spend an enormous amount of time daily. The wireless LAN.

The Wireless LAN network probably has the most reported issues of any part of a network. That's because so many factors can affect a user's experience and requires so much time to identify and resolve.

Many times, it's not the network at all, but it still consumes the operator's time to identify.

A company with 20,000 users globally was experiencing 200 trouble tickets a month and this network was brand new! They did a proof of concept with Juniper wireless LAN products and our AI. The result was a complete removal of the other vendor equipment and installation of Juniper wireless LAN products. They are now able to identify users that are unhappy and resolve the issue before they even open a ticket. Within a few months they achieved zero open support tickets for wireless LAN. The operators now have much more time to focus on important network planning.

This kind of AI is moving into many other solutions within Juniper's portfolio to even further the impact on network operations.

SW: Broadband adoption is trending upward and will continue increasing given the amount of funding from state and federal programs. What are the ways network operators can maximize these investments assuming these are once in a generation infrastructure investment?

Juniper: The proliferation of broadband networks is mainly because of Rural Electric Coops tackling the digital divide in rural areas. The federal government is implementing programs that offer billions of dollars to help expedite and close the gap. The pandemic brought this digital divide to the forefront because many people lacked access or were underserved when it comes to having broadband access. In the metropolitan and suburban areas, people were forced to work from home, students had to revert to virtual connectivity to keep moving forward with their lives. Many people in rural areas were left out. This immediately elevated the Internet Service Providers (ISPs) and Rural Electric Coops (that provide broadband) to more of a "Critical Infrastructure" status.

Since many of the Rural Electric Coops are building new broadband networks, they have a unique opportunity to build the infrastructure, upfront, and capitalize on lessons learned by many other providers before them.

First, I would recommend evaluating their core IT infrastructure and determine if this is a good time for modernization. Also, look at the Operational Technology. If they haven't implemented Smart Grid applications, is this a good time to roll that into this effort?

Finally, what services will be rolled out on the broadband network initially and in the future?

From my point of view a Layer 3 approach would be the future proof way of implementing this type of new network. This would enable the provider to implement new services without drastic cost and effort. It generally costs more to upfront but pays off in the long run.

SW: 5G rollouts continue escalating and will have significant impact on what consumers expect from technology. How does Juniper enable the delivery of 5G applications in communities?

Juniper: Juniper provides solutions specifically focused on the delivery of 5G services with the intention of making them simple, flexible, and stable for service providers to deploy.

As part of the "Cloud Metro" solution Juniper has a complete solution end-to-end that hits 6 basic requirements:

1. **Bandwidth** - Nx 10Ge, 25GE, 40GE, 100GE
2. **Timing & Latency** – Stringent timing spec & HA latency
3. **Operational Simplicity** – Fewer protocols, Stateless and Programable
4. **High Availability/Scalability** – 100x Node increase with reliable Node/Link/Path protection
5. **Service Differentiation** – Differentiated Dynamic Transport SLA
6. **Application Aware Routing** – Seamless Transport & Application Stitching

"They are now able to identify users that are unhappy and resolve the issue before they even open a ticket."

Juniper simplifies Network Slicing by providing deployment flexibility. You can "Slice" through networks that are unaware that slicing is taking place. And they are fully automated.

SW: Why should a Rural Electric Cooperative, planning to build broadband to its members, consider using Juniper/Walker for their Partner/Vendor?

Juniper: First, choosing Walker is a no brainer. They have the knowledge, skill set and workforce to deliver everything from design, implementation, and day 2 support for Juniper solutions.

Second, Juniper Networks provides solutions, not just products. When network engineers develop the vision of what they want to build, they know they need products to fulfill their vision. Juniper has a vision of building products with solutions in mind. For example, if you want to use automation in the network, do you find software automation tools to bolt on to your network? Or do you look for hardware products that are built with automation in mind?

But it goes far beyond just automation. Juniper also includes security, telemetry, analytics, management, resiliency, etc. Then we can insert tools to take advantage of all the resources in the products to deliver insights, AI, network health, ZTP, network assurance. The results in lower cost of operations, lower trouble tickets, and improved up-time. Most importantly the customer experience has improved which results in lower churn. It also improves operator experience.

SW: What is the most deployed technology for broadband networks?

Juniper: The most common technology deployed in broadband networks today is PON (Passive Optical Network). When using fiber optics all the way or most of the way from the internet to the subscriber home, PON is the most common technology used. This technology provides a cost-effective way to deploy shared bandwidth into rural areas.

Juniper provides a solution called "Unified PON" that is designed to reduce hardware footprint, ROI, all while increasing density. By combining a PON OLT platform within Juniper routers it creates a platform for all kinds of services both commercial and residential. Consider Active Ethernet on the same router.

SW: How were upload speeds affected during the pandemic?

Juniper: Early in the health crisis oversubscription for the upload side of the network was a big issue. Prior to the pandemic upload bandwidth was fine. Once people moved to their homes to work, attend school, etc., the network started to slow down. Upload speeds were more susceptible to oversubscriptions since the focus was on download speeds. End users didn't have a need for much upload capacity. Service providers quickly adapted by re-configuring resources and adding more bandwidth to the network. Moving forward, network operators are taking a more strategic approach to factor in the shift of how the network is being used. Providing symmetrical gigabit speeds with PON technology eliminates the upload issue.

SW: Can an "Electronics Overlay" help providers extend the life of the network?

Juniper: The short answer is yes. For instance, newer technologies for PON can be added side-by-side with older versions. Many PON networks deliver 1G of service to end users and now they are seeing demand for 10G. Service providers can now support their legacy 1G users that are happy and for the ones that want to upgrade they can deliver the newer 10G on the same network. This extends the life of the service while providing a transition path without a forklift upgrade.

SW: In a recent survey Juniper is selected 53% of the time, over any other vendor, for Electric Coops' core networking vendor. Why is that?

Juniper: Juniper has a long history of being the vendor of choice when it comes to service provider networks. Most Electric Coops rely on consultants to steer them in the right direction in selecting a primary network vendor, and consultants know that Juniper is the leader in this space. You should know, by the way, that Walker is one of the leading ICT Partners for U.S. service providers!

When they are planning the evolution of the broadband network, they also know that they will include other services down the road. Smart Grid solutions will play a big part of the internal network plans as well as Smart Agriculture, Irrigation Control, Private Wireless Networks and more. They will need a platform that can handle and manage these services. Juniper provides a solution for all these initiatives. Network automation, Assurance testing, Network Health and Artificial Intelligence help ensure a high-quality end user experience and a quality operator experience.

Be sure to register now for the rest of the story during our webinar "Strategies for Network Operators In 2022". (Digital subscribers can click on the link, or visit http://event.walkerfirst.com/juniper2022webinarpreregistration to pre-register for this important webinar.)

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Public Private Partnerships: The Key to Aiding Underserved Broadband Markets

By Mary Ellen Player
Vice President, Market Management
Consolidated Communications

Before the COVID-19 pandemic shone a light on the large chasms in broadband access for millions of Americans, the lack of connectivity was strongly felt in rural areas unserved or underserved by internet providers. As a September 2021 Pew Research Study puts it, "Living on the wrong side of the digital divide brings serious costs in terms of lost opportunities."

Regardless of the reason for inferior access, be it infrastructure or financial barrier, the families and businesses in the most rural parts of the country are at a particular disadvantage. Imagine doing virtual schooling or working from home with a weak connection. Imagine applying for a job without online access. Imagine trying to have a virtual consultation with a doctor on dialup. That's the everyday reality for many of our rural neighbors. If the pandemic has taught us anything, reliable, affordable, high-quality broadband is not a luxury, it's a necessity.

The Federal Communications Commission and BroadbandNow puts different estimates on the total number of people living without access to high-speed broadband anywhere between 14.5 million and 42 million. Others suggest the number is higher still. Many in this unconnected set are found in rural areas whose remoteness makes connectivity often cost-prohibitive for providers. This population deserves all of the opportunities that broadband provides. So how do we get those residents connected?

Consolidated's Journey to Public-Private Partnerships

Spurred by the pandemic realities and the ongoing fight to bridge the digital divide, one solution is emerging as a viable option for rural areas previously overlooked by mapping and major providers: public private partnerships (PPPs).

In 2021, the CARES Act allocated $100 million to the USDA's Reconnect Program and the second round of funding from the FCC's Rural Digital Opportunity Fund (RDOF) awarded more than $163 million to aid network upgrades in 21 states. These were two of the latest windfalls for broadband efforts in a long line of funding predecessors from a wide range of departments, including the U.S. Department of the Interior, the U.S. Treasury, the National Telecommunications and Information Administration (NTIA), the Federal Emergency Management Agency and more.
In November, President Joe Biden signed his historic infrastructure bill into law. Enhancing connectivity for all was a highlight of the plan with $65 billion included for broadband deployments and other enhanced connectivity measures. These programs provide mechanisms for the most remote communities to get connected while alleviating some of the financial burden for providers.

In addition to federal sources, states are increasingly becoming more involved in actively closing the digital divide for their residents. According to Kathryn de Wit, director of the Broadband Access Initiative for The Pew Charitable Trusts, states are uniquely positioned to make broadband funding allocations because of their inherent knowledge of state geographies and constituent demands. According to the National Conference of State Legislatures, all 50 states have some group in place to chart a path toward better connectivity, whether it's a task force, commission or authority.

One of the ways that states and local communities bring infrastructure to more locations is with public private partnerships. In these agreements, local governments (the public part of the equation) partner with private broadband providers to build their own networks to the benefit of residents. These types of partnerships had previous complexities due to constraints on municipal networks.

According to a November report issued by BroadbandNow, barriers still exist in 18 states. These range from obstacles put in place to limit the creation of these types of networks to all-out bans on their establishment. However, fueled by the recognition of broadband's impact on communities, new legislation is turning the tides in many areas.

Consolidated's Chesterfield Model: A Case Study in Public Private Partnerships

In New Hampshire, public private partnerships (PPPs) were made possible thanks to RSA 33.3g, a piece of legislation that allows communities in the state to issue bonds for the purpose of financing construction of broadband infrastructure to unserved and underserved residents (defined by the FCC as residents with less than 25mbps/3mbps access). This legislation has allowed us at Consolidated Communications to partner with local municipalities on their networks to reach their most underserved citizens. For us, this began in 2019 in the community of Chesterfield.

In 2019, Chesterfield residents voted to enter into a public private partnership with us to build a high-speed, fiber-to-the-premises internet network directly to all homes and businesses. This network is based on XGS-PON technology, capable of delivering up to 10Gig connections to residents. The use of fiber means that the network is "future proof" and won't need to be upgraded in the near future. Using the PPP model also allowed the network to be built with no associated property tax increase, a unique arrangement that was the first of its kind in the state.

To date, our fiber network builds are underway in more than 20 New England municipalities that have followed in Chesterfield's footsteps. What was once one of the most underserved regions in the nation is now not only one of the most connected, but has one of the fastest networks nationally. This model has gained national recognition as an approach to address the digital divide in our most rural communities.

Altogether, these projects will connect nearly 33,000 rural locations to critical broadband services they may not have otherwise been able to access. Consolidated is also in active discussions with municipalities

" . . . fueled by the recognition of broadband's impact on communities, new legislation is turning the tides in many areas."

in several other states where we believe this model can be used to benefit citizens.
Some of the other highlights of our public private model show the impact made in Northern New England since completing Chesterfield's network:

- April 2020 – Completion of a yearlong project connecting all residents of Brooklin, Maine;
- December 2020 – In partnership with the state of New Hampshire, completion of networks in Danbury, Springfield, Mason and Errol connecting 2,000 residents;
- February 2021– Completion of networks in Dublin, Rindge, Westmoreland, Walpole, and Harrisville, N.H.;
- April 2021 – Partnership inked with Eastbrook, Maine to serve 500 locations;
- Partnerships with the Southern Vermont CUD and the ConnectMaine Authority in joint applications for federal grant assistance in connecting the underserved in their communities.

Closing the digital divide will take everyone: providers, governments, municipal and civic leadership. Public private partnerships are a critical tool in the toolbox for facilitating the closing of that divide. Our work in New England is a testament that this tool works... and it's already improving lives in the communities we are serving.

Community leaders have shared that they can now be destinations for remote work opportunities because of this connectivity, stemming what had been negative population growth locally. Small businesses can now more easily reach national and global consumers via ecommerce, fueled by symmetric Gig speeds. Schoolchildren in the most remote regions will now be at parity with their more urban counterparts in not only virtual school settings but also in everyday work where internet research and usage are standard classroom and homework tools.

The digital divide can be closed. We're honored to be doing our part, in conjunction with governments and municipalities, to make that possibility a reality. We are excited about our partnerships and look forward to connecting more residents in this way. We're just getting started.

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Mary Ellen R. Player is the Vice President for Market Management and Expansion at Consolidated Communications. In this role, she is responsible for all public/private partnership expansion as well as all field sales activities across Consolidated's 20+ state footprint. Prior to joining Consolidated, Ms. Player spent 13 years at Google, in a variety of roles across marketing, finance, and operations. Most recently, she served as the City Manager for Google Fiber in Charlotte, North Carolina, a business she launched from its inception. Before joining Google, she worked as a management consultant for Booz Allen Hamilton supporting clients in the Department of Defense, most notably for the Department of the Army's Assistant Secretariats in Acquisitions, Logistics, and Technology as well as Manpower and Reserve Affairs.

Originally from rural, Lake City, South Carolina, Ms. Player is a founding board member of the South Carolina Rural Innovation Network whose mission it is to develop technology and entrepreneurship hubs across rural South Carolina communities.

Ms. Player holds an undergraduate degree, magna cum laude, from Harvard University and an MBA from Stanford Graduate School of Business where she attended as a Google Fellow. She also holds a certification in Infrastructure Management and Public Private Partnerships from the Harvard Kennedy School of Government.

NCDIT Division of Broadband and Digital Equity Comments on Public-Private Partnerships

The North Carolina Broadband Infrastructure Office recommends that the public community – town, city or county – form a partnership with a private, commercial broadband provider to expand broadband access to as many citizens as possible.

In simple terms, a partnership means that the county or municipality builds community support, identifies its needs and offers its resources to the broadband provider to make broadband deployment more financially attractive to the provider. In return, the broadband provider brings its technical expertise, innovation, equipment and capital investment into under- or unserved areas in the community. In the end, both partners share the risks and costs of broadband deployment.

The public-private partnership can take several forms. For example, a city or county may offer a cost-sharing opportunity to broadband providers, in which the municipality contributes an agreed upon portion of the costs of broadband expansion to an under- or unserved region. A community anchor tenant, such as a school system, community college, hospital or a public safety system, might offer a stable starting point for the network and a gathering place for residents seeking wireless broadband access before the network is built or expanded.

The town, city or county can choose to lease rights of way at no or reduced cost for the installation of broadband infrastructure. Further, the municipality can make its vertical assets – tall buildings and water towers, etc. – available to broadband providers at no or reduced charges for the installation of fixed wireless internet equipment. The municipality has several policies available that can encourage forming public-private partnerships and expand broadband access.

This publication provides an overview of common broadband partnerships, the factors communities should consider in developing a successful partnership model and tips and best practices the National Telecommunications Information Administration has observed through its oversight of $4.5 billion in broadband grants to public, private and joint projects across the country. (https://www.ntia.doc.gov/report/2015/broadbandusa-introduction-effective-public-private-partnerships)

Funding Opportunities In USDA Reconnect, The Infrastructure Investment And Jobs Act, And The Build Back Better Act

By Brett Kilbourne
Senior Vice President of Policy and General Counsel
UTC

Utilities are looking for funding to support investments in communications and information technology to support grid modernization and broadband deployment, and there have never been more opportunities. Already, the USDA Rural Utilities Service (RUS) has announced that it is making $1.15 billion available for broadband deployment through its ReConnect program, starting November 24, 2021, and ending February 22, 2022. Furthermore, the recently passed bipartisan infrastructure bill (Infrastructure Investment and Jobs Act, HR. 3684) will make $65 billion available for various broadband programs, and billions more for various electric smart grid, reliability, efficiency, and cybersecurity programs. Meanwhile, the $2.2 trillion reconciliation legislation that was recently passed in the House of Representatives and is under consideration in the Senate, includes various funding provisions designed to reduce carbon emissions, facilitate transmission infrastructure deployment, increase residential and commercial energy efficiency, and promote cybersecurity and energy research and development. All this funding, will mean direct and indirect funding opportunities for utility communications and IT. The following provides a breakdown of the various programs available through federal and state levels of government.

USDA ReConnect

The new ReConnect program will include three different types of funding opportunities: 100% grants, loan-grant combinations and 100% loans. There will be $250 million available for low-interest loans; $200 million for loan-grant combinations; $350 million for 100% grants with a 25% matching requirement; and $350 million in grants with no matching requirement for projects in tribal and socially vulnerable communities. Importantly, the new rules for ReConnect will make this funding available in areas that currently lack access to broadband speeds of 100 megabits per second download and 20 megabits per second upload (100/20 Mbps) to at least 90 percent of homes in the area. That means, areas that were otherwise ineligible for funding under other federal programs such as the FCC's Rural Digital Opportunity Fund (RDOF) will now be eligible for funding under ReConnect. In that regard, the USDA RUS specifically allows ReConnect projects to be deployed in areas that are being served by RDOF projects; however, applicants should explain why additional funding is needed in these areas (e.g., accelerated deployment). Also, USDA RUS will require that ReConnect projects provide at least 100/100 Mbps symmetrical speeds to every premise in the area, and they must have sufficient capacity to be able to provide these speeds to every premise at the same time. This should also promote opportunities for utilities deploying fiber and other future-proof broadband infrastructure that have sufficient capacity to deliver faster symmetrical speed services. Here is a summary of each of the ReConnect funding options:

- **100 Percent Loan.** Up to $200,000,000 is available for loans, and the maximum amount that can be requested in an application is $50,000,000. Applications will be processed and awarded on a rolling basis, and the interest rate for a 100 percent loan will be set at a fixed 2 percent with principal and interest deferred for three years.
- **50 Percent Loan/50 Percent Grant Combination.** Up to $250,000,000 is available for loan/grant combinations, and the maximum amount that can be requested in an application is $25,000,000 for the loan and $25,000,000 for the grant. The interest rate for the 50 percent loan component will be set at the Treasury rate for the remaining amortization period at the time of each advance of fund with principal and interest payments deferred for three years. Applicants may propose substituting cash for the loan component at the time of application and funds must be deposited into the applicant's operating accounts at the closing of the award.
- **100% Grants.** Up to $350,000,000 is available for grants, and the maximum amount of grant funds that can be requested in an application is $25,000,000. However, to encourage broadband deployment in remote areas, USDA RUS will allow applicants to request up to $35,000,000 in areas classified by the USDA Economic Research Service as FAR Level 4. Applicants must provide a matching contribution equal to at least 25 percent of the cost of the overall project.
- **100% Grants for Tribal Governments and Socially Vulnerable Communities.** Up to $350,000,000 is available for grants, and the maximum amount of grant funds that can be requested in an application is $25,000,000. However, to encourage broadband deployment in remote areas, USDA RUS will allow up to $35,000,000 in areas classified by the USDA Economic Research Service as FAR Level 4. In addition, if at least 75 percent of the geographic area of an applicant's PFSA(s) consists of Socially Vulnerable Communities, there is no matching fund requirement and applicants may apply for grant funds to construct the broadband facilities.

Again, applications must be filed between November 24, 2021, and February 22, 2022, and they must be submitted electronically at https://www.usda.gov/reconnect.

Infrastructure Bill (HR 3684)

In addition to broadband funding, the Infrastructure Bill also provides funding for smart grid, electric reliability and efficiency and cybersecurity. It directs NTIA to oversee broadband funding, which must establish rules within 180 days for the $42.45 billion Broadband Equity Access and Deployment (BEAD) program and the $1 billion Middle Mile Deployment program. Both programs will provide funding through the states, and each state or territory will receive at least $100 million for broadband deployment. It also provided NTIA with another $2 billion for its Tribal Broadband Connectivity Fund, and it extended the timeframes for the funding to be awarded and projects to be completed.

The BEAD Program

The BEAD program will provide grants for projects in unserved and underserved area, which are defined as areas lacking 25/3 Mbps or 100/20 Mbps, respectively. States will serve as the grantees of the funding, and they will distribute the funding from NTIA to the project contractors (i.e., subgrantees). States may apply for planning funds which may not exceed 5 percent of the amount available for each state, and if these funds are approved, the state must provide a five-year action plan for broadband deployment, which must be developed in consultation with localities. In addition, NTIA must issue a notice inviting states to submit initial proposals for projects, and NTIA will review the plans. If NTIA approves the initial proposal, each state will receive 20 percent of the allocated funding, and then they will receive the remaining 80 percent after approval of their final proposal. Priority will be placed on projects serving unserved areas, followed by underserved areas, and finally by eligible community anchor institutions. Priority will also be placed on projects that serve persistent poverty counties or high-poverty areas; the speeds of the proposed broadband service; the expediency with which a project can be completed; and a demonstrated record of and plans to be in compliance with Federal labor and employment laws. Initial proposals by states will be subject to a challenge process, regarding whether the area and the unserved or underserved locations are eligible for funding. In addition, a matching contribution requirement of 25 percent of the project must be paid by the state or the project subgrantee, except in high-cost areas or for certain projects where NTIA waives the requirement.

The Middle Mile Deployment Program

The Middle Mile Deployment Program will provide $1 billion for FY2022-2026 to provide grants directly to eligible entities, including among others "an electric utility, utility cooperative, or public utility district" or a partnership of one or more eligible entities. The purpose of the program is to encourage the expansion and extension of middle mile infrastructure to reduce the cost of connecting unserved and underserved areas to the backbone of the internet (commonly referred to as the ``last mile"); and to promote broadband connection resiliency through the creation of alternative network connection paths that can be designed to prevent single points of failure on a broadband network. In keeping with this purpose, applicants are required to prioritize the connection of middle-mile infrastructure to existing last-mile infrastructure that would provide broadband service to households in unserved areas; connection of state trust lands; or the offering of wholesale broadband service at reasonable rates on a carrier neutral basis. NTIA will review the applications, and will give priority to projects that leverage existing rights of way, assets, and infrastructure to minimize financial, regulatory and permitting challenges; and that are designed to enable the connection of unserved anchor institutions, including Tribal anchor institutions; as well as projects that facilitate the development of carrier-neutral interconnection facilities and that improve network redundancy and resiliency of existing middle mile infrastructure and reduce regulatory and permitting barriers to promote the construction of new middle mile infrastructure. A regulated utility should use funds received from a middle mile grant as a supplement to the core utility capital investment plan of the regulated utility to (i) facilitate increased broadband resiliency or redundancy of existing middle mile infrastructure; or (ii) provide connectivity to unserved areas and underserved areas within the service territory of the utility and nearby communities. Finally, construction must be completed within 5 years, but extensions of time may be granted by NTIA; and the federal share of the grant must not exceed 70% of the cost of the project.

In addition to the BEAD and Middle Mile programs, there is also a $1 billion broadband funding initiative through the Appalachian Regional Commission, which will provide grants of up to $50,000 to any entity living in the Appalachian region and/or resides in the 13 states that are ARC members. The Infrastructure Bill also provides another $2 billion to USDA RUS, including $1.926 for ReConnect grants and loans, and $74 million for its Rural Broadband Loan program – an increase of $1.291 billion for ReConnect and $72 million for the Rural Broadband Loan program. Finally, the Infrastructure Bill provides $3 billion through 2026 for the Department of Energy and its Smart Grid Investment Grant program, which among other things can be used for projects that help utility communications, specifically operational fiber, and wireless broadband communications networks. This is just one example of provisions for energy related programs, several of which – including $5 billion to help prevent outages and enhance resilience (section 40101) and another $5 billion for R&D to promote electric reliability and resilience (section 40103) -- have implications for investments utility communications and information technologies.

As noted at the outset, the $2.2 trillion Reconciliation Bill (Build Back Better Act (HR.5376) also includes various funding provisions designed to reduce carbon emissions, facilitate transmission infrastructure deployment, increase residential and commercial energy efficiency, and promote cybersecurity and energy research and development. All this funding also has implications in terms of direct and indirect funding opportunities for utility communications and IT. As the bill is still pending, it is uncertain whether and to what extent the provisions in the bill will make their way through, if the Senate passes the bill. Yet, it is likely that the Reconciliation Bill will provide additional funding for utility communications and IT investments, including and especially cybersecurity, where there are entire sections which provide additional funding for the Department of Homeland Security's Cybersecurity and Infrastructure Security Agency (CISA), including $50 million to CISA for the purpose of protecting critical infrastructure industrial control systems. For more information, contact anyone of our advocacy staff at UTC.

"NTIA will review the applications, and will give priority to projects that leverage existing rights of way, assets, and infrastructure to minimize financial, regulatory and permitting challenges; . . . "

Shifting Landscapes in 2022

By Jason Weister
Business Developer
WireStar Networks

Americans are ushering in a new year. Most carriers are aware of shifting consumer internet bandwidth needs as they begin employing home data networks for more critical uses. While lack of broadband in rural areas has been highlighted for nearly a decade, these issues are now front and center, well understood and propelling new innovations across the telecommunications landscape.

At an industry level, the last two years presented challenges more intense and voracious than even Nostradamus could have envisioned. Leaders from companies of all types and sizes faced uncertainty as the pandemic reminded everyone there is never a time to rest on our laurels. This is especially true for internet service providers, who have seen a unique influx of new demands in a post work-and-school-from-home world.

WireStar Networks

WireStar Networks of College Station, TX is familiar with adopting new technologies as demographics, environments, and needs change. As a CLEC (Competitive Local Exchange Carrier), the company's roots date back to when DSL launched a strong foothold over dial up, and smart phones were a novelty.

In 2019 and 2020, WireStar was actively building new networks and client relationships in rural areas without existing funding. WireStar actively bid in RDOF reverse auctions throughout underserved census blocks in the State of Texas. As auction results were announced, however, it became more clear that even with a sound fundamental approach to participating in the RDOF, larger companies could withstand lower percentage bids despite having no local presence in the area. While WireStar ultimately did not receive funding from the RDOF, the planning of additional business strategies allowed for immediate refocus that had impacts for those in rural areas.

WireStar's Prioritization of Fiber Peering

As a provider specializing in the Multi-Family Community space, WireStar always focused on growth within the multi-resident market. College Station is located roughly equidistant between Austin, Dallas, Houston, and San Antonio, and is home to Texas A&M University, one of the largest college student bodies in the nation. College Station and the neighboring city of Bryan are home to roughly 200,000 residents. New residential and multifamily housing developments dot the landscape with increasing regularity. This development puts outbound pressure on the geographical edges of College Station and Bryan. Broadband access in new areas is not always turnkey or readily available despite existing robust fiber networks. Master planned community developments are no longer strictly being built inside the limits of College Station, Houston, or surrounding areas. Many are taking shape in the smaller towns and rural counties as the demand for peaceful Texas country lifestyles continues to expand beyond city limits

A strategic effort to peer with various carriers and the City of College Station allowed WireStar to identify and position itself to move quickly on opportunities that previously would have been unbuildable, even with larger carriers. As the WireStar fiber footprint grows throughout Texas and the nation, the identity of the company in a post COVID-19 marketplace emerges stronger than before.

"Developers want to be developers, and General Contractors want to be General Contractors. These folks shouldn't need to be data infrastructure experts to be able to execute effective choices for new technology that is improving the properties they are building and making a real impact on the lives of their customers."

Emphasis on Automated Networks and Implementing New Technology

WireStar's focus on new developments in the College Station region led to a unique approach for property launch techniques that are game changing for area developers and communities. The importance of minimizing in person contact to reduce the spread of illness has helped shape how new networks are launched. Coupled with WireStar's ability to use its fiber peering relationships and willingness to establish new ones, the approach for the company catalyzed nationwide growth throughout the last 24 months. Broadband users are justifiably less willing to accept wide appointment windows and in-home site visits when procuring internet services, thus developing an approach to serving users without the interaction of a technician was of particular interest to WireStar and has proven highly effective at minimizing in person contact and reducing turnaround times for new residents moving into properties. Through custom programming and development with leading hardware manufacturers, WireStar has standardized a seamless access process for multi-family communities.

Upon move-in, residents are greeted with property-wide Wi-Fi, allowing them to complete the registration process for secured network access. This process is near instantaneous for the resident and staff. The ability to launch a property in this fashion shifted the company's approach to serving new and retrofit developments. This is highly appealing to developers seeking to streamline and simplify the process of resident move-ins in a way that distinguishes them from their competition.

Wi-Fi users are offered hardwired ethernet access through media hubs located within their unit. Instead of using a modem gateway or router located within their own unit, client roaming enables users within the WireStar Network expanded service throughout the entire property. Property-wide deployments include common area access points such as pool decks, parking garages, community rooms and fitness centers, all allowing users to easily communicate with their network when outside their apartment. Users can take advantage of Wi-Fi calling and seamless data reliability from the moment they step foot onto their property.

Network programming allows for a variety of implementation approaches ranging from direct retail to bulk developer arrangements. In any scenario, each property's specific characteristics are being accounted for to ensure residents experience a faster and more consistent internet experience.

Rural Population Density and Scalable Solutions for Multi-Family Properties

With a scalable network design and a clear need for dense networks in more rural settings, WireStar established a heightened focus on ensuring these communities are not left behind in contrast to single family homes located outside the reach of conventional data networks.

WireStar challenges the status quo, showing developers that waiting weeks or months for large carriers to respond to simple questions about delivering property service is not the only option. Too often, General Contractors and developers are forced to accept subpar project management and communication from data providers who fail to prioritize their projects over other growth. In turn this leads them down a path where they are expected to make decisions regarding data readiness within new construction using only half of a full deck.

Developers want to be developers, and General Contractors want to be General Contractors. These folks shouldn't need to be data infrastructure experts to be able to execute effective choices for new technology that is improving the properties they are building and making a real impact on the lives of their customers.

WireStar has proven that low voltage and fiber communication scope is not something that can only be planned and executed after occupancy begins and people start placing orders. This is the norm with national carriers, who often are absent during the foundation and construction process. WireStar acts as a turnkey partner from design, to implementation, and post launch support, ensuring all aspects of building readiness during construction are accounted for.

EBB in Qualified Affordable Housing - Caldwell Heights in Caldwell, TX

Pairing the desire to improve data in rural areas, and offer seamless solutions for developers and general contractors, WireStar has combined the best of both worlds.

As an approved EBB provider, WireStar factored in the assistance from this fund to expand network access to two underserved affordable living communities in 2021, with additional opportunities already underway for 2022.

The rural City of Caldwell, Texas is an underserved community located within twenty-five minutes of College Station. The city has experienced growth, offering a quiet and small-town setting. With the local cable and telephone incumbents offering sub 10MBPS speeds in many areas of the town, most residents have relied on satellite or small WISP operations for access to the internet.

Caldwell Heights is a recently constructed HUD housing property situated near the edge of Caldwell, consisting of nearly 100 units across four residential buildings. Originally slated to receive connectivity through an incumbent, the developer was faced with the daunting news that the provider would be pulling out of expanding to the property just a couple months before the project's completion.

WireStar responded to an RFQ for the property and immediately began working with the developer to offer an alternative. With a short construction timeline and a late start, WireStar completely installed a turn-key managed network providing access via Ethernet and Wi-Fi for all residents. The physical network installation began with structured cabling, fiber cross connects between each building, and a network rack in the leasing facility. In tandem, last mile bandwidth to the property was being arranged through resources close to the site.

Burleson County Judge Keith Schroeder agreed to work with WireStar to co-locate a backhaul antenna atop a rooftop tower at the courthouse in Caldwell. This allowed WireStar to extend a fiber circuit from within the courthouse to the property, ensuring enough bandwidth to support the needs of new residents.

Residents at Caldwell Heights have benefited from the EBB program, and it has helped WireStar identify similar opportunities where real world impacts can be realized by underserved HUD properties. Reliance on this funding allowed WireStar Networks to quickly justify the upfront build-out costs to Caldwell Heights while offering affordable savings to residents for contract free data options with fiber backed performance and the full weight of the Federal EBB program behind it.

Additional qualified HUD housing developments are under way for 2022 that will further the impact of the EBB program and WireStar's efforts to help families affected by the pandemic.

IOT & Automation in Highly Congested Environments

Rural communities are not alone in facing data obstacles. WireStar Networks continues innovating solutions that advance the quality and affordability of data solutions for residents in well-connected communities as well.

Network congestion within highly dense areas is at an all-time high. With IoT adoption on the rise, wireless pollution in densely populated environments creates its own set of obstacles for end users. The addition of 6Ghz spectrum to the unlicensed Wi-Fi playing field by the FCC, paired with new Wi-Fi 6 technology, are promising future factors.

High density housing properties using a network approach where several providers bring isolated and unmanaged access points broadcasting with wide Wi-Fi channels quickly becomes chaotic. Incorporating managed data networks alongside unmanaged access points is difficult. Prior to considering IoT at a property wide level, it can quickly become an all or nothing scenario for providers. WireStar firmly believes that providing 100 percent access to a property does not automatically mean end users there will suffer from lack of broadband competition. When a company puts ethics and good morals first, those effects are felt through the end user's experience as well.

Single family home residents have the luxury of traveling to big box retail or shopping online for a myriad of smart home choices from lights, doorbells, locks, and other IoT devices that improve the quality of life. On the Multi-Family front, it leaves a large bridge to cross for developers to offer the same innovations in a way that makes sense from a financial and operational perspective.

Through a partnership with Point Central, an Alarm.com company, WireStar incorporates smart property solutions for developers aimed at solving common problems that negatively impact net operating income. Coupled with seamless data integration, developers choose from a variety of smart building connected features reducing both staff involvement and improving convenience for residents.

Smart Managed thermostats allow properties to operate greener at a lower cost, while passing savings to residents through programmable schedules. Smart locks make it possible for property managers to offer contactless showings when access to a unit can be offered and restricted through a simple management interface. Maintenance calls to rekey apartments in between tenancy are quickly becoming a thing of the past. Residents can allow providers or delivery drivers to access their spaces without having to take time out of their day to meet. Leak detection and smart water shut off valves are preventing unchecked damage to units. All these features are available on the open marketplace as standalone items, however the managed approach WireStar utilizes allows property managers easier administration that can scale across a diverse property portfolio.

Bringing the operational learning curves into clear focus and concisely showing the value of how these connected systems positively improve their community has become a core mission for WireStar and provided a clear direction of growth.

Insight Into a More Connected World

As consumer bandwidth behaviors continue to evolve, data trends increase and IOT smart technology continues to become more in demand, WireStar will prioritize the development of affordable and easy to manage technology solutions to help put developers in the driver seat of their technology systems.

Consumers and developers are faced with more choices every day. From the apps we use, to the services we consume, and the impact of those services on privacy and quality of life, it can be hard to understand what products truly add value and which fall short. As WireStar continues to develop new relationships throughout the country, the company has become committed to emerging as a leader in the connected property space as an ethical and trustworthy source for accurate and timely solutions for properties and residents from all walks of the USA.

For information on connected services, partnerships, or consulting - visit our website at www.wirestar.net.

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Gigabit Fixed Wireless Access: Top Five Considerations

By KT Mishra
Market Manager EMEA & APAC
ADTRAN

Fiber is being deployed everywhere. It is the future-proof solution on everyone's mind. But, with nearly $100 billion in broadband funding driven by initiatives like the Rural Digital Opportunity Fund (RDOF), the new Broadband Equity, Access, and Deployment (BEAD) program, and private equity investments, the shared goal remains: improve access to fiber and gigabit services.

Yet, actual implementations of Fiber-to-the-Home (FTTH) in rural areas and dense urban locations prove difficult. Taking fiber to rural communities presents tremendous challenges due to low population density and difficult terrain. Urban areas suffer from physical obstacles such as roadways and railroads, that make fiber-trenching an expensive proposition. Additionally labor shortages and supply chain issues have led to a market ripe with demand but short on supply.

Can I Use 60GHz mmWave for Gigabit Services? Unlicensed 60GHz millimeter wave (mmWave) fixed wireless offers multi-gigabit capacity has now emerged as the ideal complement to extending fiber-like gigabit service. Using ultra-high frequency in the V-Band (60GHz) spectrum, mmWave delivers multigigabit wireless links, making it ideal to extend fiber-like services in areas where digging for fiber can be costly, slow, and highly disruptive. By contrast, mmWave links can be deployed in hours, and often moved and reused on different sites as network requirements evolve.

However, 60GHz technology has challenges, including limited range, required line-of-sight between nodes, and atmospheric conditions impacting reliable connectivity. The market needs a solution that delivers gigabit service while minimizing obstacles.

FIVE KEY CONSIDERATIONS WHEN EVALUATING A 60GHZ SOLUTION

When evaluating 60GHz fixed wireless solutions, the following considerations are key to investing and deploying the right solution that complements your FTTH rollouts. It should:

- Support RDOF gigabit tier
- Intelligent self-organizing and self-optimizing mesh speeding rollouts
- Include cloud-enabled management, reducing operating expense and truck rolls
- Business-class QoS features to deliver up to four "9s" reliability
- Support multiple revenue-generating services

1. **Gigabit Service Delivery** - Unlicensed 60GHz provides the multigigabit capacity but is prone to atmospheric absorption from oxygen, limiting reach and throughput. Solutions that support all six channels (57GHz-71GHz) mitigate oxygen absorption and extend gigabit reach more than 500 meters, enabling cost-effective residential service delivery.

2. **Self-Organizing Mesh to Save You Time & Money** - Intelligent self-organizing and self-optimizing mesh 60GHz solutions allow fast setup – under 30 minutes - and optimization requiring fewer truck rolls and non-skilled technicians. This allows you to speed up rural broadband deployments and time to revenue.

3. **Cloud-Management to Keep You In Control** - A key to cost-effective rural broadband services delivery is to ensure resilient connectivity and the ability to remotely manage the network. When your network is covering vast area, remote management is a must. By choosing a cloud-managed solution, you can monitor and optimize your network on the go and make business decisions - without a truck roll – vastly reducing your operational expenses.

4. **Business-Class Features for Reliable Service Delivery** - Delivering reliable business broadband to businesses of all types and sizes requires guaranteed quality of service (QoS). Therefore, you need next generation 60GHz solutions that offer full business-class features to offer SLA-based gigabit services that ensure up to four "9s" connectivity.

5. **More Applications, Higher ROI for You** - High-capacity 60GHz spectrum utilizes ultra-wide 2.16GHz bands to deliver 10+Gbps throughput. The right mesh 60GHz solution should support multiple applications including residential and business gigabit, mobile backhaul, and open access for public Wi-Fi and CCTV. Maximum ROI from a single solution.

Choose the best solution for your network by using these key considerations when evaluating 60GHz solutions. This will allow you to make best use of unlicensed 60GHz spectrum to deliver gigabit services and take advantage of the vast funding opportunities for fiber and fiber-extension solutions.

Questions about the best solution for your needs? ADTRAN can help. From discovery and development services to Fiber and LAN extension, we can provide end-to-end service that fits your network's unique circumstances. Learn more at www.adtran.com/FWA.

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Premium Services Are Key to Maintaining Customer Loyalty Amidst Growing Appeal of Online Content Services

By ZYXEL Staff Writers

A recent Pew Research Center survey of U.S. adults found that the percentage of Americans who say they watch television via cable or satellite has dropped 20 percent in the past six years. Seventy one percent of respondents report that the reason for not subscribing to cable or satellite services is because they can access the content they want online. A 2019 global study conducted by Statista found that a key reason for the termination of cable subscriptions was due to the availability of online content with 18.3 percent of respondents reporting they would cancel if they were able to subscribe online to only the channels they want.

These studies underscore the critical role that premium services can play in helping service providers maintain and grow customer loyalty to keep existing customers and attract new customers.

COVID-19 Lockdowns Have Shifted Traffic Volume to Consumer Broadband Networks

According to ResearchAndMarkets.com, lockdowns due to COVID-19 have driven the shift to remote work and online learning around the world. The report states that the shift in Internet usage from enterprise and education networks to consumer broadband networks has resulted in many operators experiencing 100% growth in traffic volume.

The rapid adoption of remote work is driving requirements for increased bandwidth, Quality of Service (QoS) and network reliability to support business-class video conferencing and other cloud-based applications. The advancement of bandwidth-intensive applications in the home, such as 4K UHD video streaming, real-time immersive gaming, mobile augmented reality (AR), and a growing array of IoT devices is driving demand for faster, more reliable broadband connectivity in the home.

However, simply delivering fast broadband speeds is not enough to maintain customer loyalty. Service providers need to focus on providing services that match their subscribers' lifestyles while providing a positive and valued customer experience. Delivering premium services that maximize their productivity and capabilities as remote workers and optimize the use of their various networked home applications is critical to establishing differentiation in this increasingly competitive environment.

WiFi 6 – Next-Generation Wireless Optimizes Performance of High-Bandwidth Applications

The latest WiFi standard, 802.11ax (WiFi 6), supports higher network densities and incorporates technologies that eliminate contention and streamline connections to optimize the performance of devices on the network. By making more efficient use of both the 2.4 GHz and 5 Ghz bands, WiFi 6 supports speeds up to 10 Gbps – 40 percent faster than fifth-generation wireless networking technology.

Best-of-Breed CPE is Key to Customer Satisfaction

In partnership with Plume®, Zyxel's WiFi 6 gateways and extenders will support OpenSync™ to provide out-of-the-box support for Plume's SaaS experience platform and associated service suites. Certified for Plume's services, which include the HomePass® smart home suite and Haystack™ data prediction and analytics suite, Zyxel CPE enables service providers to provide their subscribers with flawless connectivity, complete network control, personalization, security, and customization via a highly-rated app.

Zyxel's WiFi 6 gateway-extender system gives service providers unprecedented versatility in network management and delivery of enhanced WiFi 6 services. The ability to manage the CPE with Zyxel's MPro MESH Intelligent WiFi with TR-69 remote management capability or Plume's integrated platform and associated services provides service providers with maximum deployment flexibility and enables them to provide different service options for a tiered approach. Multi-operational CPE can significantly reduce costs by simplifying logistics, maintenance and customer support costs while providing value-added services that increase customer loyalty and retention.

7% of Americans don't use the Internet. Who are they?

BY ANDREW PERRIN AND SARA ATSKE
Pew Research Center April 2, 2021

For many Americans, going online is an important way to connect with friends and family, shop, get news and search for information. Yet today, 7% of U.S. adults say they do not use the internet, according to a Pew Research Center survey conducted Jan. 25-Feb. 8, 2021.

Internet non-adoption is linked to a number of demographic variables, but is strongly connected to age – with older Americans continuing to be one of the least likely groups to use the internet. Today, 25% of adults ages 65 and older report never going online, compared with much smaller shares of adults under the age of 65.

Educational attainment and household income are also indicators of a person's likelihood to be offline. Some 14% of adults with a high school education or less do not use the internet, but that share falls as the level of educational attainment increases. Adults living in households earning less than $30,000 a year are far more likely than those whose annual household income is $75,000 or more to report not using the internet (14% vs. 1%).

There are no statistically significant differences in non-internet use by gender, race and ethnicity, or community type.

Despite some groups having persistently lower rates of internet adoption, the vast majority of Americans are now online, as ongoing government and social service programs encourage internet adoption in underserved areas. Over time, the nation's offline population has been shrinking, and for some groups that change has been especially dramatic. For example, 86% of adults ages 65 and older did not go online in 2000; today that figure has fallen to just a quarter.

The share of offline adults ages 50 to 64 has dropped 8 percentage points since 2019, from 12% to 4%. The shares of offline Black and Hispanic adults have also fallen significantly during that period, from 15% to 9% among those who are Black and from 14% to 5% among those who are Hispanic.

NTIA To Host Broadband Grant Program Public Virtual Listening Sessions

The National Telecommunications and Information Administration (NTIA) will host broadband grant program public virtual listening sessions in connection with the five new broadband grant programs authorized and funded by the Infrastructure Investment and Jobs Act: The Broadband Equity, Access, and Deployment Program; the Enabling Middle Mile Broadband Infrastructure Program; and the Digital Equity Act Programs, which include the State Digital Equity Planning Grant Program, State Digital Equity Capacity Grant Program, and Digital Equity Competitive Grant Program. These public virtual listening sessions are designed to collect stakeholder input to help inform program development and implementation.

DATES:
NTIA will hold the public virtual listening sessions based on the following schedule:
1. Infrastructure Investment and Jobs Act Broadband Programs Public Virtual Listening Session #1: Wednesday, December 15, 2021, from 2:30-4:00 p.m. Eastern Time (ET);
2. Infrastructure Investment and Jobs Act Broadband Programs Public Virtual Listening Session #2: Wednesday, January 12, 2022, from 2:30-4:00 p.m. ET;
3. Infrastructure Investment and Jobs Act Broadband Programs Public Virtual Listening Session #3: Wednesday, January 26, 2022, from 2:30-4:00 p.m. ET;
4. Infrastructure Investment and Jobs Act Broadband Programs Public Virtual Listening Session #4: Wednesday, February 9, 2022, from 2:30-4:00 p.m. ET
5. Infrastructure Investment and Jobs Act Broadband Programs Public Virtual Listening Session #5: Wednesday, February 23, 2022, from 2:30-4:00 p.m. ET.

ADDRESSES:
These listening sessions will be hosted via NTIA's virtual platform and conducted as a live public listening session. NTIA will post the registration information on its BroadbandUSA website at https://broadbandusa.ntia.doc.gov/events/latest-events.

SUPPLEMENTARY INFORMATION:
The Infrastructure Investment and Jobs Act (Pub. L. 117-58) authorized and funded five new broadband grant programs to be administered by NTIA: The Broadband Equity, Access, and Deployment Program; the Enabling Middle Mile Broadband Infrastructure Program; and the Digital Equity Act Programs, which include the State Digital Equity Planning Grant Program, State Digital Equity Capacity Grant Start Printed Page 69019 Program, and Digital Equity Competitive Grant Program. The Broadband Equity, Access, and Deployment Program is a $42.45 billion formula-based program to states, territories, and the District of Columbia for qualifying broadband deployment, mapping, and adoption project. The Enabling Middle Mile Broadband Infrastructure Program is a competitive $1 billion grant program for the construction, improvement or acquisition of middle-mile infrastructure. The Digital Equity Act Programs—which includes the State Digital Equity Planning Grant Program, State Digital Equity Capacity Grant Program, and the Digital Equity Competitive Grant Program—allocate $2.75 billion to promote digital inclusion and equity for communities that lack the skills, technologies, and support needed to take advantage of broadband connections.

https://www.federalregister.gov/documents/2021/12/06/2021-26409/broadband-grant-programs-public-virtual-listening-sessions

Five Minutes With Bryan Mauk Of PCs For People

By Allison Coleman
National Marketing Manager
PCs for People

Bryan Mauk is the Chief Innovation Officer of PCs for People, a national non-profit organization working to end the digital divide through electronic reuse and equitable access to computers, internet, and digital education. He joined the organization in 2018, first as Executive Director of the Cleveland location before being promoted to his current position. One of Mauk's top priorities with PCs for People is increasing opportunity for broadband coverage for underprivileged and underserved communities across the U.S. Most recently, that has led to a significant shift in how the organization approaches internet access, expanding from mobile hotspots to fixed wireless internet through 5G towers and multi-dwelling unit (MDU) access points.

Read on for our five minute interview with Bryan Mauk about PCs for People's internet expansion efforts to support communities most in need.

1. Why did PCs for People start exploring fixed wireless internet as internet options for your customers?

During COVID-19, we saw a nationwide need at the community level for better internet accessibility and affordability. With the growing needs and essential nature of internet connectivity, mobile hotspots were struggling to meet the demands for online learning, telehealth, and remote work for low-income households. We began deploying fixed wireless as an alternative to mobile hotspots offering faster speeds, greater reliability, and better access in communities where broadband was previously unavailable.

2. How does PCs for People fixed wireless internet work?

We provide low-cost internet to communities that have low incomes, with a priority on communities without any other affordable options. For residents of those communities, our service is a pre-paid model; there are no credit checks, no contracts, and no activation or hidden fees. We offer a 50/10 service plan for $15 per month. Customers need to purchase the modem up front, but for many households, we have financial aid available for families to apply for a free modem. Our service is also eligible for the Emergency Broadband Benefit/Affordable Connectivity Program and customers can also receive a subsidized laptop through our traditional PC service.
Our network is a fixed wireless, 4G private LTE over the CBRS spectrum. We also deploy wired MDU via coax. We are piloting both 5G and mesh technology as additional tools in our belt.

3. When was the first tower for fixed wireless internet placed and where are they operating now?

The first tower was placed in October of 2020. We now have approximately 30 towers deployed, primarily in Cleveland, OH, and Milwaukee, WI. We are working on our expansion plans every day!

4. Why is this kind of service important?

With COVID-19 our communities have been forced, almost overnight, to jump years ahead in digital adoption. Remote learning, telehealth, and work from home went from novel to the norm. Many households have been left behind in this transition and further digitally, economically, and socially marginalized. Computer and internet connectivity can provide economic impact to a family now more than ever, making the work we are all doing to bridge the digital divide even more critical.

Bryan Mauk, pictured here with PCs for People staff in their hardware refurbishment space.

5. How can people help support digital equity efforts in their communities?

Great question! In addition to providing internet and computer access to people in need, we also provide secure and environmentally sustainable PC refurbishing. Companies and individuals with end-of-life computers or other technology can recycle with PCs for People and those computers can go on to benefit families in need. Since we started in 1998, PCs for People has distributed over 250,000 devices, connected 75,000 households to internet, and recycled over 8 million pounds of e-waste. We can work with companies nationwide and would love to discuss recycling opportunities with anyone interested. Please visit www.pcsforpeople.org/recycle or email us at recycle@pcsforpeople.org for more information.

Individuals eager to help can also encourage their local, state, and federal governments to support infrastructure improvements in both rural and low-income urban communities.

Want to learn more about PCs for People?
Visit www.pcsforpeople.org.

The Great Debate: Wired vs. Wireless . . . Why Not Both?

Kara Mullaley
Market Development Manager
Corning Optical Communications

One thing we've learned through the pandemic is there are a lot of creative ways to get things done. This was acutely evident when the lack of high-speed broadband impacted home-schooling. Where internet access was available, we saw incredible increases in throughput straining networks everywhere. And children congregating at the local libraries, fast food parking lots or specially outfitted WiFi hotspot school buses to get online. Operators everywhere scrambled to increase capacities and offered up new services where possible. But one thing was clear. More capable networks were needed – and fast. How do networks get built overnight? They don't. But networks are being built faster than they have ever been before by those willing to be open minded to the reality of their network needs and their available options.

Normally pitched against each other as rivals, wireless networks have been under fire recently when compared to all-fiber architectures. There are distinct advantages and disadvantages for each to consider, however, a blend of technologies may be the best option to a cost-effective deployment. Rather than a Wired vs. Wireless debate, more network operators are beginning to explore where these technologies work in concert with each other in a hybrid architecture.

"Fiber builds are optimal in theory but insisting on a fiber-only solution can kill a project when the last 5%-10% of locations are extremely expensive to pass. Where the economics of a 100% fiber network do not work, such as rural or remote areas, you need to consider a fiber-wireless solution," says Michael Curri, Strategic Networks Group.

Undoubtedly, all-fiber networks' performance is unmatched -- but that doesn't mean it is the best choice for every situation. When to employ a blended approach depends on several factors. Even wireless systems have become more fiber-rich with optical links running all the way to the wireless antenna. Perspectives may vary based on which type of company is making this decision as do the scenarios they may encounter. Is the company a wireline-based ISP, a WISP at its core, or a brand-new entrant into broadband?

Traditional Wireline Providers

Many providers deploying fiber networks have their roots in copper/coax networks. Over time some operators have branched into delivering mobile services as part of their bundled offering as well. Areas deemed impractical to be overbuilt with fiber alone may now be revisited as more tools are made available to operators. Excessive costs to traverse challenging terrain have left some areas in broadband deserts, while others have pushed fiber deeper into the network, moving electronics to the curb or node and relying on existing copper/coax cabling to complete the run to the subscriber.

As these networks evolve to support higher speeds, consider these examples where wireless technologies could be implemented.
Microwave in the Feeder: Right-of-way issues or obstructions may exist that make it impractical to deploy fiber everywhere in the feeder network to a distribution area. Leveraging the high-capacity nature of point-to-point microwave technologies in the backhaul allows operators to reach pockets of subscribers that can then be economically served by fiber. The bandwidth capacity needed in the backhaul link dictates the type of microwave system used. (See Figure 2.)

"Rather than a Wired vs. Wireless debate, more network operators are beginning to explore where these technologies work in concert with each other in a hybrid architecture."

Fixed Wireless Access as the Drop: Perhaps there is a scenario where fiber easily reaches deep into the network and to many homes/businesses, but restrictions or permitting issues limit the ability to bring fiber connections to every end-user location. Leveraging fixed wireless access points to provide service to a fraction of the otherwise fiber-fed subscribers is an alternative, provided line-

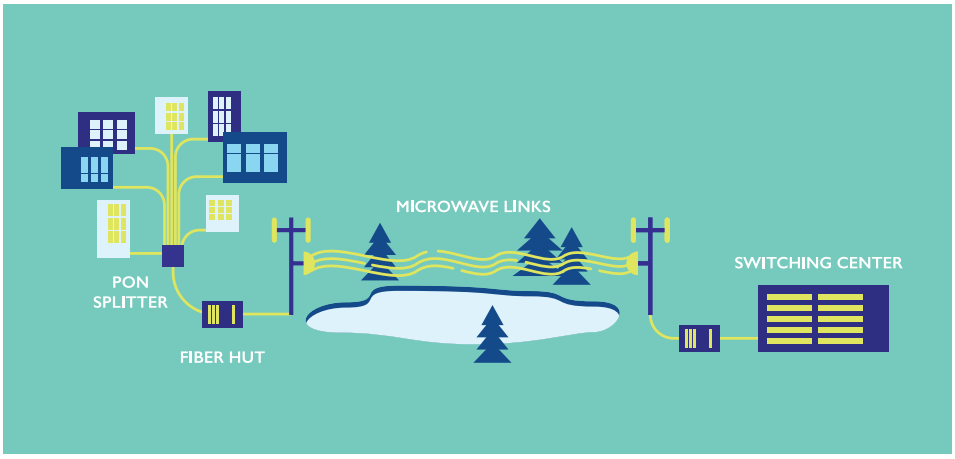

Figure 2

of-sight to subscribers is achievable. Keep in mind, power must also be made available at the radio location to support the optical to wireless electronics. (See Figure 3.)

Figure 3

LTE Routers as the CPE: For operators that offer LTE services themselves or through partnerships, there may be an option to support connectivity through existing LTE coverage. Reliability could suffer and sluggish speeds may result if the system becomes overburdened with other wireless traffic on the tower. This may be leveraged as a stop-gap solution until construction of a fiber network or more bandwidth-intensive 5G FWA options are deployed.

Wireless Internet Service Providers (WISPs)
Leveraging Spare feeder: WISPs with fiber-fed towers or aggregation points looking to stretch their bandwidth offerings may run spurs off their fiber feeder network to support lucrative business parks or high-density residential subscribers directly with fiber. Depending upon the availability of dark fiber in their network, this might also present an option to be a backhaul provider for other network service providers.

Overbuilding With Fiber: Where take rates have risen and wireless spectrum becomes exhausted, operators have fully overbuilt select areas with all-fiber networks to free up spectrum to be used to acquire new wireless customers. This rewards existing subscribers with increased broadband speeds, and offers a better ROI with a known, paying subscriber base.

Equipment Refresh: As wireless equipment becomes outdated and the actives are scheduled for replacement, operators have evaluated the cost of new wireless gear versus the cost and OpEx savings of fiber networks which might be better suited to the service area. Situations also arise where new construction impedes previously clear line-of-sight and necessitates either new fiber-fed wireless sites to be constructed or simply a conversion to a fiber drop.

New Entrants
Moving quickly to deploy a network and generate cash flow is critical to many startups. Some operators have used a "wireless first" strategy to acquire customers quickly with intentions to later overbuild with an all-fiber network. This may on the surface seem wasteful and contrary to the "build once" approach but lowering the initial capital outlay to begin earning a positive ROI may outweigh the costs to rip and replace.

An added benefit is the wireless electronics and wireless ONTs used on the subscriber premises can be harvested and repurposed once the fiber network is lit and operational. With the race to support new subscriber growth, this has become more popular in recent months.

Common Threads
The reality is no matter which entity type is looking to build (Telco, CATV, WISPs, Munis, or REC), the factors being evaluated are often the same. Each entity needs to find the right balance for its business, as well as the consumers it aims to serve. If looked at in absolute terms, with a pure fiber vs. pure wireless network approach, it may be difficult to decide, because the factors individually may favor one system over the other.

Which factors lean toward wireless or all-fiber strategies are shown in Figure 1.

Features	Wireless	All-Fiber
Capital Investment Up-Front	X	
Operational Expenses Long-Term		X
Symmetrical Bandwidth Capabilities		X
Speed to Deploy	X	
Network Reliability and/or Outage Repair		X
Time to ROI	X	
Long-Term Profitability		X
Upgrade Frequency		X

Figure 1. Factors that favor wireless or all-fiber strategies.

Still other factors are harder to decern -- as an example, rights-of-way can be very problematic. Pole attachment agreements, access to local power, or tower lease fees, can be extremely expensive and slow to acquire, making it difficult to determine whether any network type has any distinct advantage. All pointing to why network and customer needs should be looked at holistically with an eye toward the reality of the competitive landscape as well.

Kara Mullaley is the FTTx Market Development Manager with Corning Optical Communications. Kara has over 20 years of experience in the telecommunications industry, primarily supporting major network operators in the deployment of broadband networks worldwide. She is a subject matter expert on best practices for fiber deployment, architecture, and solutions to address tough deployment challenges, including meeting today's rising bandwidth and application demands.

For more information, please email Kara.Mullaley@corning.com or visit www.corning.com/fttp.

AFCEA Meritorious Service Award Presented to Lisa Smiley

By Randy Turner
Director, Marketing
Executive Editor, Skinny Wire
Walker Powered by USTC

Through its annual awards program, AFCEA International recognizes outstanding contributions of individuals in the communications, electronics, intelligence and information technology disciplines. In addition, AFCEA's chapters are recognized for outstanding support to the association.

Lisa Smiley, Director of Product Marketing & Business Development at Walker Powered by USTC, received the AFCEA Meritorious Service Award for the North Carolina chapter, which was presented during AFCEA Awards Dinner at TechNet Cyber in September

This award recognizes professionals for meritorious contributions to AFCEA and the community as well as professional accomplishments. "The AFCEA community wouldn't be the same without these fantastic individuals – thanks for all you do!", stated the press release from AFCEA.

Congratulations to Lisa Smiley on this achievement! Ms. Smiley has worked at Walker over 32 years, serving in a variety of leadership roles in executive management and marketing.

How to Subsidize Broadband

By Claude Aiken
President and CEO
WISPA

The landmark infrastructure bill signed into law in November has $43 billion in it for broadband deployment funding. For a variety of reasons, many have hailed it as a once-in-a-lifetime opportunity to build out America's fiber-optic networks. But that's not its purpose.

Its primary goal and priority is to get all Americans online and bridge the digital divide. To make that happen, the true wisdom of the bill is its tech-neutral design. That means a wide variety of solutions – such as fixed wireless, satellite, 5G, coaxial and fiber – should be flexibly employed, truly ensuring that all Americans have access to world class and affordable broadband connectivity.

Lawmakers specifically chose "tech-neutrality" because they know this inclusive approach works. An excellent recent example of this can be seen in the deployment efforts surrounding Bonne Terre, a town of 7,000 in rural Missouri. Like many small towns in America, the outskirts of town have always struggled with quality connectivity. While the downtown area has decent broadband, the areas just outside of town have been underserved for years.

In 2018, WISPER ISP, a small, local internet provider was awarded over $200 million by the FCC to build-out rural broadband to areas that had no connectivity, including the areas surrounding Bonne Terre. It caused quite a stir when they committed to bring 100 Mbps service over wireless to those communities. This was because the technical cognoscenti of the day thought that was impossible to do via any technology other than fiber optics.

Now, three years later, those homes and businesses around Bonne Terre are getting wireless broadband: at speeds of 400 Mbps.

How did this success story happen?

First, the FCC program made room for entrepreneurship so that community-based service providers like WISPER ISP could do big things. There are thousands of local companies that are laser-focused on providing quality connectivity in communities where their owners and employees live and work. But these companies are a second thought at best when policymakers look for solutions to sub-par connectivity. Programs that leverage these companies tend to do better at creating quality service for unserved and underserved communities.

Second, policymakers allowed space for technological diversity and innovation to bloom. While the "safe option" in 2018 would have been to fund only fiber projects, that road would have made buildout slower, cost the government more money, and made it unlikely that diverse, community-based entrepreneurs would have had access to the funding. Taking this "safe" road, the program would likely have subsidized risk-averse companies that live primarily for subsidies, spent double or triple the money, and taken twice as long to build, if it was built at all. By fostering flexibility, however, the program accomplished exactly what the FCC set out to do: put communities and service providers rapidly on a path to ongoing success.

As Federal and state policymakers consider future connectivity support programs, they should look at Bonne Terre for inspiration. Bonne Terre, which literally translates into "good soil," reveals a clear roadmap that future subsidy programs should be grounded upon to promote broad innovation, entrepreneurship, and diversity of technology in service of those living in unserved and underserved areas of America.

BIO

Claude Aiken is president and CEO of the Wireless Internet Service Providers Association (WISPA). A leader on broadband policy, Aiken joined WISPA in 2018 after nearly a decade at the FCC. While there, he served as a trusted advisor to Chairman Wheeler and Commissioner Clyburn. He held senior leadership positions in the Wireline Bureau and Office of General Counsel, as well key staff attorney roles throughout the Commission. Before joining the FCC, he was a John Marshall Harlan Scholar at New York Law School, where he graduated with a specialization in information and technology law. Aiken also holds a degree in English from Grove City College.

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ABOUT WISPA

WISPA represents the interests of the evolving wireless Internet service provider (WISP) ecosystem: small innovative entrepreneurs who provide fixed wireless and other broadband solutions to consumers, businesses, first responders and community anchor institutions. WISPs bring critical Internet access to millions of Americans in unserved and underserved rural, suburban and urban areas of the country, quickly and affordably, offering cost-effective, competitive and innovative service options where they did not previously exist.

Wisper Internet: Connecting and Employing Communities

Monte Miller
Public Relations & Advocacy Specialist
Wisper

In a world where everyone is running their lives online, it's no longer adequate to say your internet works "most of the time".

In 2021, despite facing an ongoing pandemic, economic downturn, supply chain issues and record unemployment, Wisper Internet, based in Mascoutah, IL, has doubled its workforce, expanded its network resources, and widened its footprint across six states to just under 20,000 customers.

As the second largest winner of federal Connect America Fund II (CAF), Wisper was awarded $220 million by the federal government earmarked with the sole purpose of expanding broadband internet to rural, underserved communities.

As part of the CAF expansion, Wisper averaged 10 new tower launches each month in the first half of 2021. With the added employees, Wisper increased that to 20 new towers a month to finish the year very strong.

"At Wisper we feel internet service is vital to every home just like water, electricity and other utilities," Wisper founder and CEO Nathan Stooke said. "Unlike water and power, residents have a choice which company they trust to provide their internet service. This expansion highlights Wisper's ongoing commitment to improve the lives of residents in rural areas and small towns across the Midwest."

In the last four months (September, October, November, and December), Wisper launched 68 new wireless broadband towers in 40 counties across Missouri, Kansas, Arkansas and Southern Illinois with Tarana technology.

Those towers reach more than 204,000 households in 63 individual communities and are part of a $114,222,750 CAF commitment.

At the end of November, Wisper reached the major milestone of 20 percent CAF completion on its way to the total CAF opportunity of 80,149 new households being able to access reliable wireless broadband thanks to Wisper's efforts.

" . . . Wisper was awarded $220 million by the federal government earmarked with the sole purpose of expanding broadband internet to rural, underserved communities."

In addition to the ongoing CAF projects, Wisper continues to upgrade its existing network and acquire other wireless internet service providers (WISP) along with growing its workforce in those areas as well.

The most recent of which was TaneyNet in the Bull Shoals area on the border of Missouri and Arkansas in early September.

WORKFORCE EXPANSION

To expedite this aggressive expansion schedule, Wisper needs a highly trained workforce to accomplish the CAF opportunity spread over six states.

Talent acquisition coordinator Carrie Haas explained in each of the areas where Wisper is expanding, they are constantly searching talent pools for future team members.

"As a company, we have hired 100 new employees for 2021.," Haas said. "This includes all locations, internal hires and acquisitions."

Haas added 35 of the new employees report to the Mascoutah location or the company's "HUB". Other new employees branch out from Wisper's Missouri offices in Joplin, Washington, Forsyth, Smithton, Osage Beach and Kansas City.
"Overall, Wisper now has a total workforce of 193, with 122 of those working at the Mascoutah, Ill. location," Haas explained. "In addition to connecting communities to internet, Wisper is also creating jobs."

GAME CHANGER

Over the last two and a half years, Wisper has been working with Tarana Wireless based in San Jose, Calif. to bring revolutionary new fixed wireless equipment into service.

"Their equipment has leapfrogged the industry and gives Wisper the ability to scale, serving more customers faster speeds with fewer towers," Stooke explained. "The fact it does not need direct line of sight to a tower will allow Wisper to provide service to more people that desperately need home internet."

Wisper is the first company in North America to launch Tarana which Stooke calls a total game changer for Wisper and the wireless internet industry.

"Our customers deserve great service and Tarana gives us new abilities to provide up to 400mb service reliability," Stooke said. "On a scale of one to ten how much of a game changer is it? It is a 100."

Stooke added Tarana equipment has been installed on all new CAF towers since March of 2021. It works so well Wisper is currently looking at retrofitting existing key markets by as early as December.

Wisper has also partnered with the Federal Communication Commission (FCC) on the Lifeline and Emergency Broadband Benefit (EBB) programs designed to help low-income or struggling households affected by the pandemic, receive deep monthly discounts on their internet service and select devices.

KINKS IN THE CHAIN

A Perfect Storm Of Shortages Is Threatening To Douse Rural Broadband Progress

By Cathy Cash
Reprinted with permission from the August 2021 issue of RE Magazine

Progress on rural broadband is in danger of getting doused by "the perfect storm," and it could be a while before calm returns.

Electric cooperatives and others trying to deliver internet access to unserved communities are facing unprecedented shortages in the broadband supply chain, including fiber optic cable, electronics equipment and even labor.

The COVID-19 pandemic delivered a one-two punch, exploding demand for reliable, high-speed internet while hampering production as factories were forced to limit shifts or close. At the same time, billions of public dollars were being funneled toward rural broadband projects, most with specific development deadlines.

The result?

Fiber cable, largely a domestic product, is in extremely short supply and could stay that way beyond 2022.

Deliveries of semiconductor chipsets, a critical component of the modems or gateways that produce wireless connectivity, are running at least six months behind.

And soaring demand for skilled workers combined with pandemic-restricted training opportunities means available broadband crews have become scarce.

"We have an unprecedented perfect storm that's contributing to everything," says Scott Jackson, national marketing manager for Graybar, which specializes in supply chain management. "We are seeing very extended lead times."

And "no region is immune," says Nathan Weber, vice president of engineering for Vantage Point Solutions, which designs broadband systems.

"We have clients in more than 40 states, and we are seeing these challenges everywhere."

Even the global leader in optical fiber is feeling the pinch.

"This extraordinary demand—which exceeded many industry forecasts—has created capacity constraints that have resulted in extended lead times," says Kara Mullaley, market development manager for Corning Optical Communications. "These demand-driven capacity constraints have affected Corning as well as other manufacturers."

Jim DaBramo, NRTC's president for broadband solutions, says trying to close the digital divide amid a global supply bottleneck is like playing "three-
dimensional chess."

"It is a challenge for electric co-ops," he says. "But they learn really fast."

FEEDING THE FRENZY'

As the coronavirus spread in 2020, schools, public services and the economy went online, and the federal government threw big money at getting unserved Americans connected.

"The pandemic opened everyone's eyes to how critical broadband is for schooling, for people being able to work from home, for home health care," Weber says. "We had a lot of demand pre-pandemic. Since then, demand has only accelerated."

The $1.9 trillion American Rescue Plan provides $350 billion to states and localities in fiscal recovery funds, which can be used for a broad range of needs including broadband infrastructure. These funds must be obligated by the end of 2024.
That followed about $150 million from the CARES Act for state and local authorities to spend on COVID-19 relief projects, also including broadband, by the end of 2020.

While the financial support is welcomed, "the large amounts of public money for rural broadband is feeding the frenzy," DaBramo says. "The pandemic just exacerbated an already occurring problem."

Internet providers are scrambling to meet milestones this year to receive money from the Federal Communications Commission's $1.5 billion Connect America Fund II. More than $9 billion from Phase 1 of the FCC Rural Digital Opportunity Fund, with build requirements over the next six years, is expected to keep the pressure on.

Amazon, Google and Facebook each plan to deploy fiber to their data centers, and big wireless internet providers and 5G developers are expanding, further squeezing fiber supplies.

"A lot of entities are buying a lot of fiber," Jackson says. "We've never seen this in our industry."

Even Corning didn't foresee the level of demand.

"One year ago, operators needed to be convinced fiber was the right choice for their builds," Mullaley says. "Those conversations have shifted to, 'We know we need fiber; how quickly can we get it?'"

Across the industry, as lead time sits at more than a year for some types of fiber cable, optical network terminals (ONTs), Wi-Fi routers

and core network routers are delayed four to six months due to the semi-conductor shortages.

A freak winter storm in Texas that forced lengthy power outages and shut down petroleum manufacturing is still reverberating in the supply chain. And raw materials such as steel for pedestals and plastics for PVC duct are in short supply.

And even when product is available, a national shortage of truck drivers caused by COVID-created bottlenecks in the commercial licensing process means key finished materials may linger in warehouses awaiting transport.

The situation leads to hard-to-find skilled crews sitting idle or moving to find work.
"I can't have crews start and stop in two weeks because there are no materials," DaBramo says. "If you have no work for the crew, they will continue to charge you and go somewhere where is there is work."

ABSORBING THE SHOCK
Strategic planning on the front end may be the best solution to supply chain challenges.
The plan should phase in construction and be "adaptable and flexible when unexpected issues come up," Weber says. "If you design around a specific product, and that product is difficult to obtain, that could paint you in a corner."

That's one lesson from when a tsunami hit Japan 10 years ago and disrupted the availability of certain raw materials and fiber components.

"Now we keep in constant contact with cable manufacturers and situational challenges on a weekly basis," Weber says. "We pre-engineer plans now so we absorb the shock that may come from delays."

NRTC agrees that it is vital that co-ops thoroughly plan for broadband build-outs and order materials well in advance to keep on schedule. As kinks in the supply chain emerged last summer, NRTC purchased $15 million of fiber for clients. A similar allocation for chips is under consideration, DaBramo says.

To buffer labor shortages, NRTC certified a program that enables numerous construction crews to work with their design methodology.

To meet accelerating business and consumer needs, Corning is investing in new facilities and adding and upgrading equipment and ramping up production, Mullaley says. The company is planning a state-of-the-art optical fiber manufacturing plant in Poland set to open next year.

Electric co-ops accustomed to supplying their own materials with advance orders may fare well despite the crunch. Weber recalls one co-op broadband partnership began receiving fiber in June from an order made in last November.

"This unpredictability is why we plan," he says. "We take the supply chain, a wonderful blend of complexity and efficiency, for granted. When it's working well, we don't even see it. When things break down, the intricacies are exposed."

Creating A Better Broadband Future

Sizing broadband networks to meet future demand is critical to sustaining customer satisfaction and profitability – and it goes beyond high-capacity access.

By Francisco Sant'Anna
Solutions Marketing and Regional Services Providers Industry Marketing
Ciena

There is strong momentum towards greater broadband connectivity in America, and it must be harnessed to effectively transform outcomes. Long and slowly underway technological and behavioral trends were radically accelerated by the pandemic, force multiplying the impact of public incentives— some already existing and others added as part of recovery stimulus. This convergence of exploding demand and abundant capital has created the unprecedentedly favorable environment for Fiber-to-the-Home (FTTH) builds and broadband expansion that are underway and promise to grow even faster in the next two years. However, market euphoria and the urgency to capture new opportunities and execute on tight deadlines must not prevent assessing the permanence and long-term impact of the projects, considering all the design variables required for longstanding business and technical success.

A significant number of new rural broadband deployments are being funded by public programs, with clear metrics on nominal access capacity to be made available per subscriber, often in the 1Gb/s range. In the frequent discussions involving the sustainability of these programs, the usual question is whether such capacity is enough to future-proof internet access in these communities, ensuring the long-term fulfillment of their necessities. While the merit of these concerns is worthy, their object might be misdirected. As FTTH enables gigabit access capacities, bottlenecks immediately shift to the aggregation and metro networks.

It is not unusual to find broadband network designs with oversubscription rates close to a hundred to one. This means that, even though an individual connection might be capable of reaching 1Gb/s in a speed test, at peak time, the effective traffic performance might not go much beyond an unimpressive 10Mb/s. It is undoubtedly much harder to measure and verify peak-time effective application performance than the nominal access capacity of broadband services. Still, anyone who wants to have a meaningful discussion about broadband Quality of Experience (QoE) needs to expand the debate to look at how the entire network is prepared to deliver this experience, not narrowing it down to access.

Consider a hypothetical scenario typical of rural America: a new fiber build takes place in a previously underserved area, reaching 20,000 homes passed. The expansion plans to deliver 1 Gb/s nominal capacity to each household, leveraging XGS-PON technology capable of delivering up to 10 Gb/s per connection. With a much higher access capacity than previous existing internet offerings in the region, the new service manages to capture 50 percent of the targeted potential, signing up 10,000 households. All the Optical Line Terminals (OLTs—the PON access aggregators) converge into a single 100G middle-mile ring (much larger than the 10G rings still used in many deployments), with a 100G metro interconnection. Simple math shows that, in this very typical scenario, the average throughput per connection is 100 Gb/s ÷ 10,000 = 10 Mb/s. It does not mean that users are limited to one percent of what they have signed up for—statistical networks naturally take advantage of the burstable and non-simultaneous use from different clients, sharing the total capacity of the channel so that, at any instant, several users are not actively using the network, freeing capacity for those who are. However, internet traffic is heavily concentrated on streaming applications, with video accounting for almost 60 percent of total demand (reaching 80 percent when merged with gaming and social). And it does not help that streaming, gaming, and social usage tend to be highly concentrated in the prime time. Added to that, streaming tends to be a continuous traffic flow, not a burst. Combining these factors, the demand at peak time becomes highly sensitive to an undersized middle mile.

Analyst firm ACG Research has recently created a bottom-up residential broadband demand model (https://connect.ciena.com/acton/fs/blocks/showLandingPage/a/43849/p/p-0013/t/page/fm/2) with findings that further enlighten this discussion. They started from the known average penetration of video, web, and gaming devices per household built on each one's typical traffic volumes and weighed on the expected concurrency rate of these devices' usage, managing to arrive at the average household data rate at peak hours. Their study indicates demand will grow from 13 Mb/s in 2021 to 20 Mb/s per household in 2025. In the same analysis, in a reference network with 20,000 homes passed, they have shown that the network's middle-mile capacity must be able to scale to 200 Gb/s by 2023—and 400 Gb/s by 2025—to deliver on the basic expectations and demands of the average household. Are new broadband investments aligned with this vision? And if not, what might be the consequences?

If the new networks are not prepared to meet near future demands, the essential objective of the broadband incentive programs is frustrated, as underserved areas will not enjoy access to high-performance connectivity. But a lack of scalability may also take a toll on the service provider that fails to deliver on its customers' expectations. First, upgrading capacity in a way that was not initially planned could require replacing entire platforms ahead of their end of life, with much higher cost and

operational impact than if planned in advance. Second, competition will eventually come to many of the previously underserved areas, and disappointing customers can increase churn with disastrous implications to the business case. In some regions of the globe (with more challenging economic conditions than rural America), overlapping PON deployments are igniting unanticipated broadband competition, which, combined with fixed-wireless access and emerging low-orbit satellite service offerings, implies no service provider should ever neglect its customers' satisfaction.

So, how do you avoid this trap and make sure you build a fully scalable broadband network, from access to metro and core? And even better, how do you make your network flexible and adaptable to capture additional market demands that may pop within your footprint? It involves approaching every planning decision with the mindset of future-proofing the network. It includes mapping potential demand evolution, selecting network platforms that can scale to accommodate additional capacity, and bringing as much flexibility as possible to every component of the design.

For example, a growing number of service providers are selecting pluggable PON micro-OLTs connected to scalable routers instead of traditional OLT aggregation platforms limited to 100G uplink. These 10G XGS-PON µOLTs (SFP+) (https://www.ciena.com/products/universal-aggregation-and-access-over-10g-pon-transceiver) are capable of supporting up to 128 Optical Network Units (ONUs) each. By plugging these on routers such as

" . . . anyone who wants to have a meaningful discussion about broadband Quality of Experience (QoE) needs to expand the debate to look at how the entire network is prepared to deliver this experience, not narrowing it down to access."

Ciena's 5166, (https://www.ciena.com/products/5166) a temperature-hardened platform with 32 x 1GbE/10GbE/25GbE SFP28 ports and 2 x 100GbE/200GbE/400GbE coherent optics ports, the network can start small but effectively scale to support the most aggressive growth scenarios. With these universal aggregation routers as network nodes, these service providers are seamlessly equipped to address additional demand in their areas—such as backhaul for Mobile Network Operators (MNOs) and active Ethernet access for enterprise customers or last mile for other operators. It unlocks additional revenue and discourages new competing builds in the region.

America's momentum in broadband investments is a reason for celebration and optimism. But to create a better broadband future, our industry needs to invest wisely, building networks that will deliver the capacity needed today, as well as in the future. The nominal access capacity is vital, but it is only one piece of the puzzle. Only networks that are scalable and flexible end to end will assure that taxpayer money subsidizing many of these builds meets its purpose—connecting American families and businesses delivering QoE for years to come. And by doing so, service providers operating these networks will be much better positioned to sustain a thriving business for themselves.

Francisco Sant'Anna has a Master of Science in Communication Systems and an Electrical Engineering degree. In 20 years of experience in the Communication Services Provider industry, he has led various business, product, and engineering teams. He is currently responsible for Solutions Marketing and Regional Services Providers Industry Marketing at Ciena.

'THEY WANTED IT YESTERDAY'

LREC fiber project navigates the supply crunch

By Cathy Cash

Reprinted with permission from the August 2021 issue of RE Magazine

Lake Region Electric Cooperative in tiny Hulbert, Oklahoma, decided to deliver broadband internet access to its members when no other provider would. Now, at a time of extraordinary demand and unforeseen supply chain shortages, the co-op is finding a path to get the job done.

"The biggest impact is the construction timeline," says Hamid Vahdatipour, LREC's CEO. "Delays in construction increase the cost. It also leads to member dissatisfaction, because we are not able to connect them in a timely manner."
He says the biggest concern was securing fiber optic cable and electronic equipment, noting one vendor offered delivery "sometime in 2022."

"We limited our vendor search to ones that had materials on hand."

Despite the challenges, he expects work to finish on schedule. They now rely on a handful of key lessons to navigate the crunch:

- Know what to take on and what to contract out.
- Pre-order critical equipment early.
- Don't be afraid to change if necessary.
- Build in buffers.
- Availability often outranks cost.

LREC started Phase I taking on the whole job itself, from buying supplies to labor. For Phase II, they contracted both materials and labor. For the third phase, they'll secure the materials while contracting out the labor and warehousing to avoid having to let staff go when the network is built, Vahdatipour says.

But will that increase costs?

Provided the project budget is within its feasibility study guidelines, cost increases are tolerable, Vahdatipour says. And they should be balanced by a higher-than-expected take rate, now at more than 60%.

"Members are happy to get it, and they want it as fast as they can get it," he says. "They wanted it yesterday."

Building A Strong, Sustainable State Broadband Ecosystem

By: Heather Burnett Gold
CEO
HBG Strategies
Karen Jackson
President
Apogee Strategic Partners, LLC

The need for reliable, affordable, ubiquitous broadband infrastructure isn't new. For more than 10 years, states such as Virginia, Kentucky, and California have recognized the need for all of their citizens – rural and urban to be "connected" in order to take full advantage of online opportunities for education, employment, personal enrichment, and healthcare. For many years broadband had been viewed as a "luxury" rather than a ubiquitous utility service such as electricity.

It wasn't until the pandemic when traditional "in-person" options for all facets of life were stripped away that policy makers and funders were forced into dealing with a "tsunami" of broadband related issues (short and long-term) that simply would not be denied nor deterred – solutions had to be found. There is no single silver bullet that will solve the long-term broadband challenge, so it is imperative that states build a strong, sustainable broadband ecosystem capable of not only supporting the need for immediate action, but also building a policy and support environment that can evolve to embrace advancement in technology and applications. Specifically, a successful ecosystem should include: support (for communities), policy, funding, and statewide planning as depicted below in the graphic below from Apogee Strategic Partners, LLC.

We are heading into a new era of massive Broadband funding, enabled first by the American Rescue Plan Act (ARPA) of 2021 and then put on steroids by Bi-Partisan Infrastructure and Jobs Act which has mandated the creation of the Broadband Equity, Access and Deployment (BEAD) Program. Both legislations offer primary disbursement through state organizations. The BEAD in particular requires that each state submit a Letter of Intent that should include details as to the state's:

1. Existing Broadband Program or Office
   a. Activities included in program
   b. Number of rounds of Broadband deployment grants that the state has awarded
   c. Whether the program has a statewide plan and goal as to the availability of broadband and any deadlines attached to those goals
   d. Whether the state has any funding available for broadband deployment or related activities and the sources of that funding including ARPA funds
   e. The number of full-time employees and part time employees who will assist in administering amounts received
   f. Any contracted support
   g. Goals for the state in the use of amounts received and processes that they will use to distribute those amounts to subgrantees, timeline for awarding and the oversight and reporting requirements.
2. Identification of any barriers of challenges to developing and administering a program to administer grants under this program
3. Identification of additional capacity needed by the state to implement the requirements of the program including:
   a. Technical assistance from Federal entities or other partners, additional employees, or contract support
   b. Additional data or programmatic information
   i. An explanation as to how these needs were identified and how funds may be used to address those needs
   ii. Details of any relevant partners such as organizations that may inform broadband planning or adoption planning

Any state that requests funding under BEAD must submit a five-year action plan detailing how it will use the funds.

Given these extensive requirements, we felt that now was the perfect time to review a given state's existing Broadband requirements and how they might be structured. As a starting point, we relied upon Pew Research's February 2021 report "3 Key Components Define Effective State Broadband Programs". This was a follow up to Pew's more extensive report "How States are Expanding Broadband Access" released in 2020.

In these companion pieces, Pew lays out the requirements and examples of states that have an effective broadband program notably:

1. The existence of a "broadband" office with "a full time focus on expanding high speed internet access, including distribution of funds and providing planning and capacity-building support to communities." The office must be supported financially with staff that understands broadband issues, manage grants, and reach out to multiple parties. These offices should serve as the single point of contact for the state in incentivizing more robust broadband deployment.
2. Planning and technical assistance for local and regional entities. Many communities do not have the expertise and resources (staff and dollars) to engage in the extensive planning necessary for effective broadband deployment. The state must provide these capabilities as a service through its broadband office. It

must also engage in proactive outreach, identifying and assisting those communities most in need of broadband. This needs to entitle local coalition building and planning, a bottom - up approach as opposed to a top down state mandate approach.

3. Competitive Grants program -- that "provide limited subsidies to the internet service providers to extend services into rural and unserved areas and, when well-designed, can correct the market failures that have left many people without access to high-speed, reliable internet." Among the many things that competitive grants should be doing is placing an emphasis on faster speeds, requiring scalable technology and prioritizing projects that use future proof technology.

In its initial piece, Pew identified Virginia as one of nine states exemplifying effective broadband expansion efforts including not just the above characteristics but also stakeholder outreach and engagements and creating a definitive policy framework.

Below we discuss the Virginia broadband system and then close with examples of how it has worked.

ORGANIZATIONAL SUPPORT

Virginia's broadband planning and support dates to the late 1990s, originally through the Center for Innovative Technology (CIT), then augmented by the Office of Telework Promotion and Broadband Assistance (OTPBA). Most recently all of CIT's broadband functions were centralized under a broadband office located within the Department of Housing and Community Development (DHCD). The office not only administers the Virginia Telecommunications Initiative (VATI) funding program but also engages in robust outreach and support with communities that are currently lacking in sufficient broadband deployment. Virginia Tech has developed and maintained the state's broadband mapping efforts since its inception, resulting in a more robust map than that currently relied upon by the FCC, making it easier for the DHCD to identify those underserved communities.

" . . . a successful state program is a delicate orchestration of sometimes uncontrollable forces. As counterintuitive as it may seem, successful state programs can't rely on simply "funding" their way out of the broadband challenge."

FUNDING SUPPORT

Virginia has two major state-level sources for broadband funding—the Tobacco Region Revitalization Commission and the Virginia Telecommunications Initiation (VATI).

The Tobacco Region Revitalization Commission (TRRC) provides support for those counties impacted by the decline of the tobacco industry has also been active in promoting and funding broadband deployments. Tobacco Region Revitalization Commission funds are used for a variety of economic development projects in Southern and Southwest Virginia counties impacted by the Tobacco settlement of 1999. It is estimated that to date it has invested over $150M in Broadband projects.

VATI funding was established at $35M for 2020. It was the only item in the budget not cut back during the tough budget discussions due to COVID-19 and was further enhanced by an additional $15 million in CARES Act funding. Much of the VATI funding is community directed and requires each community to put together a plan and solicit private co-partners to support that plan. In August of 2021, the Commonwealth announced it would use $700M in federally provided pandemic relief to accelerate build out in areas that do not currently have access to 25Mgps up/3Mgps down service. Using this metric, the state expected to deliver universal coverage by 2024 or at least have lined up fully funded projects by then and have them underway.

These two sources are coordinated through the Commonwealth Connect coalition led by the head of the Tobacco Region Revitalization Commission and sub-chaired by the head of the Department of Housing and Community Development. The Commonwealth Connect coalition was established in 2019 to prevent overbuilding and ensure all Virginians would receive some minimal broadband coverage within ten years.

Authors' Note: it is currently unclear how the changes of leadership in Virginia's executive and legislative branches in January 2022 will impact the organization of Virginia's Broadband Office, funding structure, and programs.

As noted above, building a successful state program is a delicate orchestration of sometimes uncontrollable forces. As counterintuitive as it may seem, successful state programs can't rely on simply "funding" their way out of the broadband challenge. Legislative and regulatory rules can, and often do, "make or break" a provider's ability/willingness to deploy broadband infrastructure. Virginia's legal and regulatory environment have matured as demand for affordable, reliable services surged and political pressure to embrace non-traditional models and providers has escalated. Most notably are the changes related to the participation of Investor-Owned Utilities (IOUs)

- 2018 - The Grid Transformation and Security Act. Authorized Dominion Energy Virginia (DEV) to seek approval of a plan to modernize Virginia's electric grid, including the deployment of fiber optic technologies at and between distribution substations to support new "smart" infrastructure initiatives. It also directed Dominion Energy and Appalachian Power to conduct a broadband feasibility study aimed at exploring how the two companies could leverage excess fiber capacity. The evaluation concluded that, with some adjustments, both companies' grid modernization plans could support additional broadband needs.

- 2019 Legislation enacted a broadband pilot program for Virginia's two largest electric utilities, Dominion Energy and Appalachian Power. The pilot enabled the utilities to utilize "middle mile" fiber installations and lease excess fiber capacity to third-party ISPs, which would then provide the "last mile" connections to customers. The pilot program was made permanent by legislation in 2021.

MODEL PROJECTS

The new age of hyper broadband demand has ushered in a wide variety of new and interesting project models, collaborations, and partnerships. Partnership arrangements are being written by/among teams working from "blank slates" and learning how to work together to expedite construction, maximize availability of resources, and provide the best services to both internal and external stakeholders. In Virginia, both Dominion Energy and Appalachian Power are actively participating in largescale projects that represent "best practices" for how communities, last-mile providers, electric cooperatives and IOUs can

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Cont'd from page 51
work together effectively to lower deployment costs and help bridge the digital divide.

DOMINION ENERGY

As a regulated electric service provider, Dominion Energy's duty to provide electricity to all within its service territory puts it in a unique position to bridge the current broadband gap. Dominion Energy is installing fiber in rural areas as it moves forward with efforts to transform Virginia's energy grid. By utilizing fiber capacity for operational needs and broadband access, Dominion Energy can reduce broadband deployment costs for internet service providers.

In both 2019 and 2021, Dominion Energy issued a Request for Information (RFI) to gauge interest from potential partners to help facilitate greater broadband internet access for unserved rural areas of Virginia. As a result of the first RFI (2019), Dominion Energy initiated three pilot projects: in Surry County in partnership with Prince George Electric Cooperative (PGEC) and their Internet Service Provider subsidiary, RURALBAND; in Botetourt County in partnership with BARC Electric Cooperative and their BARC Connects Internet Service Provider; and in the counties of King George, Northumberland, Richmond, and Westmoreland on Virginia's Northern Neck in partnership with Internet Service Provider All Points Broadband and Northern Neck Electric Cooperative. Dominion Energy submitted the first three pilot projects to its regulator, the Virginia State Corporation Commission (SCC), for approval in October of 2020. In June of 2021, the SCC approved the pilot projects.

"There is real momentum in Virginia right now on bridging the digital divide, and we're excited to be part of the solution and help bring this critical resource to the communities we serve," said Alan Bradshaw, Vice President of Strategic Partnerships for Dominion Energy.

SURRY COUNTY VIRGINIA

The partnership between Dominion Energy and PGEC in Surry marked the first time an IOU partnered with an electric cooperative to expand broadband access in the Commonwealth. The agreement will help provide access to nearly 2,000 locations in the County.

In this case, Dominion Energy agreed to serve as the "middle mile" provider by allowing RURALBAND, a wholly owned subsidiary of PGEC, to lease fiber and provide last-mile Fiber To The Home (FTTH) service. The Memorandum of Understanding (MOU) detailed how the parties would work together on the project. The pilot projects, including Surry, were filed with (and ultimately approved by) the Virginia SCC.

NOTE: In the fall of 2021, Dominion Energy completed construction on the nearly 40 miles of middle-mile fiber in Surry County and completed testing and handoff to RURALBAND. Thanks to the partnership, Surry County will be one of the first localities to have countywide accessibility to high-speed broadband internet service.

APPALACHIAN POWER

Appalachian Power has also emerged as a significant force in connecting the Commonwealth. In December 2020, the company announced a major milestone in delivering high-speed internet in southwest Virginia by installing the first fiber optic cable on its poles in Grayson County. One year later, the Elk Creek Volunteer Fire Dept. became the first of 6,000-plus customers identified in the project area to connect to broadband. The remaining customers are expected to gain internet access over the next year. GigaBeam of Bluefield, Va. is the internet service provider tapped to provide the last-mile connectivity for the area's unserved customers. Appalachian Power gained approval for the pilot program from the (Virginia) State Corporation Commission in March 2020. When complete, the company will have installed up to 238 miles of 96-strand fiber optic cable on its poles in the rural county. In addition to providing broadband capacity, the fiber optic cable supports Appalachian Power's deployment of Advanced Metering Infrastructure (smart meters) for customers, as well as equipment and technology that pinpoints and corrects faults on circuits, shortening outages. Equipped with hands-on experience, Appalachian Power is currently working with several other counties in its Virginia service territory on potential projects. "We approach each discussion as a partnership," said Amanda Cox, Appalachian Power external affairs manager. "We want to be part of the solution. With the Grayson County project, we gained valuable knowledge across the board in how to identify unserved areas, engineer complicated projects, negotiate contracts, and perhaps, most importantly, ways to save time and speed up the process," she said. "We've learned a lot over the last three years, and with the knowledge gained we want to help our customers and communities prosper and succeed."

CONCLUSION

The history of support for broadband deployment in Virginia has been long and has required support from throughout the Commonwealth - legislative and executive at the state level, local and county governments, civic organizations as well corporate entities – to build the robust infrastructure that exists today. The ability to understand that there are alternative entrants that can provide essential services, such as the IOUs and middle mile, is the kind of out of the box thinking that must be implemented if states are going to witness robust deployment in rural hard to reach places. There is even more work to be done as states contemplate who will be willing to bring these essential services to remote communities and we may need to open ourselves up to even more community ownership models as potential last mile solutions.

ABOUT THE AUTHORS

Heather Burnett Gold *is the CEO of HBG Strategies, a consultancy engaged in broadband education targeted at enabling fiber deployment among underserved communities. A thirty-year plus industry veteran, Gold most recently served as the President/ CEO of the Fiber Broadband Association. Prior to that, she was the SVP of External Affairs and Access Management for XO Communications. Gold holds a BA (magna cum laude) and MA degrees in Economics from Tufts University and an MBA in Finance and Marketing from Washington University in St. Louis. Gold also completed the General Management Program of the Harvard Business School. She was honored by the Washington Business Journal as one of its 2010 Women Who Mean Business and was recognized by Fierce Telecom as one of its Women in Wireline for 2013. in Wireline for 2013.*

Karen Jackson *serves as President of Apogee Strategic Partners, LLC a Virginia firm specializing in the development and implement of technology and innovation strategies in information technology, cyber security, autonomous systems, education, and smart communities. Ms. Jackson formerly served as Virginia's Secretary of Technology from 2014 – 2018 serving as senior innovation and technology advisor to Governor McAuliffe on matters including innovation, data analytics, telecommunications (broadband), cybersecurity, unmanned systems (autonomy) and smart communities. She also oversaw the Commonwealth's IT infrastructure.*

Ms. Jackson also serves as the Interim Executive Director of the New College Institute (NCI). In this capacity she serves as NCI's senior executive and is responsible for positioning NCI as a premier rural innovation and training center in Southern Virginia. She is also charged with building industry and academic partnerships to enhance the quality of life and employment in cutting edge industries in Southern Virginia.
During her tenure as interim director, she has been recognized for positioning NCI as a premier training site for cutting edge industries such as on/offshore wind and cloud computing and for securing more than $1.5m in external funding for NCI programs.

Five Important Reflections to Have a Way Better Year

Brenda Abdilla, PCC
Executive & Career Coach
Management Momentum

Most of us figured that 2020 was the worst year ever due to the dramatic changes brought on by the Covid 19 crisis. But 2021 turned out to be much harder on the professional sector. I guess pivoting and pivoting and then pivoting some more can be a bit wearing. In a piece for the Washington Post, Social Psychologist Amy Cuddy explained that we are now facing a phenomenon called "Covid Flux," and that one of the main reasons we are so stressed is that we did not get that moment of it all being "over," which most of us fully expected. Instead, we got a few weeks of thinking it was over before the Delta Variant of the virus ruined our summer fun.

So how do we keep ourselves from having a third "bad" year? And keep ourselves from becoming part of the "Great Resignation," which estimates that more than 40% of us will exit our current roles ?

Grab a pen and a notebook and treat yourself to the following reflections. Try to actually write by hand instead of just pondering the answers. A team of neuroscientists at Stanford and Brown University recently published findings of a new study in the journal, Cell, revealing that the motor region for the hand also connects to the entire body.

REFLECTION 1 – A look back at the year: Consider each of the following items and how much of your energy and time was devoted to each item. For each item, decide if you spent too much time (TMT) here, not enough time (NET) or about the right amount of time (RAT) and make a note beside each one. Try to be honest and a bit dispassionate about your ratings. For example, you may rate caring for an elderly parent or sick child as too much time but feel badly because nothing could be done about it. That's okay. The point is to get an honest look at the past year—without judgement.

Item	Assessment
1. Problem solving, pivoting and reacting at work.	
2. Executing on tasks at work. Working "in" the business.	
3. Big picture work, collaborating, leading others at work.	
4. Quality time with self (spiritual or otherwise).	
5. Time with community (church, professional network, etc.)	
6. Fitness, exercise, non-medical attention to self.	
7. Personal medical issues (planned and unplanned).	
8. Quality time with family/friends/ loved ones.	
9. Support of an elderly person or a disabled or sick child.	
10. Education, or personal or professional development.	

REFLECTION 2 – A theme for the last year: As you examine the areas where you rated yourself as spending too much time or not enough time, come up with a theme for last year. Mine is "Overwhelm and Unnecessary Complexity." It's okay if it is a sarcastic or a funny theme, like "Drowning for Dollars" or "Covid Crush." The point is to name it. Once we name things, we are more apt to be able to make improvements and changes. And don't forget to give yourself credit if you have even one area that you scored as spending the right amount of time. Congratulations!

REFLECTION 3 – What one item got too little or none of your time in the last year? Choose only one, and again, allow no judgement. The point is to let this item (such as meditation, friends or travel) stand out in your mind. That will help set your intention for next year.

REFLECTION 4 – What areas of your life and work are going to be important next year? List five items you really want to focus upon in the next year. Two of my five are physical fitness and financial planning. Try to think from an aspirational mindset when you list your five items.

REFLECTION 5 – Who do I need to become to have the life I want for myself? I love this question because in order to answer it, we must first describe what we would be like, if we became the person we aspired to be. For example, in the last decade I have really worked on being calm. I do not come from a calm family. My family of origin is about being in constant motion, working a lot, and being frenetic and high energy—not calm. At some point I decided that calm was better for me. It has taken a lot of focus and intention, but I am now a calm person. I am proud that I had this insight, because being calm has led to better decision making, less stress, and self-pride. So, who do you need to become? This answer, ideally in a paragraph form, will reveal your true values and intentions. Take ten minutes and write a draft of that paragraph right now. Later, you can come back and improve it, set some goals around it or make a to-do list. But for now, come from your heart and let yourself reflect on this important question.

The world's most famous coach, Tony Robbins, once said, "The quality of your life is a direct reflection of the quality of the questions you are asking yourself ," and I could not agree more. By taking time to reflect on higher level questions like those listed here, you are accessing the higher aspects of your own humanity. Once you finish the exercises, let the answers occur to you over the coming weeks and notice what shifts and what solutions appear.

Brenda Abdilla is an executive and career coach and the author of Outsmarting Crazytown: A Business Novel About How Derailed Professionals Can Get Back on Track. (Indie Books, 2020) Outsmarting Crazytown hit the Amazon bestseller list for new releases in career. A respected and sought-after executive coach, she works with corporate leaders who want more effective strategies for team accountability and collaboration, and with professionals who are navigating a change in their high-level careers. More than 90% of Brenda's coaching clients get promoted, land the role they desire, or address their core issue within 12 months of engaging Brenda. Please visit Brenda's website at: https://ManagementMomentum.net

"I am not afraid of storms, for I am learning how to sail my ship."
— Louisa May Alcott, Little Women

UPCOMING EVENTS 2022

Live events are back on schedule headed into 2022! We look forward to connecting with you at your state and regional events, as well as during national conferences. As an active member of multiple state, regional and national industry associations, Walker is strategically engaged with organizations supporting telecommunications markets. We demonstrate our commitment through event sponsorships, contributing educational content and advertising, and exhibiting at conferences and expos.

Look for us at the events listed here, and refer to the Upcoming Events section of our website, https://walkerfirst.com/events, for additional details.

FEBRUARY 2022	
NTCA Rtime	Dallas, TX
UTC Regions 8/9/10	Reno, NV
TT&S Annual Conf and Vendor Showcase	Bismarck, SD
GTA Vendor Showcase	Macon, GA
MARCH 2022	
ITA Showcase Northwest	Portland, OR
NRECA Tech Advantage	Nashville, TN
Big Sky Tech Fest	Havre, MT
MTA Annual Convention	Minneapolis, MN
SCTBA Annual Conference	Charleston, SC
ICA Annual Meeting & Expo	Des Moines, IA
AREA Annual Meeting	Montgomery, AL
APRIL 2022	
AFCEA TechNet Cyber 2022	Baltimore, MD
MAY 2022	
BBC Summit 2022	Houston, TX
UTC T&T 2022	Oklahoma City, OK
FNA Conference	Jekyll Island, GA
MTUG	Portland, ME
WSTA Annual	Lake Geneva, WI
TNBA	Franklin, TN
JUNE 2022	
Fiber Connect 2022	Nashville, TN
IBTA Annual	St. Louis, MO
TEC Information Technology Conference	San Marcos, TX
KEC Summer Meeting (Kansas Elec Coop)	Overland Park, KS
Mountain Connect	Keystone, CO
Cooperative Technologies Conference & Expo	Myrtle Beach, SC

AFCEA

PREMIER MEMBER Fiber Broadband ASSOCIATION

INDATEL

NRECA America's Electric Cooperatives ASSOCIATE MEMBER
*Associate membership in NRECA does not signify an endorsement of products or services

NTCA NATIONAL TELECOMMUNICATIONS COOPERATIVE ASSOCIATION The Voice of Rural Telecommunications

UTC Utilities Technology Council™

WISPA

Let's deliver broadband level connectivity to all communities across the US. Whether it's the need for remote learning, a telemedicine appointment, working from home, or streaming entertainment, more than ever, your customers deserve the best experience no matter where they live. Juniper solutions are here to power those connections while making it simple for you to deliver.

Power Connections. Empower Change.

JUNIPER NETWORKS | Engineering Simplicity

Creating a better broadband future together

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