Bridging the Broadband Availability Gap

At **Broadband Communities**' 2019 economic development conference, held in October in Alexandria, Virginia, participants shared stories about how communities are improving broadband access to facilitate economic development, digital literacy and consumer choices. Following are some of the highlights of the conference sessions.

A BBC Staff Report

Broadband Dearth Creates Productivity Inequalities

A lack of broadband doesn't just stop people from accessing entertainment or good hotel deals – it can hamper productivity.

Local businesses, including farmers and contract laborers, often can't conduct their day-to-day work because of a lack of consistent broadband access.

Nicol Turner-Lee, Fellow, Governance Studies, Brookings Institution

During her recent tour of rural communities, **Nicol Turner-Lee, fellow of governance studies at the Brookings Institution's Center for Technology**, met John Yoder, a farmer in Garett County, Maryland, who has trouble ordering materials to run his farm.

Although Yoder can see the last mile from his house, he is not able to get network access. "Because he's not online, he can't order equipment to stay competitive," Turner-Lee said. "It puts him at a disadvantage, so he becomes digitally invisible."

Joseph Mulgrave in Stanton County, Virginia, has a similar problem. A day laborer who often exceeds data caps from his wireless operator, he visits his mother's house to access broadband.

"When he does not have wireless data, he does not work," Turner-Lee said, adding that "we used to talk about a supply and demand issue, but the digital divide is both."

Nirali Patel, Wireline Advisor, Office of Chairman Ajit Pai, FCC

Nirali Patel, wireline advisor for Ajit Pai, FCC chairman, agreed that getting broadband into more unserved rural areas is a key priority. The FCC's proposed Rural Digital Opportunity Fund (RDOF) directs up to $20.4 billion to expand broadband in unserved rural areas.

"The stories Nicol is talking about as she has gone around the country to these seven cities are precisely the types of things we're focused on at the FCC," Patel said. "Chairman Pai has visited 48 states to hear firsthand what are the challenges and what are the potential solutions." In addition to improving broadband availability in rural areas, Patel said, the FCC also is trying to encourage broadband competition in urban areas.

Reducing Middle-Mile Fiber Friction

Once a rural provider establishes a last-mile network, accessing middle-mile fiber backhaul facilities to connect to major internet hubs and supporting traffic remains a key challenge.

Deborah Simpier, COO and co-founder of Althea, a vendor whose software powers decentralized internet infrastructure, told attendees that procuring middle-mile fiber is cumbersome. She knows, because she operates the primary node on a decentralized network that uses Althea software.

"One of the hardships we face is getting wholesale fiber connections," she said. "The sales process is long and cost-prohibitive, especially for smaller increments of bandwidth."

Today, procuring a circuit takes six to nine months. "We are trying to start the conversation with middle-mile providers and municipalities to smooth that process," Simpier said. "We want to find a way to reduce the friction and time."

Deborah Simpier, COO and Co-founder, Althea

THE CONNECTED BURGER

"What does it mean when you can't get a job flipping burgers in America without internet access? It means that in the next decade, everyone in America should be able to use high-performance broadband … and why invest public funds in obsolescent networks?"

– Jon Sallet, Benton Institute for Broadband and Society

Alexandria Mayor Wilson: Broadband Is Essential Infrastructure

Justin Wilson, Mayor, Alexandria, Virginia

Having worked for wireline and wireless service providers, **Justin Wilson, mayor of Alexandria, Virginia**, cannot understand why the city does not have a robust broadband network.

"As someone whose day job has taken me from stints at a dial-up internet startup, a regional wireless provider, a CLEC and a LEC, it drives me insane that we don't have 21st-century broadband infrastructure in the city," he told conference attendees.

Alexandria recently issued a request for proposals (RFP) to build a municipal fiber network that would support broadband services for the city's public institutions. The city said in a release that it had worked with industry experts to design a network to provide connectivity for city government buildings, public schools, libraries, public safety communications and the city's Smart Mobility transportation initiatives.

Upon completion, the fiber network will replace Alexandria's institutional network, which connects nearly 90 municipal and educational facilities and is largely leased from Comcast. Alexandria expects to award contracts early next year, with construction expected to begin in spring 2020 once contract negotiations are complete.

Wilson said the city's broadband issues have been brought to the forefront by residents and by businesses trying to attract new talent.

"The broadband issue came to light for me more than a decade ago, mostly from residents who were complaining about a lack of competition and high-level service in our community," Wilson said. "I came to recognize the impact it also has on our community's economic growth."

He added, "It has become a clarion call not only for small businesses but also for large businesses."

A LONG JOURNEY

Alexandria's road to issuing an RFP for its proposed municipal fiber network has been long and fraught with challenges. The city's fiber plans date back to 2015, when officials sought information from outside sources on the feasibility of constructing a fiber network.

"We put out a solicitation where we said we wanted to bring broadband capacity to the city," Wilson said. "We got about 11 responses from different private-sector partners who said they were interested in working with us." From there, Alexandria devised a network plan with growth in mind: The design includes conduit space to accommodate various providers.

"We decided to sufficiently overbuild that network and provide the conduit so we could lease capacity to private providers that would provide services to homes and businesses," Wilson said.

This is not the first time Alexandria sought private partners to expand broadband availability. More than a decade ago, the city talked to Verizon about building out Fios. After Verizon decided to halt new Fios deployments, Alexandria had to look for other options.

"We had an agreement with Verizon to bring Fios to

the city," Wilson said. "They ultimately chose to freeze Fios deployments, so we got caught up in that."

A partnership with EarthLink to provide municipal Wi-Fi also fell through when the former CEO passed away. "A new CEO came in and did not like that business and bought us out of the franchise," Wilson said.

WAKING UP COMPETITION

Connecting city facilities and sites is Alexandria's initial priority, but the open-access municipal fiber network also will enable new consumer and business service choices.

Multiple ISPs and other application providers in areas such as telehealth will be able offer an array of broadband speeds and services.

After receiving feedback from residents about the lack of video and broadband service options, the city has actively pursued other potential provider partnerships. It has not named any provider partners yet.

Having a new network in place could potentially drive incumbents to be more responsive. "The prospect of competition has spurred incumbent providers to up their game from a customer service perspective and service perspective," Wilson said. "Without the prospect of that, incumbents aren't going to react."

Because digging trenches and burying conduit is a significant cost of building a fiber network, the city will look for opportunities to lay conduit wherever current digging projects are already underway and align with the municipal fiber construction. This approach strives to avoid unnecessary impacts on neighborhoods and businesses.

"We think from the municipal side, we have a role to play in how we set our right-of-way policies and what infrastructure we allow to make that connectivity," Wilson said. "From a city side, we're looking at what policies to put in place to facilitate that effort."

He added, "We want to set the table so the private sector can do the work they need to do in order to serve our residents."

EDUCATING CUSTOMERS

"AT&T and Comcast have some great low-cost broadband programs, but the problem is that not a lot of people know about them."

– Leo Delgado, Converged Services

5G, Smart Cities Will Need a Lot of Fiber

Lisa Youngers
President and CEO,
Fiber Broadband
Association

Offering a mix of higher speeds and applications, 5G and smart-city applications represent the exciting next generation of services. But to obtain their benefits, service providers and cities will need to deploy a large amount of fiber. **Lisa Youngers, president of the Fiber Broadband Association**, told attendees that the advent of small cells to support 5G will facilitate fiber growth. "Fiber deployments are at record levels, but small cell is just beginning," Youngers said. "We're just beginning to see the fiber deployments rise to support small cells, so we expect the deployment of fiber to continue."

A recent Deloitte Consulting study revealed that the United States will require an estimated $130 to $150 billion in fiber investment over the next five to seven years to adequately support broadband competition, rural coverage and wireless deployments for future network technologies such as 5G.

Youngers said the Fiber Broadband Association estimates that nearly 1.4 million miles of fiber will be deployed to support 5G and wireless in just the top 25 metro areas. This number does not include multiple carrier deployments.

SMART-CITY APPLICATIONS EMERGE

Fiber's role in enabling smart cities can't be overlooked. New research by RVA shows that cities with fiber – especially those with widespread residential fiber – have more small cells and smart-city applications than cities without fiber.

The research firm found that cities with fiber have, on average, 37 percent more deployed small cells and just over 35 percent more smart-city applications.

For example, Cincinnati Bell's CBTS division has been leveraging its Fioptics fiber network as the foundation for its Connect Cincinnati initiative. It offers free Wi-Fi in more than 50 high-traffic areas across Greater Cincinnati. Its Connect Cincinnati mobile application features special deals and offers from more than 100 regional businesses. By leveraging its fiber experience and the radio frequency expertise it retained from its former wireless business, CBTS is working with local governments developing smart-city applications.

Verizon has deployed smart-city solutions in more than 60 communities, including Sacramento, Boston and Washington, D.C. In San Diego, Verizon signed a multimillion-dollar agreement to deploy fiber and small cells to 60,000 city-owned light poles.

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Cities are taking different tacks with smart-city applications, offering everything from smart grids and citywide Wi-Fi in city parks to smart health.

"Every city is focused on something different to make the city smart," Youngers said. "Almost all of them want to improve traffic applications and have safer pedestrian walkways."

In Coral Gables, Florida, city officials are focused on hurricane restoration, and in villages outside Orlando, they are conducting autonomous vehicle trials.

"All the cities are focused on different applications, but what they all have in common is that they need fiber to be smart," Youngers said.

EDUCATING CUSTOMERS

"We don't offer triple play – only broadband – so the challenge for us is to educate our customers about what we offer."

– Mel Poole, Ocala Fiber Network

Driving Digital Literacy, Education

Despite efforts by the FCC and other organizations to close the rural broadband divide, the lack of computer and internet skills keeps many residents from taking full advantage of the internet.

A recent Pew Research Center survey revealed the lack of general knowledge about a few terms important for how people use the internet. For example, only 30 percent of survey takers knew that a website address starting with https:// means that the information provided on that site is encrypted.

Laura Breeden, chair of the National Digital Inclusion Alliance, told attendees five elements are needed to enable adults to use broadband: affordability, reliable connectivity, digital skills, technical support and useful applications.

Breeden said, "It's not just a rural problem. People often think that people in urban areas have broadband, but that's not true, because other barriers are formidable for a lot of people."

Laura Breeden
Chair, National
Digital Inclusion
Alliance

ACQUIRING DIGITAL SKILLS

Several organizations help adults get the necessary digital skills to pursue new employment and education opportunities.

Providing a "pathway of inclusive tech training" that leads to living-wage careers, Byte Back offers classes on computer skills and other digital skills. Its Computer Foundations class allows students from 18 through their 60s to learn computer skills.

Elizabeth Lindsey, executive director of Byte Back, said that although laying more fiber and rolling out 5G helps, making broadband more broadly available is not just a technology issue.

Elizabeth Lindsey
Executive Director,
Byte Back

"There are deep structural inequalities in our society, and so many of them are made worse by a lack of access to computers and digital skills," Lindsey said.

The proportion of digitally literate Americans varies by race. Eleven percent of white Americans are digitally illiterate as are twice as many African Americans and almost three times as many Latinos.

According to a Brookings Institution study, 28 million more jobs that did not require technology skills were available in 2002 than are available today. Lindsey pointed out that "those jobs have disappeared, or they require more tech skills."

Likewise, Older Adults Technology Services (OATS) is working to close the gap for older adults. The organization has 24 computer labs and 15,000 pages of curricula.

OATS has taught seniors the basics of email, helped geriatric patients manage medical information, and empowered activists to build community networks. **Tom Kamber, executive director of OATS**, noted, "When we started working with senior citizens in New York City, people did not want to just know how to get online; they were also asking how to get pictures on their cellphones."

Kamber added that OATS has been working with members to expand their social circles. "We developed a 26-week-long course on social isolation, and that program is still at play in various communities," he said.

Tom Kamber
Executive Director,
OATS

BROADBAND NEEDED FOR EMPLOYMENT ADVANCEMENT

A lack of broadband, particularly in low-income areas, can inhibit access to education and advanced job opportunities.

Thien-Huong Nguyen, CPA and manager of executive compensation for Comcast, spoke about her own experience in this regard. She grew up with a single parent in Section 8 housing in Delaware and, after graduating
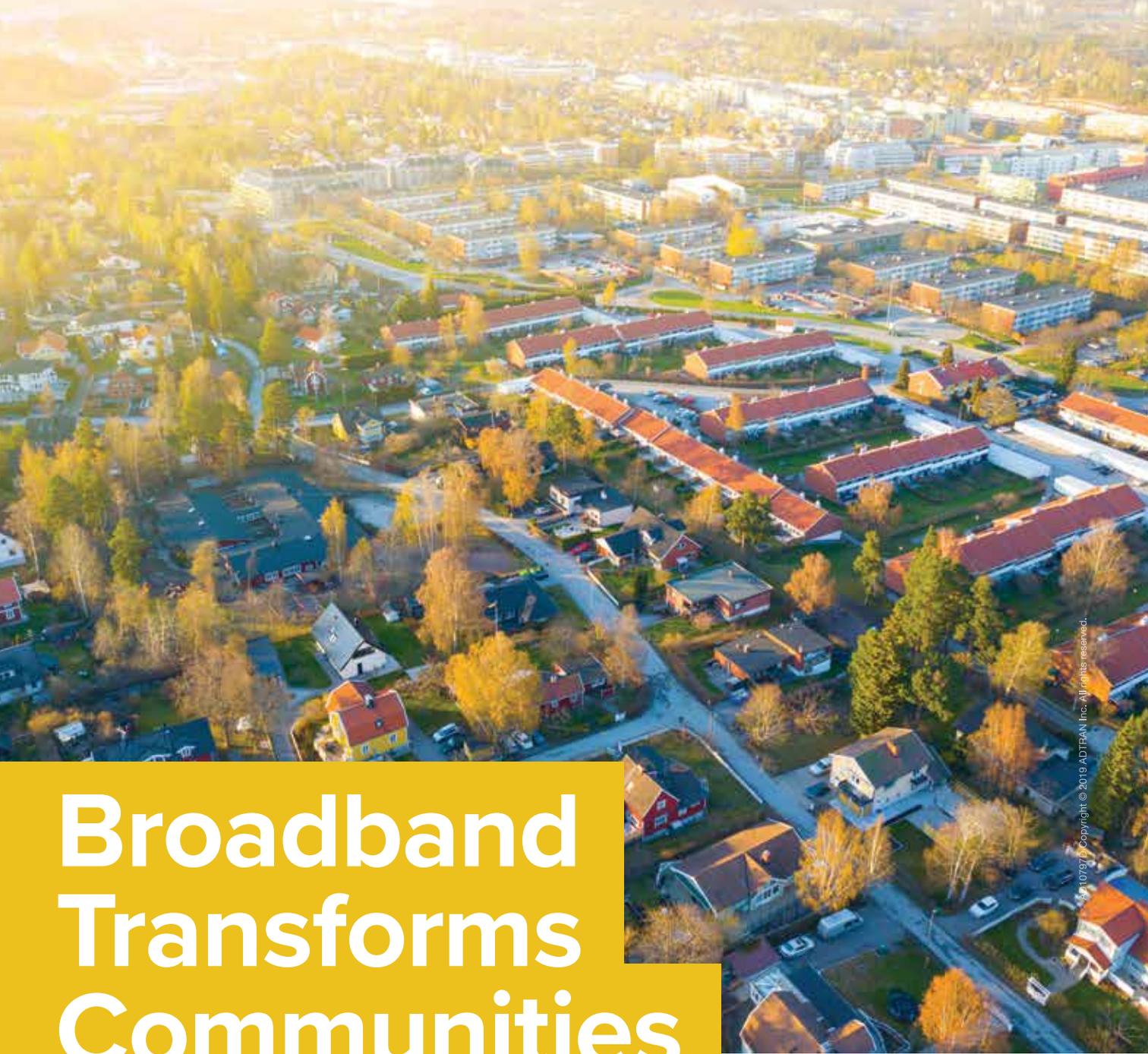
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Thien-Huong Nguyen
CPA, Executive Compensation Manager, Comcast

from college, had to travel nearly an hour and half to study for the CPA exam at a Barnes and Noble with Wi-Fi access. Nguyen said, "The internet connection at the Barnes and Noble was not very robust and dropped every hour or so." Only when her mother subscribed to Fios was she able to cut her commute and study for exams at home.

Digital skills are not relevant just to positions that require college degrees, such as accounting. Getting access to low-

paying entry level jobs now requires applicants to apply online.

Lindsey recounted, "When I first started working for Byte Back four years ago, I saw a new fast food restaurant that was opening. In the window, there was a sign that said, 'We're hiring; apply online.'"

She added, "This really struck me that even for the lowest-wage jobs, people not only need access to broadband but must have the skills to fill out an online application or create a résumé."

WIRELESS SPECTRUM AUCTIONS

"Auctions may generate a lot of cash, but allocating unlicensed spectrum for Wi-Fi generates huge tax revenues."

– Vinton Cerf, Google

Electric Co-ops' Broadband Journey Is a Culture Shock

Having already installed fiber to manage their electric grids, rural electric cooperatives are now deploying fiber and broadband to drive economic growth in their communities.

There's no question that these communities need broadband: An NRECA fact sheet revealed that 6.3 million households in rural electric cooperative service areas lack high-speed internet access. But panelists in the Policies to Power Co-ops Rural Broadband Deployment panel agreed that delivering broadband poses cultural challenges for companies that have previously delivered only electricity, a service that has not changed much in the past century.

Craig Eccher
President and CEO, Tri-County REC

For example, Tri-County Rural Electric Cooperative (REC) had to create a sales and marketing plan for its broadband business. The electric cooperative hired a marketing veteran who previously worked for NRTC and headed up Huawei's North American business. "Because we're monopoly electric companies, our approach has been more public notices versus sales and marketing," said **Craig Eccher, president and CEO of Tri-County REC**. "That [mindset] is transferring over to the electric side, and it has been a huge culture shift."

Tipmont REMC, which is making the same transition, found that these changes don't sit well with company veterans. "I have a staff of people who are not traditional cooperative people," said **Ron Holcomb, president and CEO of Tipmont REMC**. "That has created a lot of consternation among some of those who have a longer tenure at the utility because they see these massive changes occurring."

Ron Holcomb
President and CEO, Tipmont REMC

He added, "it's a culture shift in the way you do your business."

A CHALLENGING PAYBACK
Unlike the cash cow electric business, returns on fiber and broadband investments don't come quickly. Panelists warned that a broadband venture requires patience.

One route co-ops are taking to get their FTTH networks off the ground is seeking federal and state grants.

Electric co-ops made a large splash in the FCC's CAF-II auction last year, when 35 co-ops won more than $225 million in funding, which will be distributed over 10 years. Thirteen individual electric co-ops won bids worth more than $39 million in 11 states. Separately, the Rural Electric Cooperative Consortium, which is made up of 22 co-ops, won bids totaling $186 million in eight states.

Tri-County REC was able to raise a total of $53 million in grant funds. The CAF-II auction and state grants helped Tri-County REC get off the ground but created new challenges.

"By landing all of those grant funds as a cooperative, we will be a taxable co-op next year," Eccher said. "This will change our structure."

Prince George Electric Cooperative, which launched a broadband initiative in 2017, faced a similar issue. "When we

Casey Logan
President and CEO, Prince George Electric Cooperative

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looked at the numbers back in 2017, we found out it is not very lucrative," said **Casey Logan, president and CEO of Prince George Electric Cooperative**. "It produces about a 10-to-15-year payback."

Although Tipmont REMC received grant funding from the state of Indiana, Holcomb cautioned that electric utilities should not depend on state or federal funding. "Run your numbers, but recognize this is a tough business," he said. "You might get some money, but you might not."

MANAGING CUSTOMER EXPECTATIONS

Besides the difficulties of getting a favorable payback, cooperatives face a new reality: Broadband consumers aren't nearly as patient about getting access to service.

Logan said this forced Prince George Electric Cooperative to be a bit faster on its feet. "Once you start offering broadband internet service, the biggest challenge we have seen is managing the expectations," he said. "As soon as the cat's out of the bag that you're offering broadband, people want it now, and they don't want to wait for it."

Another problem, paradoxically, is that some members of the community simply have no interest in broadband. About 50 percent of its demographic is over the age of 55. "Their reaction is, 'Well, I have lived without it for 50 years, so why do I need it now?'" Logan said. "We are studying now through our marketing team how to approach those residents to show them the value of broadband."

Eccher agreed and added that providing broadband changes the perception of how a community views a cooperative. "When you work with our membership on a project like this, you're providing something they can't get," he said. "You become relevant again."

Urban and Rural Community Broadband Successes
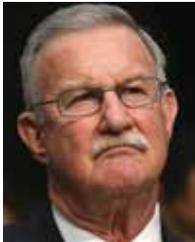
Dick Sherwin
CEO of Spot On

With more than 3,100 units, Queensbridge Houses, in Queens, New York, is the largest public housing community in the United States. Queensbridge suffered from poor cellular service and unaffordable broadband until 2016, when the NYC Department of Information Technology and Telecommunications selected Spot On Networks to install a fiber-and-wireless network throughout all the buildings and provide free service to residents. **Dick Sherwin, CEO of Spot On**, said that Spot On completed the project in 2018, delivering 25 Mbps/25 Mbps internet service to all residents and allowing them to use Wi-Fi calling anywhere in the community. Spot On's patented, cost-effective wireless technology was used in the project.

Residents can access social services, educational programs and job opportunities and have been participating in digital literacy programs at the community. Spot On opened a customer service office in the community and hired and trained residents to help build, support and promote the network.

Robert Bridgham
Executive Director,
The Eastern Shore Of
Virginia Broadband
Authority (ESVBA)

Virginia's Eastern Shore counties faced similar problems in a very different setting. **Robert Bridgham, executive director of the Eastern Shore of Virginia Broadband Authority (ESVBA)**, described his agency's efforts to bring broadband to this rural area. Using funding from the Rural Utilities Service, NASA (which had an interest in serving one of its flight facilities in the area), and other sources, ESVBA first built a backbone network, then began connecting health facilities and commercial customers, and finally started building to residential areas, a project still ongoing.

An important benefit of the ESVBA network is that it can reverse the exodus of young people. Young adults have been leaving the Eastern Shore because of the lack of jobs and education. Commuting to work and college courses is difficult because Chesapeake Bay cuts off the region; crossing the bridge costs $26. "Distance education is crucial," says Bridgham, noting that youth now have an opportunity to take college classes from home. Soon, they will have more opportunities to work there, too.

In Wilson, North Carolina, Greenlight Community Broadband, the municipal network, is helping community members develop digital skills. **Gene Scott, general manager for outside plant**, said the effort had come about serendipitously. He was having difficulty finding skilled outside-plant technicians, so he approached Wilson Community College to see whether it would train OSP techs. When the college agreed, Scott put together a 10-week course as a proof of concept, writing the curriculum and recruiting volunteer instructors from vendor companies. The course was an instant success. "People were driving two and a half hours to take it," Scott said. The students are mostly IT professionals preparing for the next step in their careers. Next up on Scott's to-do list: a one-week "boot camp" course, followed by an apprenticeship program that exposes trainees to the full range of job opportunities in running a fiber optic network.

Gene Scott
General Manager OSP,
Greenlight Community
Broadband, Wilson, NC

In spring 2020, Greenlight will open a "gig exchange," or ecosystem for app developers. They will use the network to test their apps, and Greenlight will help connect them with engineering, marketing and other resources. Scott hopes to tie this effort to the local community college as well – possibly by developing a two-year degree in tech entrepreneurship. Later, a high school program might be developed to feed into the college program. These programs won't be limited to Wilson. "We'd like to remotely teach students all over the country," Scott said. "We'll take kids who are curious and let them find answers. They'll use our network to explore their own ideas." ❖