Vision

Every North Carolinian should be able to access affordable high-speed internet anywhere, at any time.
Objectives

- Understanding of broadband resources and efforts at the federal and state level
- Better understanding of broadband and related terminology
- Info on how to answer questions about broadband from your community
- Provide basic strategies that can help with broadband planning efforts
AGENDA - Broadband 101
Isothermal Planning & Development Commission and Broadband Infrastructure Office (BIO)

9:00am Welcome
   Scott Dadson, Exec Dir, IPDC
   Agenda / Objectives for Day & Introductions
   Keith Conover, BIO

9:30am What Is Broadband?
   Technical Overview & Barriers to Deployment
   Glenn Knox, BIO

10:30am Digital Equity & Why is Broadband Important?
   Amy Huffman, BIO

11:30am Broadband Resources & Efforts at the Federal
   at the Federal & State Level
   Angie Bailey, BIO

12:15 – 1:00pm Lunch Provided

1:00pm Regional & Community Planning
   Jim Corrin, BIO

1:30pm Local Efforts
   Discussion on Needs and
   and Strategies & Next Steps
   Keith Conover, BIO

2:30pm Final Q & A

Adjourn by 3:00pm
What *is* Broadband?
Broadband

- There is not “one” definition
- Federal Communications Commission (FCC) has common definitions
- FCC recommended threshold for high speed broadband is 25 download/3 upload
- Multiple technology types & speed thresholds
Broadband 101 – What is Broadband?

• **Measured in Megabits per second (Mbps)**
  Speed in which small pieces of data (images and video) come from the web to your device.

• **Download Speed**
  Speed of getting information from the web to your device

• **Upload Speed**
  Speed at which you can send information from your device to the web

• **Latency**
  The delay in time (lag) it takes data to transfer data from the web to your device

• **Data Limits**
  The amount of data you can download and/or upload based on a ISPs standard

Source: https://www.fcc.gov/research-reports GUIDES/broadband-service-home-consumers-guide
Broadband Technology Types

- **Digital Subscriber Line (DSL)**
  - Runs over traditional copper phone lines, speed dependent technology and distance
  - Speeds range from 1.5 Mbps to 80 Mbps

- **Cable Modem (Coax or DOCSIS)**
  - Different DOCSIS version and companies allow for different speed options
  - DOCSIS 3.0: allows for speeds up to 100 Mbps
  - DOCSIS 3.1: allows speeds up to 10 Gig, with typical speed threshold of 1-2 Gbps

- **Fiber-to-the-Home (FTTH, FTTP, “Fiber”)**
  - Phone and cable companies are building FTTH and business solutions allowing speeds up to 10 Gig, with typical speed threshold of 1 Gbps

- **Wireless (mobile)**
  - 4G allows downloads of 5-12 Mbps, but may peak upwards of 50 Mbps
  - 5G – standards being developed but speeds will be comparable to “Fiber”

- **Wireless (fixed)**
  - Offering speeds of 10-50 Mbps depending on application, terrain, etc.

- **Satellite**
  - Speeds up to 25 Mbps, but is typically more expensive, may have data caps, or latency issues

Source: Presentation from providers to NC General Assembly 2017
# Broadband 101 - Broadband Technology Types

<table>
<thead>
<tr>
<th>Activity</th>
<th>Minimum Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Usage</strong></td>
<td></td>
</tr>
<tr>
<td>General Browsing and Email</td>
<td>1 Mbps</td>
</tr>
<tr>
<td>Streaming Online Radio</td>
<td>&lt; 0.5 Mbps</td>
</tr>
<tr>
<td>VoIP Calls</td>
<td>&lt; 0.5 Mbps</td>
</tr>
<tr>
<td>Student</td>
<td>5 – 25 Mbps</td>
</tr>
<tr>
<td>Telecommuting</td>
<td>5 – 25 Mbps</td>
</tr>
<tr>
<td>File Downloading</td>
<td>10 Mbps</td>
</tr>
<tr>
<td>Social Media</td>
<td>1 Mbps</td>
</tr>
<tr>
<td><strong>Watching Video</strong></td>
<td></td>
</tr>
<tr>
<td>Streaming Standard Definition Video</td>
<td>3 – 4 Mbps</td>
</tr>
<tr>
<td>Streaming High Definition (HD) Video</td>
<td>5 – 8 Mbps</td>
</tr>
<tr>
<td>Streaming Ultra HD 4K Video</td>
<td>25 Mbps</td>
</tr>
<tr>
<td><strong>Video Conferencing</strong></td>
<td></td>
</tr>
<tr>
<td>Standard Personal Video Call (e.g., Skype)</td>
<td>1 Mbps</td>
</tr>
<tr>
<td>HD Personal Video Call (e.g., Skype)</td>
<td>1.5 Mbps</td>
</tr>
<tr>
<td>HD Video Teleconferencing</td>
<td>6 Mbps</td>
</tr>
<tr>
<td><strong>Gaming</strong></td>
<td></td>
</tr>
<tr>
<td>Game Console Connecting to the Internet</td>
<td>3 Mbps</td>
</tr>
<tr>
<td>Online Multiplayer</td>
<td>4 Mbps</td>
</tr>
</tbody>
</table>

# Broadband 101 – Typical Broadband Usage

<table>
<thead>
<tr>
<th></th>
<th>Light Use</th>
<th>Moderate Use</th>
<th>High Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>(Basic functions only: email, browsing, basic video, VoIP)</td>
<td>(Basic functions plus <em>one</em> high-demand application: streaming HD video, teleconferencing, online gaming)</td>
<td>(Basic functions plus <em>more than one</em> high-demand application running at the same time)</td>
</tr>
<tr>
<td><strong>1 user on 1 device</strong></td>
<td>3-8 Mbps</td>
<td>3-8 Mbps</td>
<td>12-25 Mbps</td>
</tr>
<tr>
<td><strong>2 users or devices</strong></td>
<td>3-8 Mbps</td>
<td>12-25 Mbps</td>
<td>12-25+ Mbps</td>
</tr>
<tr>
<td><strong>3 users or devices</strong></td>
<td>12-25 Mbps</td>
<td>12-25 Mbps</td>
<td>25+ Mbps</td>
</tr>
<tr>
<td><strong>4 users or devices</strong></td>
<td>12-25 Mbps</td>
<td>12-25 Mbps</td>
<td>25+ Mbps</td>
</tr>
</tbody>
</table>

Source: [https://www.fcc.gov/research-reports/guides/household-broadband-guide](https://www.fcc.gov/research-reports/guides/household-broadband-guide)
Broadband Availability Challenges

93.7% NC Households with Access

92.3% US Households with Access
Broadband Availability Challenges

~738,306
North Carolinians without access broadband*

~661,224
Live in rural North Carolina

Source: FCC 2016 Broadband Progress Report
North Carolina Broadband Service Inventory

Advertised Speeds of at Least
25 Mbps Download and 3 Mbps Upload


Note: A provider that reports deployment of a particular technology and bandwidth in a census block may not necessarily offer that service everywhere in the block.

In areas where multiple service options are available this map shows the coverage layers in the order presented above.
Technical Overview & Barriers to Deployment
What do the following terms mean? Why are these terms important?

- **Backbone**
- **Middle Mile**
- **Last Mile**
Broadband 101 – Backbone - What is an IXP?

Source: http://drpeering.net
Broadband 101 – IXP Exchanges Worldwide

Source: https://internetexchangemap.com
Broadband 101 – Backbone, Middle Mile, Last Mile

Dark Fiber

Lit Fiber
MCNC Fiber Infrastructure
Enabling the Operation of the North Carolina Research and Education Network

LEGEND
- MCNC Fiber
- MCNC Co-location Facility
- MCNC Fiber (Triangle Ring)
- City

As of July 2017
Broadband 101 – Backbone, Middle Mile, Last Mile

- **Backbone**: Large-capacity fiber
- **Middle Mile**: Segment of fiber system linking core network to the local fiber
- **Last Mile**: Fiber network connects to end-users

Source: https://scottmadden.com
Broadband 101 – Last Mile

Source: http://masstech.org
Broadband 101 – Digital Subscriber Line (DSL)

Source: http://www.conniq.com/InternetAccess_ADSL.htm
Broadband 101 – Cable (Coax or DOCSIS)

Source: http://www.conniq.com/InternetAccess_cable.htm
Broadband 101 – Fiber to the Home (FTTH)

Source: http://www.conniq.com/InternetAccess_cable.htm
Broadband 101 – Mobile Wireless – LTE

1G
1st Generation wireless network
- Basic voice service
- Analog-based protocols

2G
2nd Generation wireless network
- Designed for voice
- Improved coverage and capacity
- First digital standards (GSM, CDMA)

3G
3rd Generation wireless network
- Designed for voice with some data consideration (multimedia, text, internet)
- First mobile broadband

4G
4th Generation wireless network
- Designed primarily for data
- IP-based protocols (LTE)
- True mobile broadband

The Need for Speed
- 2.4 kbps
- 64 kbps
- 2,000 kbps
- 100,000 kbps

Source: www.commscopetraining.com
Broadband 101 – Mobile Wireless – 5G

5G Capabilities & Opportunities

Multiple 5G Dimensions
- Ultra low latency
- Ultra reliable transmission
- Massive internet of things scale
- Security by design
- High bandwidth (Spectrum width of hundreds of MHz)

Flexible Architecture
- Deep fiber deployment
- Multi-access edge compute (MEC)
- Public and private network slices for new 5G use cases

New opportunities with 5G and multi-access edge compute

Source: Verizon
Broadband 101 – Mobile Wireless – 5G

Source: Qorvo.com
Broadband 101 – Wireless – Ideas for Deployment

Source: American Tower/Philips
Why can’t I get a provider to deploy to my home?
Common Barriers to Broadband Deployment

- Capital Expenditures (CAPX)
- Population Density
Broadband 101 – Deployment Barrier - CAPX

CAPX - design/engineering, permitting, ROW, other fees, and construction

Design considerations include planning and routing dependent on but not limited to the following:

- Client’s needs
- Type of cabling – aerial or underground
- Safety
- Terrain
- Local restrictions
- Existing infrastructure
- Future or proposed developments

Source: Southwest Commission Broadband Training – Cabling Infrastructure Presentation
Jan Van Tol, RCDD, ECC Technologies
Example of Associated Costs for Wireline Deployment

Underground Deployment
- Digging or boring to create a pathway can cost $20K or more
- Costs depend on what is below the surface – granite, clay, or sand

Aerial Deployment
- Pole attachment fees can range from $1,500 to $10,000
- “Make-ready Work” fees to properly prepare the pole

Other impacts on cost for underground or aerial deployment
- Routing the infrastructure – safety, road/traffic, environmental conditions
- Permitting, ROW Access, and other fees will also increase costs

Source: Connecting North Carolina, State Broadband Plan
Example of Associated Costs for Fixed Wireless Deployment

- Building a new tower
- Land – purchase or leasing
- Electricity to the tower
- Fiber backhaul
- Tower access fees or lease
- Pole attachment fees and agreements

Source: Connecting North Carolina, State Broadband Plan
Broadband 101 – Deployment Barriers

Source: Duke Power Company
Future Technologies – What’s new out there? Here’s an example:

Fiber deployments are costly, as we’ve discussed. How about epoxying fiber to the road?

Epoxy Fiber in a parking lot

Epoxy fiber entering a building
Fibertrax is a brand new concept by Traxyl (www.traxyl.com)

Benefits:
• 30-90% reduction of per foot install costs for network links
• Project timeline is measured in hours and days, not weeks and months
• Create network redundancy and diversity of routes
• Avoid existing and unseen underground hazards
• Great for short distances and last mile
• Easily extend existing networks
• Tested for durability using multiple snow plows running across installations with no impact to the fiber
• Same type of technology now used to paint roads already
• Estimated lifetime to be around ~10 to 20 years

Existing Projects:
• ISP Network access – Chestertown MD. 215 feet through a parking lot. 215 feet
• High school campus network – Bealeton VA. 615 feet – provides fiber connectivity to sports facilities and complexes – through parking lot traversed by school busses every day
• 2 fuel Island installations – Fauquier County VA. 484 feet and 28 feet. Eliminated the need to trench or drill underground near existing fuel stations
• Municipal Network Expansion – Stillwater OK. 120 feet provides redundant link for traffic control monitoring system
List of acronyms used in this presentation and not already explained:

ADSL – Asymmetric Digital Subscriber Line – data (internet) to last mile with up to ~10 Meg download. Distance between the client and the DSLAM and the quality of the copper plant will impact available bandwidth.

CAPX – Capital Expenditure

Coax – Coaxial Cable. Type of cable with a copper wire core, entirely shielded with a wire mesh surrounding that core cable that protects from outside interference and serves as a ground.

DAS – Distributed Antenna System

DOCSYS – Data Over Cable Service Specification

DSLAM – Digital Subscriber Line Access Multiplier. These feed broadband via DSL (copper) lines to each subscriber via a DSL modem.

FTTH – Fiber To The Home.

FTTP – Fiber To The Premise

MSC – Metro Switch Concentrator

PSTN – Public Switched Telephone Network

RRH – Remote Radio Head

WISP – Wireless Internet Services Provider
Digital Equity & Why is Broadband Important?

Amy Huffman
Research and Policy Specialist
Broadband Adoption, Digital Equity, and Inclusion
High levels of broadband availability are associated with lower total employment.

High levels of broadband adoption in nonmetropolitan counties are positively associated with higher numbers of businesses and jobs.
Definition: Broadband Adoption

The percentage of the population that subscribes to a broadband service.
Common Barriers to Broadband Adoption

- Cost
- Relevancy
- Access
- Digital Literacy
2017 Broadband Adoption Rates

ADOPTION AT ANY SPEED

<table>
<thead>
<tr>
<th></th>
<th>North Carolina</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>75.8</td>
<td></td>
<td>78.1</td>
</tr>
</tbody>
</table>

ADOPTION, 25/3

<table>
<thead>
<tr>
<th></th>
<th>North Carolina</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td></td>
<td>54</td>
</tr>
</tbody>
</table>
Adoption Rates in Isothermal Regional Commission Counties

- Cleveland
- McDowell
- Polk
- Rutherford
- NC

2017
Definition: Digital Divide

The Digital Divide refers to **the gap between** those who have access to technology, the internet, and digital literacy training and those who do not.
Income and Broadband Adoption Rates
Isothermal Regional Commission Counties

BROADBAND INTERNET ADOPTION RATES

% Households w/ Less than $20,000 Income
% Households w/ $20,000-$74,999 Income
% Households w/ $75,000+ Income

Cleveland  McDowell  Polk  Rutherford  North Carolina
Computer Ownership Rates in Isothermal Regional Commission Counties

<table>
<thead>
<tr>
<th>County</th>
<th>Percent of Households with No Computers</th>
<th>Percent of Households with Smartphone Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland</td>
<td>26.7</td>
<td>5.9</td>
</tr>
<tr>
<td>McDowell</td>
<td>20.4</td>
<td>6.9</td>
</tr>
<tr>
<td>Polk</td>
<td>16.2</td>
<td>4.3</td>
</tr>
<tr>
<td>Rutherford</td>
<td>24.4</td>
<td>4.7</td>
</tr>
<tr>
<td>North Carolina</td>
<td>14.5</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Cleveland McDowell Polk Rutherford North Carolina

Legend:
- Dark blue: Percent of Households with No Computers
- Light blue: Percent of Households with Smartphone Only
Digital Equity is a condition in which all individuals and communities have the information technology capacity needed for **full participation** in our society, democracy and economy. Digital Equity is **necessary for civic and cultural participation, employment, lifelong learning, and access to essential services.**
Definition: Digital Inclusion

Digital Inclusion refers to the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of Information and Communication Technologies (ICTs).

Digital Inclusion must evolve as technology advances. Digital Inclusion requires intentional strategies and investments to reduce and eliminate historical, institutional and structural barriers to access and use technology.
Definition: Digital Inclusion Cont.

This includes 5 elements:

1. Affordable, robust broadband internet service;
2. Internet-enabled devices that meet the needs of the user;
3. Access to digital literacy training;
4. Quality technical support; and
5. Applications and online content designed to enable and encourage self-sufficiency, participation and collaboration.
Definition: Digital Literacy

Digital Literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills.
A Digitally Literate Person:

1. **Possesses the variety of skills – technical and cognitive – required to find, understand, evaluate, create, and communicate digital information in a wide variety of formats**;

2. **Is able to use diverse technologies appropriately and effectively** to retrieve information, interpret results, and judge the quality of that information;

3. **Understands the relationship between technology, life-long learning, personal privacy, and stewardship of information**;

4. **Uses these skills and the appropriate technology to communicate and collaborate** with peers, colleagues, family, and on occasion, the general public; and

5. **Uses these skills to actively participate in civic society** and contribute to a vibrant, informed, and engaged community.
BIO’s Role in Digital Equity and Inclusion

Lead

Lead the state in digital equity & inclusion work

Convene

Bring stakeholders together around different topics related to digital equity & inclusion
Provide space and time to work together on understanding and addressing those topics

Connect

Connect groups to each other
Connect resources to efforts needing them
Connect best practices to those who need them
Connect citizens to groups who serve them

Champion

Advocate for resources from funders and policymakers to support strategies & policies that close the divide
Advocate for policies/programs/resources from policymakers & funders to address digital equity & inclusion
Champion and highlight the work of partner and stakeholder organizations to our audience
BIO’s Role in Digital Equity and Inclusion Cont.

Aggregate

Aggregate the best ideas and best practices for closing the divide

Aggregate the data, research, etc. necessary for measuring the divide and benchmarking progress in closing it

Educate

Educate state, policymakers, etc. on digital equity

Educate state & policymakers on depth of current digital divide

Educate stakeholders on how to address the digital divide

Define the issue and create materials/resources for stakeholders and partners to use

Strategize

Design policies to address the digital divide

Design strategies to address the digital divide

Design programs to address the digital divide
NC Digital Equity and Inclusion Collaborative

In 2017, BIO Convened Leaders of Organizations Across North Carolina Dedicated to Digital Equity and Inclusion the NCDEIC includes:

- Device Refurbishers
- State Agencies
- Universities
- MCNC
- Non-profits
- Local Leaders
NCDEIC Vision and Mission

Vision Statement:
We envision a North Carolina where all citizens have access to the technologies, digital skills, and opportunities necessary to thrive in today’s society.

Mission Statement:
To foster collaboration among digital equity and inclusion leaders to bridge the digital divide in North Carolina.
“The Homework Gap is the cruelest problem we have, but I think it is in our power to fix.”

Federal Communications Commissioner, Jessica Rosenworcel
Pilot Homework Gap Survey

- State level data
- Consulted with Previous Surveys/Experts
- 17 Questions
- English & Spanish
- Distributed Online and some paper
Count of Survey Participants by Zip Code
Survey Respondents without Access

- respondents without internet
- no respondents / respondents have internet
Quantifying the Homework Gap

Surveyed households with no internet access at home

90%

Surveyed households with internet access at home

10%

“Very Comfortable” Respondents:

67%

Parent’s comfort level using digital devices for work

55%

Student’s comfort level using digital devices for homework

67% of those without internet access cite cost as the primary reason.
Addressing the Homework Gap through Libraries

New Grant
- $250,000 from Institute of Museum & Library Services
- Awarded to BIO/DIT + State Library
- 2 year grant

Homework Gap
- Grant will fund pilot to test holistic model of closing homework gap through local libraries
- Will produce Toolkit with best practices for addressing homework gap through libraries

Details
- Creates new position: Digital Inclusion Librarian
- Provides hotspots, digital literacy training for participants
- Partner with one library system in Y1, expand to (up to) 3 others in Y2
Next Steps to Close the Homework Gap in NC

Summarize
- Full Report Release

Implement
- Implement Policies & Programs

Research
- Add Survey Questions to Existing Surveys
Upcoming Digital Equity Projects

‘Device Day’
- Establish annual “Device Day” to highlight need for devices to close digital divide
- Purpose: to educate, public & businesses on digital divide, device refurbishing

Highlight Low-Cost Offers
- Offer Locator Tool
- Highlights existing low-cost offers
- Assists citizens in identifying low-cost offers
- Encourages providers to offer low-cost offers

Digital Literacy & Adoption Days
- Establish annual “Digital Literacy” and “Broadband Adoption” days to highlight need for digital literacy and ability to afford broadband as means to close the digital divide
- Most likely between January & August 2019

Net Inclusion 2019
- April 1\textsuperscript{st}-3\textsuperscript{rd}, 2019 in Charlotte, NC
- BIO hosting workshop for elected officials on April 1
Broadband Benefits
How Broadband Impacts Your Daily Life
Broadband and Education

Opportunities

• Personalized Learning
• Immersive Technologies
  • Augmented Reality (AR) and Virtual Reality (VR)
  • Skills based training
  • Soft skills training
• 3D Printing, robots, AI, etc.
• Online educational resources
  • Apps
  • Khan Academy, etc.

Challenges

• Homework Gap
• Teacher Training
• Device management
• Funding
• Speed of technology evolution
• Screen time
Broadband and Healthcare

Opportunities
- Telehealth
  - Video
- Store & Forward
- Remote Patient Monitoring
- mHealth
- Digital Health
  - Electronic Health Records
- Rural healthcare delivery
- Healthcare IoT or (Internet of Medical Things)

Challenges
- Insurance/Reimbursement
- Policy
- Provider & patient training
- Complicated nature of healthcare industry
Broadband and Economic Development

Opportunities

• Growth of Entrepreneurial Ventures and Ecosystem
• Small Businesses with Tools to Grow and Increase Impact
• Business Location Selection and Retention
• New Workforce Development Opportunities Telework
• Smart Cities
• Positive Impacts to Quality of Life

Challenges

• Funding
• Coordination
• Rapid technology evolution
Public Safety and Broadband

Opportunities

• “Connected Responder”
  • Quick Response
  • Better Informed

• Data Sharing Between:
  • Departments
  • Local, County, State and Federal entities

• Increased Communication Methods

• Trainings

Challenges

• Policy

• Governance

• Standardization

• Funding

• Laws/Public Policy

• Perception
Broadband 101

Broadband – Resources & Efforts at the Federal Level
Broadband 101 — Federal

Federal Communications Commission
fcc.gov

• Promote competition, innovation & investment in broadband
• Manage spectrum
• Mapping (Form 477 Data)
• Broadband Deployment Advisory Committee
  o (Disaster Response & Recovery Working Group)

Universal Service Administrative Company
• Schools & Libraries (E-rate Program)
• Rural Health Care Program
• Lifeline Program
• High Cost Program (Connect America Fund)
Broadband 101 – Federal

Definition of Broadband

Multiple technologies, multiple industries, built with different purposes sometimes, differing laws and sometimes different services

• Telcos
• Cable
• FTTH
• Fixed Wireless
• Cellular/Mobile
• Satellite
Broadband 101 – Federal

FCC - Form 477 and Other Data

Data & Reports:

- Fixed Broadband Deployment Data
- Mobile Broadband and Voice Deployment Data
- Internet Access Services Reports
- Voice Telephone Services Reports
- Broadband Progress Reports
- Additional Form 477 Data
- How State Commissions Can Obtain Form 477 Subscription Data

Source: https://www.fcc.gov/
Fixed Broadband Deployment Data from FCC Form 477

Who Files What?

- All facilities-based broadband providers are required to file data with the FCC twice a year (Form 477) on where they offer Internet access service at speeds exceeding 200 kbps in at least one direction.
- Fixed providers file lists of census blocks in which they can or do offer service to at least one location, with additional information about the service.*
- Mobile providers file maps of their coverage areas for each broadband technology (e.g., EV-DO, HSPA, LTE). See Mobile Deployment Data.

Related Links
- Interactive Map
- Explanation of the Data
- Mobile Deployment Data
- Fixed Broadband Technology Codes
- Form 477 Resources
Broadband 101 – Connect America Fund

- Deployment of service is based on Return on Investment (ROI)
- No entity can force an ISP to deploy or upgrade infrastructure
- Some funding available through Connect America Fund

The FCC offers this fund as a subsidy to major providers to construct 10 Mbps down/1 Mbps up broadband networks in areas currently unserved with internet service. The following table from the FCC identifies four carriers that accepted Phase II CAF in North Carolina:

<table>
<thead>
<tr>
<th>ISP</th>
<th>Homes &amp; Businesses Served</th>
<th>Support Amount in Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT&amp;T</td>
<td>13,139</td>
<td>$3,498,889</td>
</tr>
<tr>
<td>CENTURY LINK</td>
<td>36,159</td>
<td>$10,008,390</td>
</tr>
<tr>
<td>FRONTIER</td>
<td>11,981</td>
<td>$3,596,156</td>
</tr>
<tr>
<td>WINDSTREAM</td>
<td>6,988</td>
<td>$1,952,082</td>
</tr>
</tbody>
</table>
Broadband 101 – Federal

National Telecommunications and Information Administration
• US Department of Commerce

• Advise the President on telecommunications and information policy issues

* Broadband USA

* Broadband Interagency Working Group

* FirstNet
Broadband 101 – Federal

**National Telecommunications and Information Administration**
- US Department of Commerce
- Advise the President on telecommunications and information policy issues

**Broadband USA**
broadbandusa.ntia.doc.gov
- One shop for broadband information around the federal government
- National convener (State Broadband Leaders Network)
- Publications, Funding Information, Data, Webinars, Federal, and State Resources

**Broadband Interagency Working Group**
ntia.doc.gov/category/broadband-interagency-working-group
- Federal interagency coordination – co-chair with USDA- Rural Utilities Service*
- Assists in reducing regulatory barriers
- Promotes awareness of broadband investment & digital inclusion programs
- Collects & shares information about federal resources for deployment & digital inclusion programs
NTIA and FirstNet (First Responder Network Authority)

- Nationwide Public Safety Broadband Network (NPSBN)
- LTE data network dedicated to first responders
- AT&T was chosen to build out the network
- State of North Carolina opted into participating with the national effort
- Single Point of Contact (SPOC) within states
- Applications, devices, location services, deployables
Broadband 101 – Federal

US Department of Agriculture

Co-Chair Broadband Interagency Working Group

Rural Utilities Service / Rural Broadband Programs
  • Telecommunications Loan Program
  • Farm Bill Broadband Program
  • Community Connect Grants
  • Distance Learning & Telemedicine Grants
Broadband 101 – Federal

US Department of Agriculture
Rural Development

Rural e-Connectivity Pilot Program (ReConnect Program)

NEW - $600m in federal funds for rural broadband loans and grants

http://reconnect.usda.gov
Broadband 101

Broadband – Resources & Efforts at the State Level
State of North Carolina
–
Broadband Infrastructure Office
The Broadband Infrastructure Office

- Community
- Policy
- Programs and Tools
Technical Assistance Regions

West
Keith Conover
828-450-7933
Keith.Conover@nc.gov

Central
Jim Corrin
919-353-1126
Jim.Corrin@nc.gov

East
George T. Collier
919-754-6558
George.Collie@nc.gov

Region

- West
- Central
- East

Broadband Infrastructure Office
Tools: Community Broadband Playbook

COMMUNITY BROADBAND PLAYBOOK
Building a Better Broadband Infrastructure

Welcome to the Community Broadband Playbook
CONNECTING NORTH CAROLINA
State Broadband Plan
www.ncbroadband.gov/sbp
Incentivize investment/reduce barriers:
Next-generation infrastructure

Close the 'homework gap'

Create community-based adoption & utilization programs and initiatives

Enhance public safety and first responder connectivity

Integration of broadband into economic development strategies

Leverage telehealth technologies
Policy Considerations

County authority to build and lease infrastructure is somewhat grey.
Bill introduced in the past to clarify and allow broader authority to grant money.

Municipal authority based on S.L. 2011-84 (H129).
Cities can build and operate for municipal purposes and offer free service to public.
Some cities: excess capacity is surplus property and can be leased; bills in NCGA to clarify including S.L. 2018-5.

Small Cell Siting – S.L. 2017-159 outlines requirements/sets fees and timelines for permit approval.
NCLM and UNC School of Government = resources.

GREAT Grant Legislation includes municipal leasing & state property use.

Electric Membership Cooperatives
Tools:
NCBroadband.gov/map

N.C. Broadband Map

IS YOUR AREA REPRESENTED CORRECTLY?
In an effort to identify the pockets of unserved and underserved areas around the state, we have launched a new user-reporting tool. We want to make sure that the information that we have for homes and businesses around the state is as accurate as possible and getting your feedback is critical to that. This helps us develop strategic plans for improving connectivity in your area.

ADD YOUR INFORMATION

View Larger Map
Leading Digital Equity and Inclusion Efforts

- Device Refurbishers
- Regional Leaders
- Non-profits
- MCNC
- Digital Equity Leaders
- State Agencies
- Friday Institute
First Responder Emerging Technologies Program

• Focuses on the impact to the first responder disciplines because of up-and-coming hardware and software changes.

• Adopting new technologies can impact operational, financial, or policy considerations for the agency.

• These changes have recently been accelerated by the Nationwide Public Safety Broadband Network (NPSBN), also known as the FirstNet Network.

• Program Staff are former and current first responders also having experience in the emergency management field.
How do we help?

- Providing adjunct technology exploration support
- Collaborating with subject matter experts (first responder and industry)
- Addressing cybersecurity issues, connectivity needs, interoperability with existing and emerging systems, and other challenging/threatening topics
- Collaboration across state agencies and departments

Growing Rural Economies with Access to Technology

GREAT Grant Program
GREAT Grant Program

Growing Rural Economies with Access to Technology (GREAT)
• New Program
• Tier One Counties
• Areas with less than 10/1 Mbps
• Eligible Applicants are Broadband Providers

To expedite terrestrial deployment of broadband, by encouraging partnerships and competition between private broadband providers and cooperatives…and lease of State and local-government owned properties or facilities
GREAT - Baseline Data for Identifying Eligible Areas

Tier One counties

Census block boundaries

Census blocks with less than 10/1 Advertised Speeds

Mapped GIS layers available for download
**Broadband 101 – State**

### GREAT Grant Program Overview

<table>
<thead>
<tr>
<th>Criteria</th>
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<tr>
<td><strong>Legal Applicant</strong></td>
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<td>Internet Service Provider</td>
</tr>
<tr>
<td><strong>Proposed projects only</strong></td>
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<tr>
<td>in Tier 1 Counties</td>
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<tr>
<td><strong>Proposed project areas</strong></td>
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<tr>
<td>must have less than 10/1 Mbs</td>
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<tr>
<td><strong>Provide minimum speeds</strong></td>
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<tr>
<td>of 10/1 Mbps</td>
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<tr>
<td><strong>Matching funds required</strong></td>
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<tr>
<td><strong>A single grant award shall not exceed</strong></td>
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<tr>
<td>$2,000,000</td>
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<tr>
<td><strong>Deployment of speeds</strong></td>
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<tr>
<td>of 25/3 Mbps or greater is encouraged</td>
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<tr>
<td><strong>No more than one grant award per county</strong></td>
</tr>
<tr>
<td>(applications should target one county)</td>
</tr>
<tr>
<td><strong>5-Year Service Agreement</strong></td>
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<tr>
<td>(including deployment period)</td>
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</table>
Launch of Grant Application Portal: November 9, 2018
Applications Due: February 1, 2019
BIO Initial Review – Vetting for Completeness & Basic Eligibility: early February
Public Posting & Protest Window (30 days): mid-February to mid-March
Final Application Review/Scoring: late March
Award Letters & Contracts Executed: March to April

Leveraging State Assets for Broadband Deployment

“…The State shall allow the collocation, installation, and operation of equipment by a broadband provider on any existing structure owned by the State and shall lease real property, or grant an easement of license with an interest in real property, for the purposes of construction and placement of broadband infrastructure on State land…”
Currently reviewing leasing processes for VIPER Towers and UNC-TV Towers

Developing Processes

Leasing Guidance

Collected fees would go into GREAT grant fund

Assets will be leveraged for deployment/access points

Leveraging State Assets

DIT/DOA Partnership

DIT/DOA Partnership

DIT/DOA Partnership

DIT/DOA Partnership
Regional & Community Planning

So Where Are We Now and What Are Our Next Steps?
Taking the time to understand the current broadband coverage, providers, policy issues, and assets within your region can help you develop a more comprehensive approach to attracting the desired middle-mile or last-mile broadband providers to your area.
Isothermal Planning and Development Commission
## Broadband Providers in Cleveland County

<table>
<thead>
<tr>
<th>County</th>
<th>Provider Name</th>
<th>Frequency</th>
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<td>CLEVELAND</td>
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*Broadband Providers that submitted Form 477 Data to the FCC, June 2017 Data*
## Broadband Providers in McDowell County

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<tr>
<th>County</th>
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*Broadband Providers that submitted Form 477 Data to the FCC, June 2017 Data*
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<td>POLK</td>
<td>SALUDA MOUNTAIN TELEPHONE CO.</td>
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## Broadband Providers – Rutherford County

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</table>
Broadband Planning, First Steps….

What Are Your Goals?
What Connectivity Challenges are you working to solve?

- Connectivity to Govt-Facilities (county, towns)
- “Smart City” Applications
- Public Safety
- Schools & Libraries
- Healthcare Facilities
- Downtown Wi-Fi
- Economic Development sites
- Large or Small Businesses
- Agriculture/Connectivity to Farms
- Residential Unserved/Underserved
- Homework Gap
- Adoption/Digital Equity
BIO Community Broadband Playbook

Defined Steps for Broadband Planning:

- Broadband Planning Committee
  (coordination, clear goals)

- Assets & Needs
  (demand aggregation, market analysis, vertical & other assets, importance of granular data)

- Connecting with Provider Partners
  (offer strategies, work with BIO)

- Policy & Broadband
  (local ordinances, taking advantage of existing State or county infrastructure)

- Building the Network
  (RFPs/RFIs, funding sources)
Broadband Planning Committee

Top Takeaways

Forming a broadband planning committee is one of the first things to do in working to improve broadband access.

Identify a “champion” of your committee, likely someone who can serve as a chairperson or primary contact person for the committee. Be certain that the champion will have enough time, energy and interest to manage the efforts.
Consider recruiting for your committee from leaders and stakeholders in the following community areas:

- Local government
- Public safety
- Libraries
- Education (public and private K-12, universities, community colleges)
- Healthcare
- Economic development
- Businesses
- Nonprofits
- Utilities and broadband providers
- Private citizens, and others committed to the expansion of broadband internet in the community
Assets and Needs

Top Takeaways

Target assets that will help you in the areas of your strategic goals.

Identifying your best vertical assets can take some outside of the box thinking and can increase community buy-in.

The Broadband Infrastructure Office team can help you identify the best assets for your plan.
Surveys and interviews can provide essential information, including the following:

- Neighborhoods and businesses served by broadband
- Affordability and willingness to pay
- Download and upload speeds
- Types of available internet service
- Levels of satisfaction with current services
- Reasons for non-usage among unconnected citizens and businesses
- Internet speeds likely to be required for applications in the future, especially for businesses, hospitals, schools, nonprofits, and other organizations.
Connecting with Provider Partners

Top Takeaways

Understanding the most attractive way to put your best foot forward for providers is the most productive way to get providers to come to the table.

The Broadband Infrastructure Office team is here to work with you every step of the way.
Connecting with Provider Partners cont.

Top Takeaways

One of the best ways to expand broadband access is for counties and communities to partner directly with private-sector internet service providers.

Communities seeking to expand access to broadband internet can work with providers by lowering their deployment costs through revenue and/or cost sharing, as well other incentives and favorable policies, including offering the use of rights of way, utility poles, and other physical assets in the area.

Your technical assistance representative can help you locate providers, each one a potential partner in building a core broadband network.
Top Takeaways

The lower the costs, the more likely it is that broadband providers will deploy broadband.

Offering incentives and implementing other strategies and policies can make regions and communities more attractive to providers, potentially forming new partnerships between the communities and the providers.
Policymakers should write and distribute RFPs and RFIs that are neither too general nor too specific.

Build your RFP or RFI around your goals and objectives. Establish your committee's priorities and must-haves as well as optional elements that providers might consider as well.
Top Takeaways

Local foundations or businesses can provide assistance in helping your project be funded.

Broadband USA, a federal program administered by the National Telecommunications and Information Administration (NTIA), publishes an up-to-date list of broadband deployment grants.

Community leaders can contact their Broadband Infrastructure Office technical assistance team member for information on funding possibilities.
Broadband Planning, First Steps….

Determine Where You Are

Where Is Your Community Now with Information Gathering?

Municipal Assets and Fiber – What do you have, what are you considering?

What Are Your Other County or Regional Assets?

Who are Your Potential Partners, especially Broadband Provider Partners?

Do you have other Projects or Initiatives that can be leveraged?
What Are Your Goals?

What Connectivity Challenges are you working to solve?

• Connectivity to Govt-Facilities (county, towns)
• “Smart City” Applications
• Public Safety
• Schools & Libraries
• Healthcare Facilities
• Downtown Wi-Fi
• Economic Development sites
• Large or Small Businesses
• Agriculture/Connectivity to Farms
• Residential Unserved/Underserved, Developments…
• Homework Gap
• Adoption / Digital Equity
As You Develop Plans, Keep in Mind…

No One Solution, rather…
a combination of solutions, a combination of providers,
a combination of technologies…even in one county or municipality

Leverage Other Projects, for example…
smart/connected city applications, public safety, economic development, homework gap
Your Role As A Community Leader

Learn

Plan/Use the Playbook

Identify Eligible Areas

Advocate
In Closing…

Thank you.

We are happy to assist as you continue your planning.

BIO can look at models, potential leveraging of projects, and assist in conversations with providers.

For additional information, please contact:

Keith Conover  
Broadband Infrastructure Office  
(828) 450-7933, keith.conover@nc.gov