



West Next Generation Network

Accelerating Opportunities

There is a significant opportunity in Western North Carolina for an advanced broadband service provider to capitalize on optimizing our region's "connective infrastructure." This opportunity has been created by the passion of our citizens for a quality of life that has resulted in an influx of new residents and attracted unparalleled national attention.

The Asheville region is poised for major economic growth that requires the availability of advanced broadband connectivity. Because of this need, more than 80 regional leaders met in late 2016 and early 2017 to discuss the potential of a regional initiative. Asheville, Biltmore Forest, Fletcher, Hendersonville, Laurel Park, and Waynesville combined forces to create the West Next Generation Network (WNGN), an endeavor designed to accelerate the implementation of broadband service to build a 21st-Century economy.

This document is intended to help potential providers see the region as a phenomenal opportunity to form a strong public/private partnership. The region needs better broadband services, and our area's strong leadership is poised to accelerate this process. The WNGN initiative gives providers the opportunity to partner with local leaders and communities that have the vision, dynamism, diversity, and location to accelerate the future.

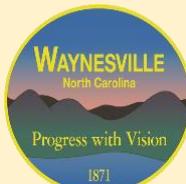


Table of Contents

Overview of the Area	3-7
A Place People Want to Be!.....	3
Region Poised for Success	4
Diverse Economy Supports Area	5
Soul of the Community	7
“Sense of Place”	8
Economic Sector Analyses	9-25
Advanced Manufacturing	10
Commerce & Entrepreneurship.....	12
Education.....	14
Government.....	16
Healthcare	18
Housing & Communities.....	20
Real Estate & Development	22
Tourism.....	24
Summary	26
Testimonials: What People Are Saying.....	27
Photo Credits	28

Regional leaders agreed that a “Vision Profile” was needed as part of the WNGN initiative. The project was led by students from UNC Asheville and Lenoir-Rhyne University’s Center for Graduate Studies of Asheville. The team consisted of Will Clark and Darby McKnight (UNCA) and Colleen Clark (LRU).



The document was designed by Michael Dempsey and William Sederburg, with input from Edward Katz, Jacob Barrocas, Stagg Newman, and Jonathan Feldman.

Advisement was provided by several civic and community leaders, many of whom are quoted throughout the document. They are further acknowledged in the “Summary” section.

A Place People Want to Be!



The broader **Asheville community** is a “hot” commodity. It is a destination where professionals, retirees, and the young want to live. Asheville and its environs have been recognized for their vitality and future potential. A few of the significant affirmations of this statement are found in various economic, environmental, gastronomical, and educational ratings. The area enjoys high rankings on livability, business, careers, innovative “green” technology, etc.

Asheville ranked #3 among World's Best Cities for Millennials

– matadornetwork.com

Asheville a top U.S. destination

– USA Today, Money magazine, Outside magazine, Forbes

Asheville: The Next Green Tech Town

– Huffington Post, 2014

Rated one of the best mid-markets in the South to relocate business headquarters

– Southern Business & Development, 2016

Asheville:
The Coolest
City in America

– matadornetwork.com

Asheville named #1 city for veteran entrepreneurs

– United Services Automobile Association & U.S. Chamber of Commerce, November 2016

“An unexpected source of innovation”

– Forbes magazine, 2014

Top 10 U.S. travel destination

– Travel & Leisure, 2016

No. 1 travel destination

– Good Morning America, 2016

Listed as #12 out of 200 cities as a best place for business and careers

– Forbes magazine, 2015



Region Poised for Success

The Asheville region is **expected to grow significantly over the coming decades**. The growth is likely to be from the **migration of highly educated young people and economically secure retirees**. The statistics are compelling:

- Population** → *By 2036 Buncombe, Henderson, Madison and Haywood counties are expected to have a combined population of 552,056 residents, up from 425,494 in 2010.*
- Jobs & Income** → *According to the Bureau of Labor Statistics, Buncombe County is in the top 10% for job growth and top 1/3 for wage growth among nation's largest 345 counties.*
- Educated** → *59% of adults ages 25-44 have an associate's degree or higher, and 50% of adults ages 45+ have an associate's degree or higher (TownCharts.com).*
- Young** → *Median age is 42 – 36% of the population is between the ages of 30 and 50 (2010 Access NC).*
- Not-So-Young** → *Population of people ages 65 to 74 expected to grow 21% by 2020 (Asheville Citizen-Times).*

Diverse Economy Supports Area

The region has developed **significant businesses and support organizations that will accelerate its economic growth and vitality.** In just the past few years, the region has built entrepreneurial incubators, venture capital clubs, workforce career pathways, and energized its higher education community to better serve the region. **It is the world's center for data about climate change and sustainability.**



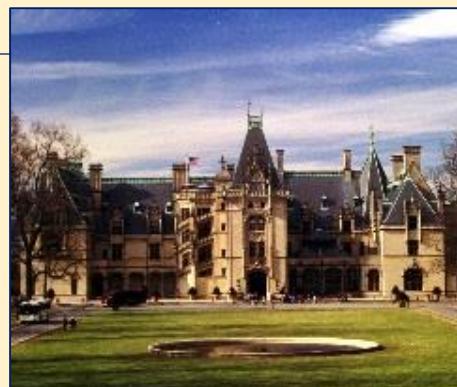
National Oceanic and Atmospheric Administration (NOAA): Asheville is the center of climate data and research, housing the National Centers for Environmental Information. It hosts 20 Nobel Prize-winning scientists.

The Collider was created in 2016 as a meeting place for scientists and entrepreneurs to collaborate in the use of climate data to create new businesses.



Including GE Aviation, the region hosts 22 advanced manufacturing firms that employ more than 2,100 employees (Asheville Area Chamber of Commerce).

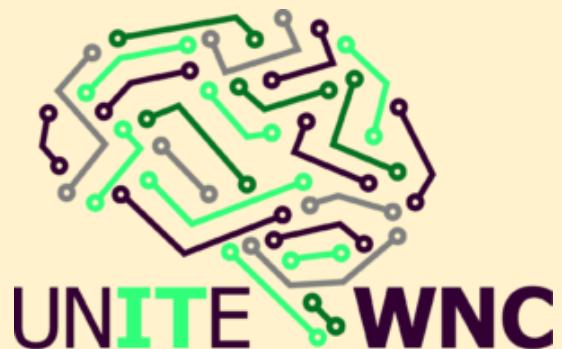
The region is a tourist destination: On average, 30,000 people visit Buncombe County each day, spending \$5.2M daily (Convention and Visitors Bureau). Asheville is home to the iconic Biltmore Estate, pictured at right.





Healthcare has grown dramatically. The health services and private education sector makes up the largest percentage of total employment in the Asheville metro region. Since 2000, this sector has grown by 62.5% (Asheville Area Chamber of Commerce).

UNITE WNC was organized in 2017 to develop a grassroots strategy for creating “the digital future.” The group is working to create a shared vision for the Western North Carolina tech sector that will be realized by 2025.



The University of North Carolina at Asheville was ranked No. 1 nationally for “Making an Impact” by connecting liberal arts students with economic opportunities (The Princeton Review, February 2016). UNC Asheville also hosts the National Environmental Modeling and Analysis Center (NEMAC), a climate data and environmental visualization research facility.

Venture Asheville, started in 2012, is catalyzing Asheville’s high-growth entrepreneurial ecosystem and connecting entrepreneurs with start-up funding, mentors, and talent.

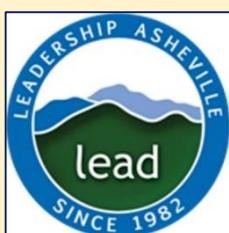


Soul of the Community

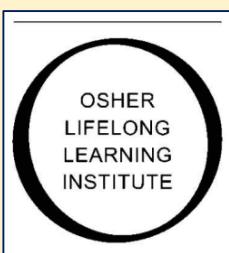
The Knight Foundation has defined the “soul of a community” as being a key factor in defining livable regions. People give higher ratings to communities that “relate directly to their quality of life: an area’s physical beauty, opportunities for socializing, and a community’s openness to all people” (“Soul of the Community,” Knight Foundation, 2010). These qualities provide a community with a unique “sense of place.”

This region has the referenced “sense of place.” There is a certain “weirdness” to the Asheville region that is created by its **openness to people of different ideologies, cultures, and backgrounds.** A recent UNITE WNC (Western North Carolina) tech-sector summit of 100 young “geeks” defined the area’s “soul” or “core” by these adjectives:

- Collaborative and generous, with a high level of acceptance for new people, diversity, and inclusion
- Resourceful: self-starters, self-sufficient, persistent, and resilient
- Creative: eclectic, curious, open-minded, passionate, and visionary
- Socially conscious: purposeful, committed to local businesses and community
- Education-centric, continuous learning, and improvement
- Leadership and expertise



The region provides its residents with great opportunities for personal growth and development. Leadership Asheville, hosted by UNC Asheville, annually trains 30 to 50 mid-career professionals in leadership skills and community engagement. The program is in its 35th year of operation.

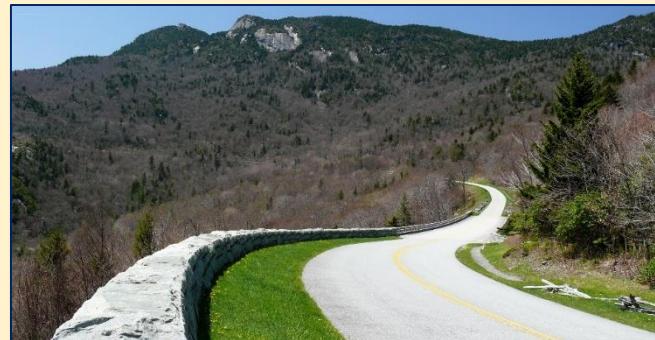


For seniors, Asheville hosts The Osher Lifelong Learning Institute at UNC Asheville. It is an award-winning, internationally-acclaimed learning community dedicated to promoting lifelong learning, leadership, community service, and research. It presently has 2,200 members.

The region is home to innovative community colleges (Asheville-Buncombe, Blue Ridge, and Haywood), UNC Asheville, the downtown Asheville campus of Lenoir-Rhyne University, the Biltmore Park campus of Western Carolina University, Warren Wilson College, Montreat College, Mars Hill University, and branch campuses or offices of North Carolina State University, Wingate University, and South College.

“Sense of Place”

The Internet economy has given people the freedom to choose where to live and where to locate businesses. Again, our region’s “sense of place” is a key variable in attracting the young, talented, socially engaged, and ambitious. For many firms, tax rates and financial incentives are less important than being located in an enjoyable and sustainable area with opportunities for employees to interact with both the environment and other interesting people. In Western North Carolina, one can do both. The region hosts more than 400 individually owned (i.e., non-chain) restaurants and bistros. It is also home to nearly 40 craft breweries, with 14 added in 2016 alone, along with three national-level artisan producers. These ventures provide locals with further opportunity to connect at “homegrown” establishments.



In addition, the opportunity for locals and visitors to engage in outdoor recreation is unsurpassed. The Pisgah National Forest is a 15-minute drive from downtown Asheville. “The Pisgah National Forest is a land of mile-high peaks, cascading waterfalls and heavily forested slopes. Comprised of more than 500,000 acres, the Pisgah is primarily a hardwood forest with whitewater rivers, waterfalls and hundreds of miles of trails” (visitnccsmokies.com).

The Blue Ridge Parkway winds its way through the Smoky Mountains. The Parkway provides easy access to Craggy Gardens, the state Folk Art Museum, and hundreds of hiking trails.

The North Carolina Arboretum’s 434-acre campus is nestled along the Blue Ridge Parkway and offers 65 acres of cultivated gardens including the Bonsai Exhibition Garden, 10 miles of forested hiking and biking trails, garden tours, an Art Walk, nature activities for families, ever-changing science, art and cultural history exhibits, and a cafe and gift shop.

Read about how the economic sectors of our region plan to use advanced broadband technology in the following sections of this report.



Downtown Hendersonville is a haven for small businesses. See more in the Commerce & Entrepreneurship section, Pages 12-13.

Economic sectors highlight need for advanced broadband

For the region's economic drivers to reach their full potential, adequate high-speed internet connectivity is required. **The next sections of this report highlight 8 economic sectors that will utilize the services of an advanced broadband provider.** These analyses are proof that Western North Carolina is eager to embrace a new broadband source!



"Smart grid" technology is one of the advanced broadband-related goals for municipalities involved in the West Next Generation Network initiative. Read about this in the Government section, Pages 16-17.



The Folkmoot USA international dance and music festival attracts thousands of tourists to Waynesville and Haywood County every year. The Tourism section is on Pages 24-25.

Advanced Manufacturing

Efficiency will be maximized with broadband's help

There are 22 advanced manufacturing companies in Western North Carolina.

According to the Asheville Area Chamber of Commerce, this industry provides more than 2,100 jobs, with an average annual salary of about \$50,000. **High-speed internet will have an incredible impact on the trajectory of this economic sector and, therefore, the ability of Western North Carolina to attract and retain more high-paying advanced manufacturing jobs.**



According to mountainareacareers.org:

- About 1 in 3 brake calipers sold in the U.S. is made in the Continental plant in Henderson County.
- The third-largest craft brewery in the U.S. (Sierra Nevada) is located in Henderson County, and the country's fourth-largest craft brewery (New Belgium) is located in Buncombe County.
- GE Lighting in Hendersonville produces and ships more than 3,000 LED lighting systems every day, saving cities \$17 billion annually in lighting costs.
- The region is home to more than 25 outdoor-industry manufacturers, including Outrider USA in Henderson County, producer of the world's fastest sub-100 lb. vehicle and a recumbent mountain bike that can be modified for use by quadriplegics and people with traumatic spine injury.

Respondents to a survey distributed to manufacturers in Western North Carolina indicated that advanced broadband would serve local manufacturers by:

- Allowing for **greater efficiency** in customer service
- Providing **access to online training** for workers in remote locations
- **Increasing the speed of business** and demand for immediate responsiveness
- **Improving the logistics sector** by keeping up with the needs of global consumers
- **Automating sales processes**, due to increased availability of real-time customer data and reduced response time
- **Boosting remote access** to assembly lines and machines
- **Attracting a younger workforce** that is well-versed in technology
- **Providing increased options for apprenticeships** that could turn into permanent employment

Example responses from advanced manufacturing broadband survey

"We will not be able to grow our workforce here without Gig ... period."

"Every time we have to apologize for our inability to participate in the modern business world due to lack of digital infrastructure ... we reinforce the idea that this is a fun place to visit but not a place to invest."

"Our customers are located throughout the Americas. Improved broadband would allow us to be more timely and responsive to the needs of our customers, no matter where they are."

Top Advanced-Manufacturing Employers in Western North Carolina

Company	County	Local Employee Range	Market Area	Manufacturing Type
Evergreen Packaging	Haywood	1,000+	International	Paper
Continental Teves	Henderson	750-999	International	Transportation
Eaton Corporation	Buncombe	750-999	International	Electrical Equipment
BorgWarner Turbo Systems	Buncombe	500-749	International	Transportation Equipment
Thermo Fisher Scientific	Buncombe	500-749	International	Machinery
GE Lighting	Henderson	500-749	International	Energy and Technology
Wilsonart	Henderson	500-749	International	Laminated Plastics
Meritor	Henderson	400-499	International	Transportation
Kearfott Corp.	Buncombe	400-499	International	Transportation
Consolidated Metco	Haywood	400-499	North America	Transportation
GE Aviation	Buncombe	300-399	International	Aircraft Engines and Parts
Linamar	Buncombe	300-399	National	Vehicle Components

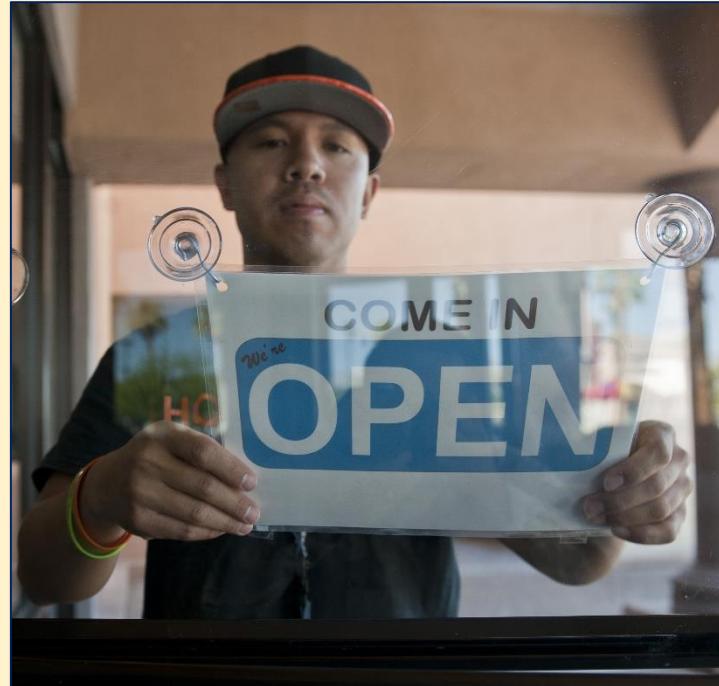
Commerce & Entrepreneurship

Advanced broadband is missing link for start-ups

The Asheville area is a growing hub for small businesses and entrepreneurial ventures. With our emphasis on community engagement, innovation, creativity, and personal enrichment, greater access to advanced broadband would not only increase economic opportunity for existing businesses and organizations, it would also generate greater entrepreneurial energy across Western North Carolina.

Mountain BizWorks, The Collider, and Venture Asheville are all organizations dedicated to expanding entrepreneurial activity in the Asheville region. They require access to high-speed broadband in order to connect their mentors and business partners to the growing number of entrepreneurs who come to them for training, collaboration, and a pathway to capital. As our start-ups grow, so does their need for cutting-edge high-speed digital infrastructure. Without access to advanced broadband, our local start-ups are at a competitive disadvantage in the global arena. Therefore, it is imperative for the six municipalities involved in this effort to be able to build out and expand their fiber backbone. High-speed internet is essential for Western North Carolina's start-ups!

According to a 2016 Federal Communications Commission report, North Carolina ranks ninth in the nation for broadband deployment initiatives that aim to overcome obstacles that diminish opportunities for social and economic growth within growing communities.



Josh Dorfman
Director of Entrepreneurship
Venture Asheville

"Broadband will unleash an enormous wave of entrepreneurial creativity. We are a city and region of highly skilled artisans, makers, and technologists. High-speed internet will enable our talent to create, connect, and build the kind of strong, sustainable businesses that are the backbone of Western North Carolina's economy."

Key factors affected by a lack of advanced broadband infrastructure are the following:

- Weak competitiveness in the global tech market
- Inability to process petabytes of data over gigabytes of data
- Inability to effectively set up cloud infrastructure to service the Internet of Things (IoT), web sites, and private data storages
- Less-effective database management
- Decreased likelihood of global and commercial business growth
- Decreased reliability of security operations

Three Drivers of Entrepreneurship in the Region

MOUNTAIN BIZWORKS



Mountain BizWorks' mission is to build a vibrant and inclusive entrepreneurial community in Western North Carolina by helping small businesses start, grow, and thrive. One of Mountain BizWorks' programs, ScaleUp WNC, provides intensive growth strategy development and implementation assistance to cohorts of 15 small

businesses annually. In total, 150 Western North Carolina businesses with strong potential for growth and job creation have or will have the opportunity to participate in this highly competitive program. ScaleUp WNC is designed to yield a diverse and distinguished group of entrepreneurs, to drive innovation and economic development.

THE COLLIDER

The Collider brings together diverse expertise and stimulates a new industry: climate products and services. The Collider catalyzes market-driven climate solutions by hosting events and educational opportunities that include live-streamed meetings, virtual conferences, state-of-the-art presentations, specialized training, lectures, and workshops. It is, in part, a response to the growth of the "big data" analytics that are required in climate science – an economic sector that requires broadband.



Mack Pearsall
Founder
The Collider

"I've been active in creating 'The Collider' because of the importance of climate change, the use of climate data to build a new economic cluster, and the desire to build the future Asheville. We need better and faster broadband connectivity to make Asheville 'Climate City.'"

VENTURE ASHEVILLE



Venture Asheville grows Asheville's startup community and connects high-growth entrepreneurs to talent, mentors and investors through unique programming and events. Progress is measured in terms of high-growth ventures created, seed and venture capital invested, and high-salary jobs generated. In 2015-2016, Venture Asheville's efforts resulted in 132 jobs filled, 90+ start-up events held, 13 start-ups funded, and \$600K+ invested.

Education

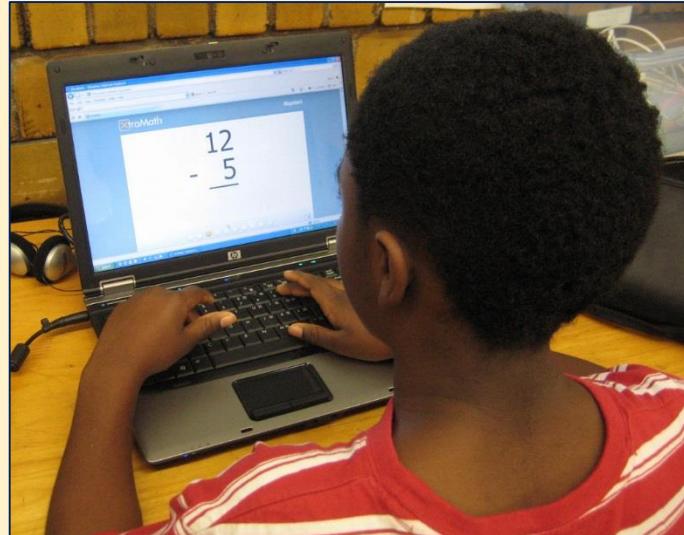
High-speed internet needed to boost learning

The digital age provides abundant opportunities to expand learning to times and places **beyond the classroom**, with access to **global knowledge and resources** available at the click of a mouse or the touch of a screen. To realize the full benefits of the digital age, young people need access to advanced broadband — high-speed internet that is always on and faster than traditional access — in order to maximize collaboration, creativity, and research. Current internet connections in schools and libraries are becoming increasingly inadequate to support **individualized technology-based learning** for all students. While nearly all of the country's schools and libraries are connected to the internet at a basic level, educational use of computers, tablets, mobile devices, and other online applications have increased the demand for **higher-performance broadband connectivity**. Nowhere is this need more profound than in our underserved, under-represented communities.

Colleges and universities offer a number of high-tech programs that would benefit greatly by advanced broadband (see table on the following page). In addition, three new high-tech high schools are in operation or are being planned for Western North Carolina: Buncombe County Schools' Martin Nesbitt Discovery Academy, Asheville City Schools' North Star Academy, and Henderson County Public Schools' Innovative High School.

Respondents to a survey distributed to colleges and universities in Western North Carolina indicated that advanced broadband would serve local educators and students in the following ways:

- Increased virtual enhancement for delivery of educational content



Dr. Tony Baldwin
Superintendent
Buncombe County
Schools

"Currently, we are completing the second phase of, ultimately, a four-phase project of one-to-one device implementation. A high percentage of students have been able to take the devices home, but the issue that we run into is there are students who do not have internet at home. Some students simply cannot afford it. This will become a direct connection to socioeconomic status."

- Streaming capabilities that would connect college campuses, connect students to one another, and increase access to learning resources**
- More collaboration with artists, scientists, statisticians, and other experts in remote areas**
- Expanded use of learning management systems for training and instruction**
- Heightened capabilities for students to access homework online, and to engage with metadata**

In addition, advanced broadband internet will serve education in Buncombe, Henderson, and Haywood counties by:

- Improving the effectiveness of instruction and enhancing learning outcomes through more engaging, interactive activities**
- Encouraging innovation in how education is delivered, including hybrid approaches to teaching**
- Allowing students to engage in activities – such as educational modules and “serious” gaming – that are targeted at refining or extending technical skills**
- Facilitating the collection and analysis of greater amounts of data to track student performance**

Key High-Tech Educational Programs/Initiatives in WNC	
One-on-one technology initiatives	<ul style="list-style-type: none"> Buncombe County Schools Asheville City Schools Henderson County Public Schools
Engineering-related Programs	<ul style="list-style-type: none"> Mechatronics programs offered jointly by UNC Asheville and NC State University, and a transfer pathway from Blue Ridge Community College Engineering program delivered at Western Carolina University's Biltmore Park Campus Engineering and Machining Technology at Asheville-Buncombe Technical Community College
Technology-based Programs	<ul style="list-style-type: none"> Computer Science at UNC Asheville Network Technology and Information Systems Security from Asheville-Buncombe Technical Community College Cyber Security at Montreat College
High-Tech High Schools	<ul style="list-style-type: none"> Buncombe County Martin Nesbitt Discovery Academy Asheville City North Star Academy Henderson County Innovative High School
Distance Learning	<ul style="list-style-type: none"> Ability to connect with international students Ability to do homework online Ability to store digital projects



"Substantial tech capabilities with speed and bandwidth will enhance our cyber-security program's ability to access various software and programs. ... I think access to high-speed broadband is the necessary means toward leadership."

Dr. Paul Maurer, President, Montreat College

Government

Broadband = Efficiency, public safety, better value

Future community services will demand higher- and higher-speed broadband. For example, new technologies will help electric and water utilities keep rates down for residents by spotting waste through what's called "smart grid" technology: the ability for utilities and consumers to track usage in real time. Hendersonville is among those leading the charge on development of "smart city" initiatives. The city plans to develop:

- "Smart parking" and traffic control systems in the downtown area
- Real-time tracking of the public bus system
- Expansion of "smart meters" for utilities and customer support
- "Mobile citizen engagement" applications to help drive public priorities
- Greater transparency and interactive use of "open data"

Hendersonville isn't alone. All six municipalities involved in the WNGN initiative are moving toward being "smart cities."

"The City of Hendersonville is growing in a region whose strengths are myriad. Providing robust broadband infrastructure builds on these strengths and will help our community continue to offer great public services while also serving as a key component of our continued economic success."



Barbara Volk
Mayor
City of Hendersonville



Esther Manheimer
Mayor
City of Asheville

"In order to maintain a strong economy, high-speed broadband is essential for residents and businesses alike. The City of Asheville is committed to being a partner to enable and enhance access to gigabit-speed broadband in the region."

Expected byproducts of "Smart City" implementation

- | | | |
|--|---|--|
| <ul style="list-style-type: none">• Increased citizen input and civic engagement• Reduction in carbon emissions, energy consumption | <ul style="list-style-type: none">• Reduction in crime• Improved financial forecasting• Better urban planning• Reduction in traffic jams | <ul style="list-style-type: none">• Attracting business investment |
|--|---|--|
- From "An Introduction to the Sunshine Coast Smart City Framework" – Cisco Systems, 2015



"Our first responders stake their safety daily on the ability of large amounts of information to be communicated immediately during difficult situations. High-speed broadband is essential for us to perform our jobs in the information age."



Scott Burnette
Fire Chief
City of Asheville

Our leaders recognize that a region's quality of life hinges, in part, on truly advanced broadband services being available. In the world of emergency services, the availability of fiber optic cable for county 911 and city firefighters means faster and more reliable emergency response in an area's neighborhoods. Old-style "station alerting" (the process of the 911 center notifying the appropriate station of an emergency) can take precious seconds and delay firefighter response. New-style fiber optic alert notifications take a fraction of a second.



Advanced Broadband a Prerequisite for 'Smart Cities'

A "smart city" collects, analyzes, and communicates data to enhance livability, workability, and sustainability. Information is collected through sensors and other devices. The captured data are communicated through wired or wireless networks. Then, the data are "crunched" to understand current situations, as well as to predict future occurrences. An extensive broadband network is a prerequisite to creating a "smart city" that is capable of providing better services for its residents. Various "value-added" services are identified as benefitting from improved technology infrastructure, data management strategies, and leadership. Area governments are moving toward using these services to improve the region. A few of the "smart city" value-added elements are described in the column to the right.

Energy
<ul style="list-style-type: none"> Smart electrical grid & energy planning Electronic metering of homes, businesses Strategies for renewable energy management
Safety and Security
<ul style="list-style-type: none"> Integrated operations centers Lighting efficiencies Public transportation route management Electronic security systems
Health
<ul style="list-style-type: none"> Telehealth monitoring in the home Telecare via video conferencing Mobile clinical assistance
Transportation
<ul style="list-style-type: none"> Supply chain and logistics management Private transportation optimization Parking

Information in this graphic from Smartcitiescouncil.com, 2017

It's common knowledge that high-speed internet is a must for high-quality teleconferencing, telemedicine, and distance learning, but it's not as well known that advanced broadband can add about 3% value to a home.

A 2015 study done by researchers at the University of Colorado and Carnegie Mellon University found that homes that have availability of neighborhood fiber-optic networks, plus access to high-speed internet, are valued at an average of 3.1% higher than similar homes without those amenities (see the graphic on Page 20).

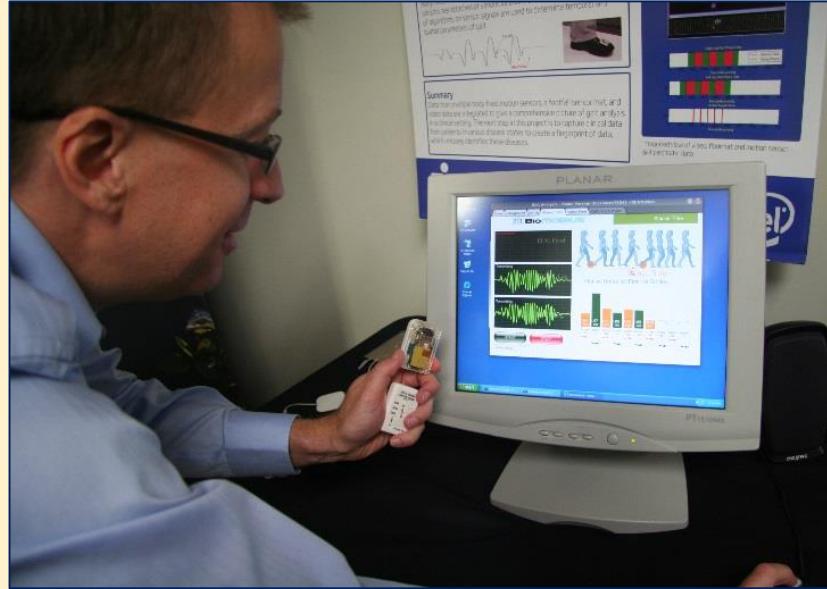
Healthcare

Advanced broadband will strengthen medical services

High-speed supplementation with extra connection will **strengthen and maintain services** that local hospitals need to reach patients and staff. Such supplementation will allow our hospitals to **expand access to and quality of healthcare and reduce cost**. The use of advanced communications technology to transmit medical data and imaging in real-time, while linking patients to providers for direct consultation, **removes geographical barriers and allows people to receive the medical care they need when and where it's needed**.

Local experts indicate that advanced broadband would benefit the healthcare industry in Western North Carolina in these ways:

- Real-time transmission of medical imagery enables the interpretation of MRI, ultrasound, X-rays, and other diagnostic procedures to be performed remotely.
- The number of patient transfers, such as from a nursing home to a doctor's office, or for expectant mothers seeking prenatal care from a distant hospital, can be significantly reduced through remote monitoring and online consultations that are only possible through a high-speed internet connection.
- High-speed internet allows physicians to connect with distant specialists for real-time guidance in emergency situations, potentially saving lives by eliminating the delay of long ambulance rides when seconds count, such as during a stroke or heart attack.



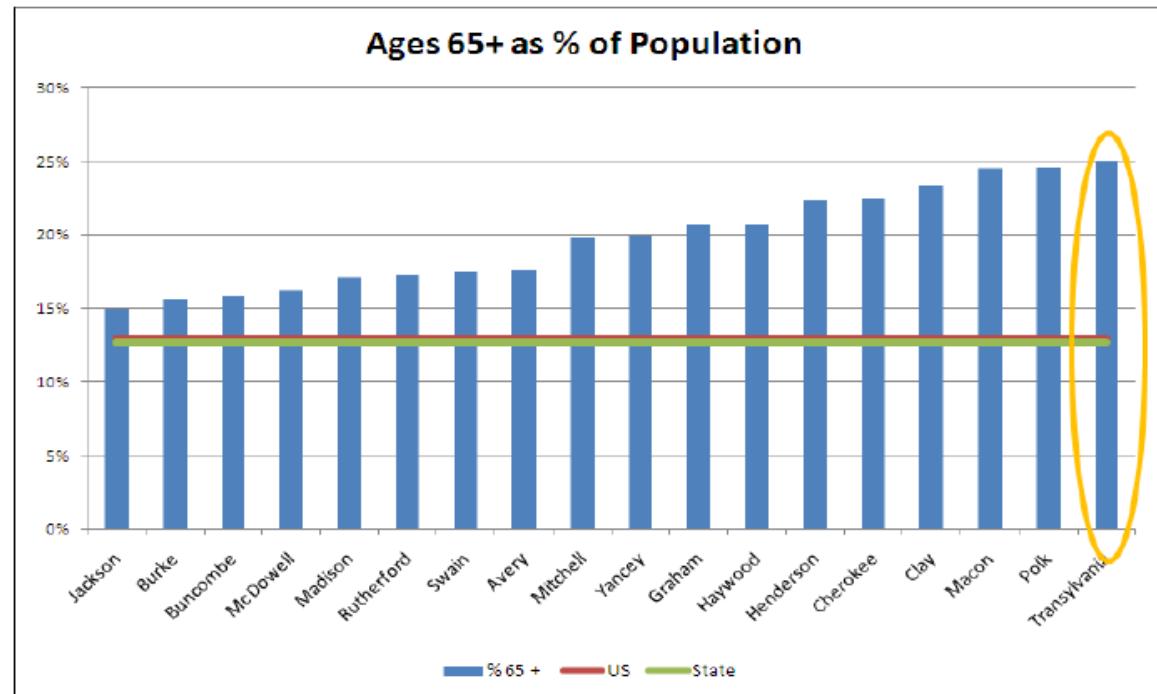
Jill Hoggard Green, Ph.D.
Chief Operating Officer
Mission Health

"Kaiser Permanente in California has been able to reduce their primary care visits by 40% through telehealth in Western North Carolina, we need our patients to have access in their homes."

Major Healthcare Providers in the Area

Charles George VA Medical Center	<ul style="list-style-type: none"> A 273-bed facility in Asheville that serves 38,500 veterans from 20 counties Rated by Veterans Affairs Administration as No. 1 VA facility for patient satisfaction in 2015 (SOURCE: Asheville Citizen-Times)
Haywood Regional Medical Center	<ul style="list-style-type: none"> A 146-bed facility in Haywood County that includes 133 doctors and 183 nurses Serves more than 25,000 patients annually in its emergency room (SOURCE: usnews.com)
Mission Health	<ul style="list-style-type: none"> Region's largest employer (13,000+ jobs), headquartered in Asheville Serves patients from 18 counties in Western North Carolina Licensed for more than 800 beds and bassinets Staff includes more than 540 physicians and 1,800 nurses (SOURCE: Mission Health)
Pardee Hospital	<ul style="list-style-type: none"> Located in Hendersonville, Pardee is licensed for 222 beds with 230+ physicians on staff Second-largest employer in Henderson County (SOURCE: Pardee Hospital)
Park Ridge Health	<ul style="list-style-type: none"> Hendersonville-based system includes more than 1,100 care givers and 223 physicians (SOURCE: Park Ridge Health) Third-largest employer in Henderson County (SOURCE: US Department of Commerce)

WNC healthcare providers serve aging population



Source: US Census Bureau

Image provided by Mission Health

Housing & Communities

Access will spur inclusion for many WNC residents

Currently, Asheville and its surrounding communities are facing an affordable housing crisis. Bowen National Research concluded in 2015 that just 1% of apartments and multi-family units were vacant in Asheville, and found significant gaps between the local housing supply and household income. In response, the City of Asheville has committed to increasing housing to meet the growth.

Local communities will work with high-speed internet providers to ensure access to advanced broadband technology. High-speed internet access in surrounding towns, multi-family housing units (public and private), and community retirement communities can aid in creating solutions that would make housing more affordable for citizens. Kansas City, Cleveland, and Seattle are examples of cities that are closing the digital divide through providing gigabit technology in public housing units.



Advantages of Advanced Broadband for WNC Housing	
Housing type	Benefit(s)
Public Multi-Sector Buildings	<ul style="list-style-type: none">• Greater efficiency in process to obtain public housing• Increases cost-effectiveness• Opportunities to close poverty gap
Surrounding Towns	<ul style="list-style-type: none">• Telecommuting opportunities increase
Retirement Communities	<ul style="list-style-type: none">• Increased efficiency in meeting healthcare needs• Greater access to family and community

Additionally, Western North Carolina is developing more and more multi-dwelling communities. Obtaining access to high-speed internet in these locations will be attractive to our workforce and residents, because it will provide more opportunities for telecommuting.

Asheville Retirement Community Cited for Broadband Success

Givens Gerber Park, an affordable senior housing community, was nominated for Property of the Month in July 2016 by *Broadband Community Magazine*. According to the community's technology director, residents' lives have been greatly enhanced through a fiber network that is shared by the property owner and a cable company.



"We're planning ahead and thinking about what will happen. Will residents need 3D video? Virtual reality? The medium that gives us most chance of success with these is fiber."

Ricky Foor,
Technology Director,
Givens Gerber Park

Better Broadband Boosts Home Value: Got Fiber?



The FTTH Council just released a study showing the positive correlation between home prices and fiber-delivered Internet, adding increased property value to the already long list of fiber's benefits.

Access to fiber adds **3.1%** to the value of a home.

The Fiber Effect

Access to fiber in your neighborhood raises the value of your home by

1.3%



The Speed Effect

Being able to get speeds up to one gigabit boosts the value another

1.8%

Put another way: that's an additional \$5,437 for the sample median home price or like adding

A full fireplace.



Half of a bathroom.



Or a quarter of a swimming pool!



Real Estate & Development

Advanced broadband will be catalyst for local boom

Asheville is a premier destination for tourists and families looking for opportunity. High property values accompany the beautiful views and unique vibe of Western North Carolina's growing population; therefore, future homeowners are looking for accessibility to fast and reliable internet. According to Isaac Chavez, CEO of Vermont Realtors, "internet is a must for those looking to buy a home." Residential broadband technology is becoming essential to our residents' connection with their employers and their children's educators.

The local population is more connected than ever before. In current real estate practice, many of the processes that connect buyer and seller are through online interfaces. Local real estate firms competing with national platforms (Trulia, Zillow, and Realtor.com) are at a disadvantage without affordable advanced broadband access. High-speed internet technology will help local firms through faster responsiveness and greater access to data.

With vacation and seasonal housing being of interest in the real estate market, people are looking for homes to get away from their "everyday life," but not from civilization entirely. People desire the beautiful, scenic views of Western North Carolina, while still maintaining their connection to work, family, and friends. A local billboard for a WNC development reads, "fiber optics and chickens," which speaks to our residents' desire to live in a



"Gigabit technology is very important to our community. Healthcare, education, and economic development will greatly benefit from this infrastructure investment. This is crucial if our community is to remain competitive in the global economy. We need this to educate, retain and attract a creative and entrepreneurial workforce



Jack Cecil
President and CEO
Biltmore Farms

that catalyzes the broader community's real estate and development activities."

Development Statistics

According to the Asheville Area Chamber of Commerce, in the Asheville region:

- Construction jobs rose 14% from 2013 to 2015.
- New housing units rose from 1,381 in 2014 to 1,950 in 2015. This was up from 1,001 units in 2011.
- Overall housing units rose from 211,000 in 2011 to 216,000 in 2014.
- House sales totaled \$540 million in 2011, and skyrocketed to \$1.2 billion in 2015.
- New developments include:
 - Four designated Asheville innovation districts
 - A new 12-story Mission Health tower
 - A 170,000-square-foot Health Sciences building at A-B Tech Community College

sustainable and connected community. As developers build in our area, they should have the opportunity to cultivate infrastructure that can facilitate this technology.

Advanced broadband would benefit real estate developers in the following ways:

- **Boosting values: Access to high-speed internet typically increases a home's value by 3%**
- **Aiding people who want to telecommute: 20% of all Americans work from home**
- **Making homes located outside of central Asheville more attractive to buyers**
- **Creating a competitive advantage for real estate companies**
- **Providing better access to educational opportunities**

Tourism

Service providers & visitors crave better access

Tourism is big business in Western North Carolina. This sector includes commerce generated by **hotels, entertainment, and restaurants**. According to the Asheville Convention & Visitors Bureau, 30,000 people visit Buncombe County every day, and they spend \$5.2 million daily. A large percentage of jobs (14%) within Buncombe County are supported by the tourism industry, and visitors spend \$1.7 billion annually, which generates \$2.6 billion in economic impact.

Advanced broadband will benefit the local tourism industry by:

- **Easing access to information about museums, hotels, restaurants, and events, which would improve consumers' knowledge about the area. Broadband-supported virtual reality will play a key role in the presentation of such information**, according to

Marla Tambellini, vice president of marketing and deputy director for Explore Asheville.

- Allowing conference speakers and attendees to simultaneously access internet during large meetings and presentations.
- Expanding marketing opportunities that allow hoteliers and other industry experts to **utilize state-of-the-art software programs that are instrumental for growing their business**.
- Improving the **quality of industry services**, particularly in the area of cloud-based software systems.
- Deepening the **bargaining power** of both the industry and the consumer.



Clockwise from top: The Biltmore Estate is owned and operated by the Biltmore Co., Main Street in Hendersonville during early autumn, a sign designating Waynesville as "Gateway to the Smokies."



Stephanie Brown
CEO, Explore Asheville

"Meetings mean business in Asheville and broadband is essential for successful group events. High-speed connectivity is a requirement for today's technology-intensive tourism industry, which generates revenue for local businesses and supports 27,000 jobs in Buncombe County."

The Tourism Landscape



- 417,000 passengers flew into or out of the Asheville airport in 2016, compared to 317,000 in 2012, an increase of 32%*.
- About 15% of all jobs in Buncombe County are tourism-related.
- Visitor spending was close to \$2 billion in 2016, up from about \$1.5 billion in 2011.
- Approximately 11 million people visited the area in 2016, up from 8.2 million in 2011.
- Hotel room demand is outpacing supply; therefore, several hotels are being built.
- Including indirect sales, tourism generated \$2.9 billion in 2016.
- Tourism supports about 27,000 jobs in the Asheville area.
- Tourism generated \$366 million in tax revenue in 2016.

All data from the Asheville Convention and Visitors Bureau, except for *, which was supplied by the US Bureau of Transportation Statistics.

Summary

In 2016, community leaders decided that our region needs advanced broadband coverage and service. They concluded that internet access, speed, and capacity are prerequisites for growth. **The internet is not only an essential part of a sound economy, it is also a vital component in the types of proactive social policy decisions that will lead to a sustainable, strategic, fiscally responsible and symbiotic future for our region.**

The WNGN initiative grew out of those conversations. Six municipalities have banded together and are eager to work with an innovative internet service provider (ISP) to help accelerate our future.

The WNGN cities want potential ISPs to consider the following:

1. Our region is home to a dynamic, diverse, and growing community that has awesome potential.
2. Entrepreneurial elements indicating future success are here and ready for expansion and development.
3. Increasingly, critical local economic sectors are relying on broadband services to be successful and have plans for future expansion of advanced broadband services.
4. A public/private partnership will be the appropriate model to help our cities meet their needs.
5. WNGN municipalities are willing to partner and help find ways to reduce bureaucratic roadblocks, access public resources, and market the partnership.

If you have any questions or comments, please let our WNGN team have an opportunity to respond. Questions related to the associated RFI should be addressed to Sherry McCuller (SMcCuller@Magellan-Advisors.com). General questions can be addressed to William Sederburg at wsederburg@gmail.com.

<p>WNGN Coordinating Committee</p> <ul style="list-style-type: none">• Dr. William Sederburg – Retired College President• Corey Atkins – Vice President of Public Policy, Asheville Area Chamber of Commerce• Dr. Otis Brown – Director, NC State University's North Carolina Institute for Climate Studies• Dr. Michael Dempsey – Dean & Director, Lenoir-Rhyne University, Center for Graduate Studies of Asheville• Hunter Goosmann – Executive Director and CEO of ERC Broadband/Board of Directors, North Carolina Technology Association• Justin Hembree – Executive Director, Land-of-Sky Regional Planning Council• Dr. Edward Katz – Associate Provost and Dean of University Programs, UNC Asheville	<p>WNGN Steering Committee</p> <ul style="list-style-type: none">• Erica Anderson – Director of Economic and Community Development, Land-of-Sky Regional Planning Council• Jonathan Feldman – CIO, City of Asheville• John Connet – City Manager, City of Hendersonville• Jon Feichter – Alderman, City of Waynesville• Jonathan Kanipe – Town Administrator, Town of Biltmore Forest• Alyson Alexander – Town Manager, Laurel Park• Mark Biberdorf – Town Manager, Town of Fletcher	<p>Special Thanks to These Community Leaders for Their Input</p> <ul style="list-style-type: none">• Dr. Tony Baldwin, Buncombe County Schools• Dr. David Brown, HUB Economic Community Development Alliance• Stephanie Brown, Explore Asheville• Scott Burnette, City of Asheville• Jack Cecil, Biltmore Farms• John Connet, City of Hendersonville• Josh Dorfman, Venture Asheville• Dr. Jill Hoggard Green, Mission Health• Esther Manheimer, City of Asheville• Dr. Paul Maurer, Montreat College• Mack Pearsall, HUB Economic Community Development Alliance/The Collider• Megan Robinson, The Collider• Marla Tambellini, Explore Asheville• Barbara Volk, City of Hendersonville
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Testimonials: What People Are Saying

These anonymous quotes are excerpts compiled from a survey that was distributed to about 1,000 business people in 2016. The quotes represent several of the economic sectors that are the backbone of Western North Carolina commerce.

“The better the access, the more flexible the future.”

“Involving patients in our care through a patient portal improves their engagement and their ability to understand their treatment plan. This improves compliance with their plan and, therefore, improves outcomes. Patients in broadband communities use internet-connected patient monitoring systems to feed data back to their providers, so problems can be detected earlier.”

“Everyone would love to live and build a business here, but without the infrastructure it won’t happen.”

“We manufacture, produce, and sell beer. Automation of the brewing process is occurring. Access to real-time connectedness via gigabit availability would enhance our processes, which are spread out in different locations.”

“The movement of data centers from current on-premises locations to remote hosted services such as AWS, Azure, and other cloud infrastructures would benefit greatly from improved connectivity.”

“Increased broadband would strengthen our ability to meet the growing needs of the community and would help us grow as an organization by keeping up with technology instead of being left behind.”

“Gigabit infrastructure is absolutely key to small businesses surviving, and more importantly ... thriving.”

“I am growing a national business and am considering moving due to the lack of internet solutions.”

“A lot of what my company does is directly tied to the internet. Some of my data can take hours to upload and the whole time my computer is locked down and dedicated to that single task.”

“We would like to offer load management incentives to our customers, which would save them money and save energy at peak times, if there were more customers who had access to broadband at home.”

“We are looking at solar projects, and real-time data of electrical usage would be instrumental.”

“Remote management of business technology is now standard, as well as work-from-home options.”

“Coupling research data with real-time controls is essential in many manufacturing applications.”

“We’re expanding into Europe, where the internet is much faster. We have to be faster to compete.”

“I am investing in technology for online ordering and our region has a weakness in that there are vast numbers of customers that cannot access our services.”

“We are a technical community college, so high-speed internet is integral for everything we do.”

“Increased use of real-time video interaction – connecting college campuses, connecting students to one another, connecting students to resources (such as financial aid or student services) – is so important.”

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