

Capturing the Promise:

A 10-Year Action Plan Using Broadband Internet to Increase North Carolina's Competitiveness and Sustainability in the Global Economy

January 2009



"To build an economy that can lead this future, we will begin to rebuild America...It means expanding broadband lines across America, so that a small business in a rural town can connect and compete with their counterparts anywhere in the world..."

President-elect Barack Obama

Jan. 8, 2009

"Today, we live in a digital world. Many of our most valuable assets are online, traded virtually. As a result, communities with broadband access grow employment at a significantly higher rate. And yet today, the United States, the country that developed the Internet, ranks 12th in broadband penetration and 15th in average broadband speed. This is unacceptable if we want our nation to compete in the 21st century.

I meet frequently with government leaders around the world, and they are considering exactly these kinds of smart investments. Forward-thinking nations, companies and communities will leverage this opportunity to completely rethink key infrastructure services. Will we? Will the United States make investments in our future whose impact is not just additive, but exponential?

Let's not fix a flawed past. Let's build a smarter future for our country."

IBM Chairman and CEO Sam Palmisano

Jan. 14, 2009

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Broadband Internet Access: Creating a More Competitive and Sustainable Future

The financial crises of late 2008 have once and for all established the reality that we exist in a global economy. Tremors in American markets have reverberated through the world's financial markets, generating seismic waves that are toppling pillars of the global banking community. The illusion that local communities could be buffered from the machinations of international markets is evaporating as well, with the workings of Wall Street causing working capital on Main Street to disappear. How are we to respond? In large part, the answer lies in technology, specifically, broadband Internet.

We live, work and learn in a time where technology is fueling an expanded definition of both community and competition. Increasingly, our community is no longer confined to a state or region. Our community is the world, where global markets depend on the real-time exchange of information. The old axioms "time is money" and "information is power" have been recast. Today, the Internet gives broader access to information, and broadband connectivity moves that information at greater speeds and in more sophisticated formats than ever before. In this global market, both power and money increasingly go to the nations, states, communities and individuals with the ability to connect with the most bandwidth.

Most societies and governments have long-recognized what it takes to develop a comprehensive and competitive economy – a business-friendly environment that has adequate infrastructure, a well-trained, healthy workforce, coupled with environmental and natural amenities, and an engaged and responsive local government. Broadband Internet supports all of these factors.

Another urgent factor shaping both public policy and economic development is our delicate environmental balance. Global warming is real, its potential consequences are dire and the need to act is pressing. Sustainability and green technology are gaining traction not only as critical considerations in economic and community planning efforts, but also in the ways that many people conduct their daily lives. Broadband Internet again emerges as a platform that can empower greener technologies and support more environmentally sustainable economies.

Can broadband Internet – this one infrastructure – really deliver on such grand promises? The answer is yes. And this is based on both rigorous academic research and anecdotal support from every economic sector in every nation. Economies can move forward with the promise of broadband, but with three important caveats.

- Broadband availability alone is insufficient – the transformative power of this technology can only be optimized when citizens are able to understand and use it in their personal and professional lives. Successful efforts to utilize broadband Internet for economic and community development must focus significant attention on both supply (infrastructure) and demand (human capacity).
- Broadband infrastructure is a technology that is evergreen, pushing bandwidth to faster speeds. As the technology evolves, bandwidth can capture more information over the faster network. This means that close attention must be paid to what technology is being utilized, in an effort to ensure adequate networks and bandwidth for community and economic goals.

- The scope, span and scale of changing applications requires the need for recurring infrastructure upgrades. It necessitates a constant focus on comprehensive and cross-cutting planning efforts to optimize the return on the required investment.

To this end, the e-NC Authority is working to assist and inform the N.C. General Assembly and the citizens and businesses of North Carolina about the role that broadband can have in creating a more competitive and healthy future for all North Carolinians. This report develops detailed recommendations for actions that will build on the significant progress already made in North Carolina's connectivity arena.

Over the past six months, the e-NC Authority has completed a comprehensive assessment of where things stand in terms of connectivity at the global, state, county and local level.

These studies include the June 2008 report, *Bigger Vision, Bolder Action, Brighter Future: Capturing the Promise of Broadband for North Carolina and America*, written by Jim Baller and Casey Lide of the Baller Herbst Law Group in Washington, D.C. The report is a global and national scan of where the United States stands in terms of broadband deployment, and includes current deployment trends and lessons-learned in North Carolina.

In addition to the Baller Herbst report, the e-NC Authority has recently released its annual study, *High-Speed Internet Access in North Carolina: A 100 County Report (2007 data)*, which examines the percentage of homes with the ability to access high-speed Internet in all North Carolina counties. In compliment to the 100 County Report, the e-NC Authority also has a Geographic Information System (GIS)-based Internet mapping application which enables online viewing of the location of available high-speed Internet access and other telecommunication services in North Carolina (upgraded at the end of 2008). Data displayed on this application was derived from e-NC's interpolation of data obtained from providers, census tract data, and cable and DSL service areas, and is intended to provide greater understanding of which areas of the state remain un-served and underserved.

Completed at the end of 2008 is a *Citizen Survey of Internet Access in North Carolina*, conducted by East Carolina University for the e-NC Authority. This survey compiled statistics from talking with a randomly selected group of persons in North Carolina, and asked them a series of questions about their purchase of home computers and Internet services, and the purposes for which they are using the Internet.

Finally, the e-NC Authority held eight statewide public meetings, *A Broadband Future: Your Community, Your Voice*, in September 2008. These meetings – broadband summits free and open to the public – were attended by more than 260 citizens, educators, service providers, business owners and state and local leaders. The purpose of the summits was to provide an educational forum about connectivity issues while also gathering input about what should be done to help increase the availability of high-speed Internet and/or broadband services.

This research and citizen input, as well as lessons-learned from the e-NC Authority in daily workings in the field, helped form the recommendations developed within this report. Using these many references, this report provides the following:

- Documentation of the impact that broadband is having on economic development at the national, state, community and individual level (derived from original and highly-credible secondary research).
- A short primer on broadband: what it is, how it is used, the difference in broadband and high-speed Internet service, how they are delivered, and convergence in the telecommunications industry as a preface for looking at deployment solutions.
- An assessment of progress to date and the current status of Internet infrastructure and broadband access in North Carolina (*annual 100 County Report and primary research conducted in the 4th ed. Citizen Survey*);
- A distillation of attitudes and opinions regarding the need for improved broadband access expressed by a diverse cross-section of North Carolinians, including community and business leaders from each of the seven regional economic development partnership regions (*Input from 8 Broadband Summits held across the state*).

The evidence presented in this report shows that North Carolinians, by and large, understand the need for greater telecommunications infrastructure and Internet access. Significant progress has been made, but there is more that needs to be done to ensure that all of the state's citizens and businesses are prepared to be fully engaged members of the digital global community.

The findings from these studies, along with e-NC's expertise and lessons learned from working daily on broadband issues facing the state, have been used to develop the principles, goals and recommendations for the state of North Carolina, located in the following section of this report.

The times are uncertain but our position in North Carolina is a good one. Forward-thinking investments, collaborative public-private partnerships and the involvement of concerned citizens from across the state have worked in concert over the past eight years to make substantial improvements in the status of Internet connectivity here. Recommendations developed in this report can be used to guide the state through these troubled times to a more competitive future. The costs of not taking action are too high – the time to act is now.

Goals

Broadband connectivity is a critical utility to every citizen of North Carolina. It is arguably just as important to the economic health of the state as are the more traditional public utilities such as telephone service, electricity and water and sewer lines. Through articulation of a proactive and progressive Internet Plan, North Carolina is asserting that its citizens and businesses, utilizing an information and communications technologies (ICT) platform, will be competitive in the global economy which is driven profoundly by technology. The following goals are recognized as critical to the realization of this vision:

Access: By 2012, broadband infrastructure of at least 5 Mbps symmetrical service will be available to all North Carolina households and businesses through deployment of a variety of technologies. Also by 2012, ubiquitous mobile telecommunication services for voice and high-speed data will be available throughout the state.

Bandwidth: By 2018, high-capacity broadband infrastructure of at least 100 Mbps symmetrical service will be universally available to homes and businesses. This is to ensure that North Carolina can compete and be a leader in the global, knowledge-based economy.

Applications: All North Carolina institutions, businesses, governments and parties that provide support to these entities should work to drive Web-based applications development and use – to ensure that unparalleled success in education, health care and economic development is achieved statewide.

Inclusion: North Carolina will assign special focus on the provision of affordable access to broadband infrastructure for citizens who meet requirements of the Lifeline and Link-Up programs, or a similar future program. Major efforts for public access sites and digital literacy programs will be continued. (*Lifeline and Link-Up are programs under a joint federal and state initiative to provide reduced rates to low income households for telephone installation and monthly subscription rates.*)

Funding: The state of North Carolina commits to identify creative and viable ways to fund these projects that are necessary for North Carolina to compete in the global economy. The goals included in this report can only be reached through securing a variety of funding solutions for these efforts. Funding solutions will be sought from state and federal appropriations, corporations and foundations. The state should examine selling general obligation bonds, providing tax incentives, and other solutions. The N.C. General Assembly will continue to support the activities of the e-NC Authority, the state authority mandated to increase connectivity across the state, through recurring appropriations.

Principles to Guide “Capturing the Promise of Broadband”

The following nine principles have emerged as best practices in the effort to ensure that all North Carolinians have access and the capacity to utilize broadband Internet to secure a better future. These principles should continue to guide the policies, programs and practices of the e-NC Authority and the State of North Carolina as they act to sustain progress already made.

Ubiquitous Broadband: The state of North Carolina must commit to ubiquitous broadband to enable the technology-based economic development that will create the sort of jobs and business opportunities necessary for North Carolina to be competitive in the global economy.

Inclusiveness: All populations, regardless of age or income, must have equal access to opportunities brought about by broadband Internet and ICT.

Commitment to Competitive Infrastructure: Currently-deployed infrastructure will only suffice for a short term. The state of North Carolina must support high-capacity deployment while understanding the need to utilize what is currently available. The need for provisioning of competitive broadband service should be met by the private sector. However, local governments should have the right to offer broadband services when the service available does not meet the needs of the local community.

Expansive Use of Broadband and Adaptability: Broadband demand can be driven by many different requirements. The market will accept and support innovative deployment options that are flexible in using various technologies. The technology that best equips the community to compete in a sustainable manner in a global marketplace will be given preference.

Cross-Sector Collaboration: Public, private and nonprofit organizations can work together with communities to bring about faster deployment of broadband infrastructure and adoption of high-value applications.

Digital Literacy: In order for broadband adoption to be a success in North Carolina’s economy, our citizen workforce, children, seniors and business owners must benefit from a strong educational effort about the use of new technologies and applications.

Leverage the Power of Youth: Young people are particularly potent change agents that should be enlisted to assist their local communities in moving toward adoption of computer technology and the Internet.

Grassroots Empowerment: Communities can and should organize themselves to ensure that broadband infrastructure is deployed for their citizens.

Constant Improvement through Accountability: A special focus should be made on rigorous metrics so that we can determine the most effective policies that will drive broadband deployment and adoption of services by citizens and businesses.

Data Collection: Complete, accurate, verifiable and timely coverage data from all telecommunications providers, and based on the FCC broadband tier definitions, is essential for determining North Carolina’s communities that need special attention to achieve broadband infrastructure goals.

Recommendations

The following recommendations specify the investments and actions that are needed to realize these goals.

1. Leadership

North Carolina must commit to a position of leadership at the forefront of states in all areas related to broadband-enabled, technology-based economic and community development. North Carolina must develop and implement innovative programs and policies that include the following:

- Maintain a strong focus on state-level leadership while also developing regional leadership on broadband development. A regional council on broadband deployment and use should be developed in each of the seven economic development partnership regions. The organizational structure of the councils still needs to be assessed to determine the most effective structure, but the goal of the councils would be to help citizens keep abreast of their region's capability to access electronic networks for learning, health care, economic development and government. The councils would also work on demand-building, applications and digital inclusion efforts.
- Commit to broadband. As part of its commitment to finding and implementing solutions for expanding broadband and ensuring North Carolina's competitiveness in the world, the state should recognize a permanent state entity to lead the effort of ensuring universal connectivity for the state. Specifically, the e-NC Authority should be transitioned to be a permanent state authority, its sunset date removed and a commitment should be made by the General Assembly of recurring state funds for its operations. In addition, the N.C. General Assembly should create a standing committee on high-speed broadband in the N.C. House and in the N.C. Senate. These committees would focus on addressing the unmet connectivity needs in un-served and underserved areas of the state, and on state broadband policy issues as a whole, to ensure North Carolina's competitiveness in the digital global economy.

2. Build out high-speed broadband infrastructure to all North Carolinians

North Carolina must work to see the successful build out of high-speed broadband infrastructure to all North Carolinians by committing to and carrying out the following actions:

- DSL and cable modem service (CMS) are considered transitional technologies. Existing connectivity programs must be continued, including connectivity grants to support DSL or CMS and wireless where no other high-speed option exists, until a new strategy to replace these technologies is developed.
- Continue to develop and support public Internet access sites, including libraries and community centers, for citizens who do not have a computer or Internet access at home. These sites are excellent training facilities for citizens. Some entrepreneurs starting small businesses use the public access sites as their initial e-strategy for business development.
- Create the N.C. Broadband Connectivity Services Fund to be administered by the e-NC Authority in order to incent infrastructure development and upgrades, as well as for programs around applications, demand-building and public access sites. Resources for this fund could come from a combination of the following:
 1. Issuing general obligation bonds, through an appropriate mechanism, for broadband deployment and digital literacy activities around the state.
 2. Appropriations from the N.C. General Assembly.

3. Funds from the federal government, corporations, foundations or other sources not currently identified.

3. Encourage proactive methods, policies and funding solutions

North Carolina will develop and implement best practices that will result in increased opportunities for build out of broadband infrastructure around the state, focused on both un-served and underserved areas. These methods could include one or more of the following:

- Incent all providers to continue to collaborate with the state to ensure the build-out of telecommunications service to un-served and underserved areas. Encourage all telecommunications service providers to provide timely and accurate data on availability of high-speed Internet and broadband service around the state, so that the e-NC Authority can carry out its legislative mandate of tracking access. This is to ensure that legislators can create informed and effective policies based on sound and verifiable information about actual telecommunications infrastructure that is available to households and businesses.
- Develop methods to provide access to state rights-of-way on a cost-recovery basis to providers to serve un-served and underserved areas. Examine the best way to share this access between providers and the state.
- Develop a model set of permitting standards that can be adapted by various levels of government and by providers when applicable. This would relate to utility rights-of-way issues, updating of easement regulations and recommendations on access to government and private sector co-location opportunities for providers in un-served and underserved areas. Providers, citizens, businesses and government should have representatives who are involved in the development of proposed permitting standards. Examine how state and local governments could grant access on government-owned properties for co-location facilities for wireless and wired providers in un-served and underserved areas of the North Carolina.
- Create public-private partnerships across North Carolina to upgrade infrastructure for wire line, cable and wireless providers. This would affect private, nonprofit, telephone cooperatives, wireless and satellite companies. These partnerships could be catalyzed with seed funds from the N.C. Broadband Connectivity Services Fund. These partnerships could include nonprofits, governments and private providers.
- Regulatory protection for telephone companies that have made the investment to deploy to rural portions of their service areas. These companies should have protection of their urban areas from competitors' "cherry-picking" in their most profitable areas, thereby reducing their funding to support the rural areas. For example, this would require companies who are exercising competitive access to also serve a comparable number of subscribers in the adjacent rural areas.
- In addition, by 2010, a scan of what is happening in other states as far as opening up service areas should be undertaken to examine the varying regulations between carriers, and ways to ensure equal standards for competition among providers.
- Recommend that all new or revitalized housing developments or building re-use facilities include broadband communications facilities access to all residents or buildings, in the building permits and in the N.C. building codes.
- A report on pole attachment issues to focus on access to poles and cost to locate on poles should be completed by Dec. 31, 2009.
- The state should require that all grants given for water and sewer and energy projects address the issue of adding conduit for telecommunications channels at the same time

so fiber optics could be blown through at the appropriate time. Develop guidelines for a bidding process for providers who wish to have access to the conduit.

- Develop an ad hoc Provider-Business / Government-Nonprofit roundtable to develop strategies for the N.C. Broadband Connectivity Services Fund. It is recommended that the e-NC Authority staff this initiative. Membership could include for-profit, non-profit and governmental organizations focused on technology and broadband in North Carolina. An initial topic for this group would be to look at how to use public and private resources to encourage development of open-access telecommunications infrastructure that can be shared by multiple service providers.
- Build capacity of state and local leaders, as well as professionals in the public sector, on policy and legal issues around telecommunications. Encourage law schools to prepare graduates to adequately address 21st century telecommunications and information services issues.

4. Enhance the capacity of citizens and businesses in North Carolina to utilize the programs, applications and resources available through broadband Internet

- All educational organizations in North Carolina as well as nonprofits should work to encourage digital literacy – the use and adoption of information and communication technologies (ICT) within their organizations.
- Funds to assist economically challenged North Carolinians obtain Internet access devices and high-speed access need to be made available through programs that provide subsidized basic telephone service and/or computer purchases, such as Lifeline/Link-Up. Support for public access centers should be continued while new centers are developed in areas where there are pockets of citizens with a preponderance of households with low per capita incomes.
- All businesses, institutions and governments should recommit their efforts to utilize the productivity enhancements of the use of ICT. All of these organizations should assist their constituents to learn to use the Internet for such productivity enhancements. Civic organizations should make this a priority in their yearly goals.
- Encourage existing and developing legislation that supports increasing the percentage of the North Carolina workforce (both state employees and others) that is able to telecommute from home. Telecommuting can result in additional productivity for the worker while supporting a greener environment and also providing a cost reduction for the commuting employee and the business.
- Encourage existing and developing legislation geared towards implementing a program to enable all North Carolina citizens to obtain a digital signature. Support the pilot program on digital signatures that is currently being conducted by the State of North Carolina through the Alcoholic Beverage Control (ABC) Commission and other state agencies.

5. Encourage the development, implementation and statewide availability and support for value-adding applications

- Reinforce the state of North Carolina's use of GIS-based mapping programs for state infrastructure and economic development, as a critical tool for statewide and local planning and development efforts.
- Ensure the statewide build-out of sector-specific networks that produce economic and public gains for a greater quality of life. A non-comprehensive list of such applications initiatives includes the N.C. School Connectivity Initiative, the nascent North Carolina

Telehealth Network, N.C. Live, the N.C. Virtual Public School and the NC e-Learning Portal.

- Strongly support the continued excellence of the North Carolina Research and Education Network (NCREN).
- Provide longer-term support for the state network managed by the North Carolina Office of Information Technology Services (ITS) in the Office of the Governor so that it can take advantage of purchasing procedures utilized by the private sector business networks that would inure to the economic benefit of the State's networks.
- Require that any communications networks with state funding participate in a network council to make certain that coordination of network performance and operations prevent duplication and overlap wherever permitted by regulatory agencies. To prevent any ownership of the council, the leadership of the group should rotate.

Documenting the Economic Impact of Broadband

The impact of Internet access on every level of the economy has been shown to positively affect growth and performance in ways that are significant and comprehensive. Implementation of broadband technologies and the applications it delivers amplify this positive impact in ways that are real and measurable.

Overall Return on Investment: The U.S. Bureau of Economic Analysis estimates that every dollar invested in broadband returns another \$3 to the economyⁱ. Conversely, the failure to make necessary investments in broadband is projected to reduce productivity one percent per year or more.ⁱⁱ A direct and controlled examination that matched 200 communities nationwide with and without broadband over five years found that the connected communities outperformed those lacking broadband as follows:ⁱⁱⁱ

- Comparative advantage in employment growth in broadband connected communities: 1-1.4 percent
- Increase in the number of firms: 0.5-1.2 percent
- Increase in property values: 6 percent
- More competitive workforce (increase in number employed in IT-intensive sectors): 0.2-0.6 percent

Regional Economic Growth: Lake County, Fla. experienced 100 percent greater economic growth (measured as retail sales per capita) than comparable cities in Florida after it made its extensive municipal network available to local businesses and municipal institutions.^{iv}

Direct Contributions to Productivity: Broadband accounted for almost 20 percent of the gain in productivity between 1998 and 2002.

Increased Employment: A 1 percent increase in states' broadband penetration results in 0.2-0.3 percent increase in employment.^v In North Carolina increased broadband penetration could deliver between 9,100 and 12,700 additional jobs.

Business Recruitment and Retention: A survey of site selectors reveals that broadband is an expected asset, not a competitive advantage. Firms demand direct fiber connection, redundant and reliable networks and quality technical support.

Growth in Personal Income: The effect of high-speed Internet access on business is projected to translate into a \$1,000 to \$1,500 increase in per capita income.^{vi}

Reduced Health Care Costs: Electronic health monitoring and teleconsults can result in a dramatic 20 percent cost reduction and make more efficient use of scarce professional resources in under-served communities^{vii}.

Positive Impact on the Environment: Increased utilization of broadband via telecommuting supports many potential green solutions for the state and country. Workers that telecommute are already reducing the amount of office space needed by an estimated 12 percent. This delivers considerable environmental benefits, as construction, including heating and electricity, is estimated to account for up to 50 percent of CO₂ emissions.^{viii}

These results have clear implications for policy makers in North Carolina who must recognize that broadband needs to be a critical component of the state's economic development strategies and investments.

Broadband Primer

Bigger Vision, Bolder Action, Brighter Future: Capturing the Promise of Broadband for North Carolina and America

For an in-depth look at broadband issues, a good source is the report released by the e-NC Authority in June 2008, *Bigger Vision, Bolder Action, Brighter Future: Capturing the Promise of Broadband for North Carolina and America*, by the Baller Herbst Law Group. This report explains the basics of what broadband is and looks at its countless benefits in relation to:

- economic development
- education
- public safety and homeland security
- health care
- telework
- environmental sustainability
- urban revitalization
- government services
- senior citizens
- disabled persons
- young people
- entertainment

This nationally-recognized report cites studies and case histories looking at the benefits of broadband access. It also examines where the United States stands in relation to other countries in terms of broadband build-out and use, demonstrating that we are falling behind other countries and must make the reality of a national broadband strategy a top priority. The report looks at deployment efforts abroad and within the U.S. from top service providers. The report also discusses the challenges of pinpointing where broadband or high-speed access exists in the country and within each state, and who is subscribing. The work of the e-NC Authority is examined closely. Finally, the report explores the issue of how much bandwidth capacity is enough and makes recommendations. The Baller Herbst report provides global and national context for where we are with broadband today, and what it means to the world's future. The full Baller Herbst report is available at:

http://www.e-nc.org/Baller-Herbst_Report.asp.

What is Broadband? Broadband Versus High-Speed Internet

Broadband Internet is service that uses high-capacity bandwidth, so that large amounts of data can be transmitted and received quickly. The highest-capacity bandwidth technology currently used is fiber optic lines. High-speed Internet service generally refers to speeds that are faster than dial-up Internet service, but with less bandwidth than true broadband.

The Federal Communications Commission (FCC) sets the definitions for broadband and high-speed Internet in terms of speeds of service. Prior to 2008, the FCC used the term *high-speed Internet* as service that provides the subscriber with transmission at a speed in excess of 200 kilobits per second (kbps) in at least one direction. Symmetrical bandwidth means that a subscriber can upload data (send it out) at the same speed at which it can be downloaded (received) from the Internet. Asymmetrical bandwidth means that the transmission speed in one direction (usually the download speed) is higher than the other direction (usually the upload speed). In viewing the Internet as a communications tool, two-way communication is a

necessity. This means that symmetrical bandwidth is critical so that uploading and downloading data are equally accessible at reasonable speeds.

In March of 2008, an FCC order developed speed tiers to define *broadband* services. This order requires service providers to report their upload and download speeds in a new tier system. The system outlines seven tiers of service – from the basic tier starting at 768 kbps, to tier seven with greater than 100 Megabits per second (Mbps).

FCC's New Speed Tiers	
1 st Generation Data	200 to 768 kbps
Basic Broadband Tier 1	768 kbps to 1.5 Mbps
Broadband Tier 2	1.5 to 3 Mbps
Broadband Tier 3	3 to 6 Mbps
Broadband Tier 4	6 to 10 Mbps
Broadband Tier 5	10 to 25 Mbps
Broadband Tier 6	25 to 100 Mbps
Broadband Tier 7	Greater than 100 Mbps

Source: FCC Wireless Competition Bureau

The March 2008 order, in requiring upload and download speed information, begins to address the issue of the need for symmetrical bandwidth. The higher speed tiers will also begin to address the question of how much bandwidth is needed to reasonably transmit the amount of uploaded and downloaded data from the Internet today. The question for local, state and national leaders is – how much bandwidth is needed to make use of the Internet platform in a way that makes our communities competitive in the global economy? The amount of bandwidth needed for an Internet user depends on what applications are needed. One state, California, has pledged to ensure universal high-capacity broadband, based on a recognized need for access to various applications deemed necessary to remain competitive as a state. These applications and their associated bandwidth requirements, as compiled by the California Broadband Task Force, are listed here.

<u>Upstream and Downstream Speed Range</u>	<u>Applications</u>
<u>500 kbps – 1 Mbps</u>	Voice over Internet Protocol (VOIP) SMS Basic e-mail Web browsing (simple sites) Streaming music (caching) Low quality video (highly compressed)
<u>1 – 5 Mbps</u>	Web browsing (complex sites) e-mail (larger size attachments) Remote surveillance IPTV-SD (1-3 channels) File sharing (small/medium) Telecommuting (ordinary) Digital broadcast video (1 channel) Streaming music
<u>5 – 10 Mbps</u>	Telecommuting (converged services) File sharing (large) IPTV-SD multiple channels) Switched digital video Video-on-Demand SD Broadcast SD video Video streaming (2-3 channels) HD video downloading Low definition telepresence gaming Medical file sharing (basic) Remote diagnosis (basic) Remote education Building control & management Telemedicine
<u>10 – 100 Mbps</u>	Educational services Broadcast video SD and some HD IPTV-HD Gaming (complex) Telecommuting (high quality video) High quality telepresence HD surveillance Smart/intelligent building control
<u>100 Mbps - 1 Gigabit per second (Gbps)</u>	HD telemedicine Multiple educational services Broadcast video full HD Full IPTV channel support Video-on-Demand HD Gaming (immersion) Remote server services for telecommuting

<u>1 – 10 Gbps</u>	Research applications Telepresence using uncompressed high-definition video streams Live event digital cinema streaming Telemedicine remote control of scientific/medical instruments Interactive remote visualization & virtual reality Movement of terabyte datasets Remote supercomputing
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Source: California Broadband Task Force

What Are the Technologies that Deliver Broadband or High-Speed Internet Access?

To consider the bandwidth capacities that are needed for various applications and to determine how more connectivity can be delivered to consumers and at what speeds, it is necessary to understand the basic technologies that provide access to broadband or high-speed Internet. A thorough explanation of these technologies can be found in Appendix 1. These include:

- Cable Modem Service (CMS)
- Digital Subscriber Line (DSL)
- Fiber Optics
- PCS (Personal Communications Service)/Mobile
- Wireless – Unlicensed and Licensed
- Satellite

Who Are the Telecommunications Service Providers in North Carolina?

To determine how telecommunications infrastructure can be deployed and delivered, especially to un-served areas, it is necessary to examine who the last mile service providers are in North Carolina. Internet access is provided by the following types of companies in the state. A thorough explanation of these types of service providers can be found in Appendix 2.

- Incumbent Local Exchange Carriers (ILECs)
- Competitive Local Exchange Carriers (CLECs)
- Independent Telephone Companies
- Telephone Cooperatives
- Cable Companies
- Wireless Companies – Unlicensed and Licensed
- Satellite Companies
- Municipal Companies

Convergence in the Telecommunications Industry

Providers in the telecommunications industry – and indeed, the services themselves – are experiencing a convergence of the voice, video and data fields. Traditionally, telephone providers have provided voice service and cable television providers have provided cable television, or video service. With the addition over the past decade of Internet (or data) service and cell phone service, there has been a convergence of service offerings within the industry as companies strive to compete in all these markets.

Many phone companies, in addition to landline voice service, are up-fitting their lines to offer data through the Internet. Some are beginning to offer video service through Internet Protocol Television (IPTV) as well. Cable companies are beginning to provide voice services through

digital phone service which runs over the up-fitted cable lines, as well as data, or high-speed Internet service. Both cable and landline phone companies are partnering with cell phone companies to compete in this market as well. Some telephone companies are partnering with satellite television companies to enable them to move into video offerings. Both telephone companies and cable providers are migrating to an Internet Protocol (IP) platform which allows them to offer multiple services.

As providers move to offer multiple services, including voice, data and video, (also known as triple play), one concern is that finite construction budgets focused on growing these bundled services in areas of high customer density may result in less investment in sparsely-populated rural areas, many of which are still waiting for basic high-speed Internet service.

Understanding of the situation is further confounded by the different governmental regulations that affect individual voice, video and data services. The Federal Communications Commission (FCC) oversees all interstate telecommunications and voice service is regulated at the state level by the N.C. Utilities Commission. Video service falls under the state video franchising act, passed in 2006, although many local-level agreements that predated 2006 have not yet expired. The provisioning of data, or high-speed Internet service, is not regulated at the state level. In seeking to deploy more broadband or high-speed Internet service, especially to un-served areas of the state, it is necessary to understand these different mandates under which the different categories of providers operate.

Where Are We Now in Terms of Connectivity?

Data Collection and Mapping

Under its enabling legislation (Session Law 2003-425), the e-NC Authority serves as the Internet access policy planning body in North Carolina for rural and urban-distressed areas, and is mandated by the state to maintain a Web site showing the availability of telecommunications infrastructure. In order to make policy recommendations and to target unserved and underserved areas of the state, it is critical to be able to pinpoint what service is available and where. The e-NC Authority works closely with the telecommunications service providers to track availability of high-speed Internet services throughout the state.

On an annual basis, data about service areas is solicited by the e-NC Authority and compiled in a document that reports the percentage of households in each of the state's 100 counties that have the ability to access a high-speed Internet connection through DSL or cable modem service (CMS), or the composite percentage of these services. Service percentages presented are derived from the e-NC Authority's analysis and interpolation of data from providers, census tract data, and externally identified cable and DSL service areas. Composite percentages are not averages of providers' percentages, and are affected by overlapping service areas, population and housing reporting data, geographical variations and other variables.

The coverage information collected is also used to update the e-NC Authority's **Geographic Information System (GIS)**, <http://www.e-nc.org/gis.asp>. This online interactive mapping program allows users to focus in on a specific area to see a variety of telecommunications infrastructure, along with over 30 data layers mapping resources such as roads, schools, airports, and public Internet access sites.

Data collection is only the first step in addressing the challenge of increasing high-speed Internet and broadband service for a region. Many states have found data collection to be very difficult, making it a key national issue in terms of looking at how to map the country as part of launching additional broadband deployment initiatives. The e-NC Authority developed the first data collection and online mapping program of its kind in 2001 and 2002. Unfortunately, many states do not have the capacity to perform their own data collection and mapping efforts.

The e-NC Authority has found that key factors in a successful data collection process are strong relationships and cooperation with the telecommunications service providers, and the ability to utilize proprietary data to perform independent connectivity status analysis. The e-NC Authority works to compile and extrapolate information that can be used to inform citizens and state leaders on the status of availability of needed infrastructure without compromising the proprietary competitive information supplied by providers. While on-the-ground independent surveys may also be conducted and may be useful for verifying information, the inescapable reality is that much of the data is only available through the providers. The e-NC Authority works with providers, then performs its own analysis in combination with the provider data to obtain the most accurate and verifiable data picture for the state possible under the existing information constraints. By keeping this assessment ability in-state, the state maintains an important capacity to independently monitor infrastructure that is critical to North Carolina's economic future.

High-Speed Internet Access in North Carolina: A 100 County Report

The e-NC Authority's most recent annual report on the availability of high-speed Internet service to households and businesses across the state was completed in November 2008 (using 2007 data). This report found that as of December 2007, 83.33 percent of North Carolina households have CMS or DSL service available to them, meaning almost 600,000 households in North Carolina do not have any form of high-speed Internet service available to them. In December 2006, that figure was 83.54 percent of households – representing a small decrease in statewide access over the period of one year. In 2002, when the e-NC Authority began tracking data about telecommunications access, just 74.88 percent of households had access to CMS or DSL service. Connectivity data for each of the state's 100 counties as of December 2007 is provided in Appendix 3, while Appendix 4 depicts this data in statewide map format. The full report is available at: <http://www.e-nc.org/100CountyReport.asp>.

To assess the availability of high-speed Internet access in North Carolina, the e-NC Authority collects data from cable, telephone, and wireless companies, as explained above. Percentages of coverage for each service type are developed by county, wire centers and individual communities when possible. The composite rating expressed in this data is the percentage of households that have the ability to access CMS, DSL, or both. In locations where more than one type of service is available the reported figure reflects the type of service that is reaching the greatest number of households.

Wireless coverage is more difficult to assess and is not included in the connectivity percentages, but wireless providers are listed in the county descriptions for individual counties in the body of the 100 County Report and some coverage areas are included in the GIS-mapping program. The e-NC Authority is working to collect more information on wireless coverage, including PCS/mobile coverage, to include in its GIS-mapping program. Satellite coverage figures are not tracked due to the current nature of satellite: that it is technically available to anyone with a view of the southern sky, but the speeds available generally do not meet the definition of broadband access, particularly as it relates to providing symmetrical deployment and upload of data speeds.

Data trends show that build out to rural areas is leveling off, despite advances made through connectivity incentive grant programs and recent population bursts in some areas of the state where density had been relatively low. Confounding issues and trends that account for the apparently static state of progress in moving connectivity forward in North Carolina may include the following:

- The overall number of access lines in the state is dropping. This trend is due in part to many consumers dropping second phone lines, which were often purchased to provide a separate line for dial-up Internet access. Consumers that now have DSL or CMS would often no longer need this second phone line. Similarly, many consumers are opting to only maintain cellular telephone service, instead of also having a traditional landline. (It is important to note that access to the Internet through cellular phones will not provide the dynamic broadband speeds provided that the consumer receives when the data runs over land lines, or licensed wireless with a fixed base fiber transport.)
- Budget priorities for telecommunications providers are shifting to investments that support the delivery of convergent voice, data and video products and services, and away from building out data service to less profitable, un-served rural and distressed areas.

- Consolidation within the telecommunications industry makes it even more difficult for un-served communities to gain attention of geographically-removed corporations.

From the research that the e-NC Authority conducted in 2008, the following is noted:

1. Access lines *are* dropping around the state.
2. There will not be adequate investment committed by the major telecommunications providers in extending broadband to rural and underserved distressed communities.
3. Policy changes and incentive funding is required to ensure that underserved areas obtain the broadband connectivity that is needed to support sustainable community and economic growth in these areas.
4. Vigilant oversight and monitoring of the situation is required to accurately direct public investment to leverage necessary statewide connectivity.

These beliefs underscore the critical need for accurate data from the providers that is used to identify communities in the state that do not have adequate Internet access. While there have been some inconsistencies in the data supplied by some providers, the e-NC Authority believes that this data still has value and needs to be made available to the e-NC Authority to support efforts to fulfill its mandate to proactively monitor the status of broadband access in North Carolina. As explained above, provider data is an important component of an access assessment methodology that combines data from the service providers with other externally validated data sources, as well as direct access status reports from citizens and businesses and expert knowledge supplied by the technical staff of the e-NC Authority.

Rural Versus Urban vs. Urban-Distressed

The e-NC Authority has a legislative mandate to focus on rural and urban-distressed areas of the state, with the reasoning that urban areas have the population density to attract adequate high-speed Internet service options. While the e-NC Authority does focus on the un-served and underserved areas of the state, some broadband issues impact the whole state, especially in terms of demand-building, digital literacy training needs and overall digital inclusion. In addition, some policy issues around speed or quality of service may relate to urban areas as well.

In 2005 the e-NC Authority conducted a study on High-Speed Internet Connectivity in North Carolina's Urban-Distressed Areas. (For a copy of the report, go to: http://www.e-nc.org/pdf/distressed_urban.pdf.) In general, while supply issues concerning the availability of infrastructure are definitely more of a challenge in rural or low population density areas, the study found that there are still supply challenges in urban-distressed areas as well. In addition, rural areas of urban counties are often underserved. The e-NC Authority hears regularly from citizens all over the state in the form of service inquires around the lack of availability of high-speed Internet service.

In addition to supply side challenges, digital inclusion remains a serious impediment to communities and individuals in urban-distressed areas, as well as rural areas, and throughout the state. Addressing the issues of affordability and digital literacy remain as critical to North Carolina's citizens and businesses as availability. In evaluating where the state stands in terms of connectivity, it is important to remember that both the supply and demand-sides are

equally important. These ideas are discussed further in the Citizen Survey section of this report and in the discussion from the Broadband Summits.

Key Findings From the Grassroots Level

Citizen Survey:

Tracking Home Computers and Internet Access in North Carolina, 1999 to 2008

To quote Professor Kenneth Wilson, “In less than a decade (eight years, to be exact), North Carolina has been transformed from a place where most people use the Internet but only the elite have it in their homes to a place where almost everyone uses the Internet and most people have it in their homes.” The 2008 Citizen Survey finds that 70 percent of all North Carolina households have Internet access at home. The data also demonstrates that 91 percent of the households that have computers also have Internet access.

How did this happen? Since 2001, the e-NC Authority has worked with partners from the private sector and the state and local public sector to ensure that as many North Carolina households and businesses as possible – in all regions and at all levels of income – have the technologies, infrastructure and skills needed to go online. Programs such as e-Communities, digital literacy projects, public access centers, TechForce and the e-NC Business and Technology Telecenters have been the battleground to make this happen – spreading knowledge and transforming lives. There is, however, still a great deal to do with 20 percent of North Carolina citizens yet to have access to the 21st century global economy from their households and local businesses.

To monitor progress, the e-NC Authority actively tracks the deployment of information infrastructure across the state. This regular status update highlights for both providers and citizens the remaining gaps and inadequacies in broadband infrastructure. As part of this monitoring effort, the e-NC Authority has tracked changes in Internet connectivity, deployment efforts, computer technology usage and digital literacy. This monitoring involved statistically valid surveys that were conducted by East Carolina University Prof. Kenneth Wilson in 1999, 2002, 2004, and 2008. Study data is drawn from extensive household telephone surveys (including some cell phone surveys in 2008). Key findings of the October 2008 survey include the following:

- North Carolinians are using the Internet in record numbers, although at average speeds that do not meet broadband standards.
- Non-metro home Internet users are continuing to switch to broadband at a pace that exceeds the national trend.
- Infrastructure and services continue to expand and improve, although access is still not ubiquitous.
- Insufficient income and basic digital literacy are the chief remaining barriers to the widest Internet adoption and use.
- Almost all households that include children, regardless of income level, have computers.

In September 2008, 80 percent of North Carolina households had computers, a 57 percent increase over 1999. Over this same time period, the adoption rate of Internet access has increased over 94 percent, growing from 36 percent of homes utilizing the Internet in 1993 to 70 percent today. In addition, in 1999, 62 percent of adults in North Carolina reported that they “used the Internet anywhere,” such as at home, work or a public access site. Today, that figure is 82 percent.

Inadequate rural access is a challenge to achieving universal digital literacy, a problem that is exacerbated by the relatively higher incidence of low incomes in rural communities. The Pew Internet & American Life Project, Home Broadband Adoption 2008, notes that nationwide, 25 percent of those earning less than \$20,000 per year subscribe to broadband, compared to 60 percent of middle-class Americans who earn \$40,000 to 50,000 per year ^{ix}. Adoption in North Carolina is greater at every income level, with 49 percent of North Carolinians in the same lowest income bracket and 79 percent in the same middle bracket having Internet access in their homes. Since 2004, North Carolina's poorest families have made great strides in connectivity – families with incomes under \$15,000 have doubled their home computer ownership from 31 percent to 65 percent, while Internet access increased from 25 percent to 49 percent. Still, this means that 50 percent of the families at the lowest income levels have no Internet access.

The proportion of citizens using municipal and county government Web sites is about the same in urban and rural areas of North Carolina. The study reveals that most citizens recognize the Internet as important in maintaining a decent standard of living. Most citizens believe that young children must master these skills to operate in a 21st century environment. The research in this iteration of the citizen survey indicates that people strongly support state subsidies to ensure available Internet access for both homes and businesses. However, they remain concerned about threats to privacy and indicate that the availability of obscene material must be vigilantly monitored.

For a copy of the executive summary of this study, Tracking Home Computers and Internet Access in North Carolina, 1999 to 2008, go to: http://www.e-nc.org/citizen_survey.asp.

Broadband Summits: A Broadband Future; Your Community, Your Voice

In September 2008, with the support of House Resolution 2411, the e-NC Authority held eight public meetings – summits about the importance of broadband – across the state. The summits were attended by more than 260 citizens, educators, service providers, business owners and state and local leaders. The purpose of the summits was two-fold. One goal was to provide an educational forum for participants to learn about current connectivity levels in North Carolina, the technical and policy issues that are involved in telecommunications deployment, and how telecommunications can provide solutions to many of the major challenges faced by communities: job creation, health care, education (and in particular timely workforce re-education for laid off workers and training for new industries), and solutions for aging/declining populations. The second goal of the summits was to receive input from participants on what should be done to help increase the availability of high-speed Internet and/or broadband services, and how to address issues around digital inclusion. The summits were held in the following locations:

- Yanceyville, Caswell County – Thursday, Sept. 4
- Elizabeth City, Pasquotank County – Friday, Sept. 5
- Tarboro, Edgecombe County – Monday, Sept. 8
- Elizabethtown, Bladen County – Tuesday, Sept. 9
- Charlotte, Mecklenburg County – Monday, Sept. 15
- Cullowhee, Jackson County – Tuesday, Sept. 16
- Sparta, Alleghany County – Monday, Sept. 22
- Pittsboro, Chatham County – Tuesday, Sept. 23

Overwhelmingly, the key message received at the summits was that many citizens and small businesses in North Carolina still have *no* high-speed Internet service available to them. With the exception of satellite service, which has limited capacity and reliability, many rural communities are limited to antiquated dial-up service. The resounding call from summit participants was demand for faster and more reliable telecommunications services!

Many citizens and small business owners in attendance stressed the fact that they still only have access to Internet via dial-up, despite the availability of high-speed Internet service within neighboring parts of their communities. These participants expressed great frustration in not having this service available to them, and felt strongly that they had been forgotten by state government and telecommunications providers. (In the e-NC Authority's 2008 Citizen Survey, 25 percent of respondents noted that they have broadband service, as compared to high-speed Internet or dial-up.)

Throughout the summits, citizens iterated that they consider connectivity to be a utility – an essential public infrastructure on the same level of importance as electricity, telephone service and water and sewer lines. Included in this concept was the idea that Internet access should be available to all citizens because having the service is a necessity in today's world, whether you live in a large metropolitan area, on the rural outskirts of a city or town, or in a sparsely-populated corner of rural North Carolina. They urged the e-NC Authority to look at models that have brought telephone access and electricity to the rural parts of the state, and felt that the state should commit to a similar push for high-speed Internet and broadband access.

All participants agreed that broadband is critical to their communities, that more access is needed, and that this access impacts all aspects of the community. The top areas that summit participants cited as needing better access were:

- Access for small businesses to enhance their current work but also to grow their capacities and become more competitive
- Home access for citizens, which would allow for telecommuting, building a new business out of their home or taking online classes and learning new professional skills
- Home access for school-aged children, which would enhance educational pursuits and allow those children to keep up with their classmates who already have access at home

Many participants also expressed concern that the build-out of telecommunications infrastructure should focus on building for the future – meaning that North Carolina must invest in infrastructure that can amply handle future bandwidth demands. In this regard, most participants felt that the *immediate* focus of any organized deployment plan must be to get some type of high-speed Internet service to un-served communities across the state, but also to try to “build for the future.” In general, participants agreed that the focus must be on both – immediate high-speed Internet service of some type statewide, but a simultaneous effort to increase “big” broadband deployment.

Increasing Availability to Low Population Areas: Much of the summit discussions focused on how to increase availability of high-speed Internet service or broadband to sparsely-populated areas. The challenge in ensuring service for all citizens is the high cost of building out infrastructure to individual businesses or households. This last leg of connectivity service is often referred to as the “last mile” (getting infrastructure from the bigger network directly to

individual households). Regardless of the technology used, the cost of building out the broadband or high-speed infrastructure to an individual household requires a relatively significant monetary investment. For many sparsely populated areas where the customer base is small, service providers have often been unable or unwilling to make the investment. In rural areas of North Carolina (including rural pockets of urban counties), a solution is still needed for deploying broadband or high-speed connectivity.

Some summit participants felt that deployment incentives granted by the state are unfair because they give advantages to some companies over others. The issue was raised that the telephone membership cooperatives in North Carolina are generally providing high-speed Internet service to the majority of their customer base, without having been granted incentives to do so. Some participants felt that all service providers should be making these build-out investments on their own, with no outside funding, and that incentives give unfair advantages to some companies over others. Several participants said that even with deployment incentives or subsidies, the telecommunications companies would misuse the funding. It was suggested at one of the summits that the need for funding must be clearly demonstrated by the companies before receiving money, especially with private sector companies.

Despite these issues, the majority of the summit participants felt that deployment incentives to reach un-served areas are appropriate and needed. The majority of participants indicated that deployment incentives should be sought from all possible sources including state, federal and local entities, along with nonprofit foundation dollars as well. Some participants expressed concern that small communities may not have the local funding to support broadband deployment efforts. There was also concern that federal funding would not allow state and local input on how incentives dollars could be used. It was suggested at one summit that with statewide assistance for connectivity, the financial burden of deploying in rural areas is spread out. This way, the commitment is not just up to a local community; the entire state can reap the benefits.

It was noted at one summit that federal funding from the Appalachian Regional Commission (ARC) has supported broadband projects in North Carolina, but that ARC funding cannot go to the private sector, nor can these funds be used by non ARC-eligible counties. (See <http://www.nccommerce.com/en/CommunityServices/CommunityDevelopmentGrants/AppalachianRegionalCommission> for a list of the 29 ARC counties in western North Carolina.) One participant noted that much of the funding from the Rural Utilities Service (under the U.S. Department of Agriculture) consists of loans to private sector companies. Federal money also goes to the Schools and Libraries Division (SLD) of the Universal Service Administrative Company as e-rate support for connectivity at educational institutions.

At each summit, participants were asked to discuss other funding solutions for deployment, beyond incentive grants. An example of this could be selling state or local bonds. Many participants seemed willing to consider bonds, but most thought that local bonds would be hard to finance. Some thought that bonds may take too long before results would be realized. It was noted that the revenue stream for repaying bonds would need to be identified. The question was raised at one summit as to whether the bond revenues would go only to big providers. Participants noted that bond issues should involve partnering with the N.C. League of Municipalities and the N.C. Association of County Commissioners, and that additional education at the local level around bonds would be needed. It was stated that a lot of local

bonds go toward education and that bonds can be hard to finance. It was suggested that the state must prioritize better in regard to current technology while also monitoring emerging technology trends for possible solutions.

There was brief discussion at each summit about providing tax incentives to companies that agree to build out to un-served areas, but some participants commented that this system has not worked in some states where incentives were provided but the service was not built out. One participant suggested that a company be set up to provide service and stocks be issued as a co-op or for-profit company. Another participant suggested that the N.C. General Assembly look at taxing telecommunications services so that a portion of that funding could be used for deployment costs. The question was raised as to whether such a tax would make the providers more likely to provide service in areas that are currently un-served. One participant suggested having a revolving loan fund, instead of grants, so that funding could be re-invested.

A large majority of participants expressed the importance of working with, and supporting, current providers and networks. Some suggested that any incentives funding made available should not undercut current providers in an area. Others said that the key goal must be getting more service out there. Some participants felt that networks and services should be locally-owned, in order to avoid absentee-owned networks. Some perceive that providers based out of the state may be harder to reach if problems arise.

The problem of cherry-picking was discussed at several of the summits. When awarding incentives, it is important to be aware of occasions that would allow providers to cherry-pick customers from areas with higher-density population or greater wealth per-capita, instead of providing service to the entire community. If providing incentive funding for new networks, it was suggested that this should be done in instances where the networks are really needed, and where the networks can be connected to a backbone so that North Carolina will not have islands of separate networks. It was also noted that caution should be exercised in funding new networks, so as to avoid bleeding traffic from surrounding or older networks or possibly hurting the existing providers in the area.

Most participants felt that incentives should be available to all types of service providers, including for-profits and nonprofits, and start-ups, although some expressed reservations about funding the more well-known, larger service providers. Overall, the general concern was: Who can get the job done? There was discussion of whether nonprofit or start-up telecommunications providers would have the capital necessary for deployment efforts, and if they would be financially viable for the long term. Most participants encouraged the e-NC Authority to not restrict potential solutions by putting financial viability restrictions on possible non-profit or start-up providers. The argument was made that focus of the e-NC Authority should instead be on oversight and accountability – requiring a sound business plan, sound leadership and a firm understanding of the technology being proposed. It was also suggested that a hybrid approach be taken, allocating some funding for provider incentives and some for community-based projects.

One participant expressed a perception that providing service to un-served areas is actually “charity work” because there is no business case. For this reason, it was suggested by some that no match be required of participating providers. There was a strong sentiment that in

cases where telecommunications providers are not providing the needed service, local governments or communities should *have the right* to provide that service. Some participants felt that the provider should be a private enterprise whenever possible, to help ensure enough capital and financial capacity to keep the technology ever-green.

Who Benefits First?: There was discussion on what areas of the state should receive priority in terms of rolling out future connectivity efforts in North Carolina. The consensus was that a combination of qualifying factors should be used in determining priority areas for deployment. Some participants felt strongly that these efforts should first be focused on areas with the least connectivity, and that if this factor is not the standard in prioritization - these counties will be skipped over. The feeling was that these areas have the least connectivity, so they clearly need the most help in terms of obtaining service options. It was suggested that this is the only way to ensure that connectivity is made available to everyone.

Other participants suggested that funding should go to areas with strong community involvement around connectivity as these projects would likely be the most successful in the long term. Similarly, it was suggested that a business case be made by the communities themselves, and that areas that can show the biggest potential impact from the investment should be considered a priority. It was suggested that focusing on the necessity to serve local businesses may result in increased access. The question was also raised as to whether priority could be tied to those counties with the most service requests or petitions for service.

Additional comments on subsidies for deployment included questions on how other countries have been able to provide high levels of broadband access to their citizens, which has generally been possible as a result of strong national broadband policies. A few participants suggested that homeowners could purchase and own the Internet infrastructure (such as fiber) going from the individual household to the neighborhood node as a way to promote increased last mile access. This cost could then become part of the overall investment in that property and be resold with the house.

Technologies: There was brief discussion at the summits about preferences for any particular technologies over others when it comes to offering high-speed or broadband service. Most people felt neutral about this, and concluded that any technology should be considered that would effectively and reliably deliver high-speed or broadband service. Some participants felt that wireless is the best and most cost-effective way to reach rural areas, and that the state should have a wireless strategy for rural communities. Some participants thought that fiber is the best investment for the future because of its bandwidth capacity, and reiterated the importance of not investing in something that would quickly become obsolete. Some suggested that a long term solution requiring the least maintenance should be the preference. One participant said “We cannot afford to build it wrong over and over.” One school superintendent noted that some school networks are already bogged down by Internet traffic and poor bandwidth and that it is critical to plan for future needs and growth. A few of the telephone membership cooperatives in attendance spoke of their fiber-to-the-home (FTTH) plans. As far as emerging technologies, participants encouraged the e-NC Authority to track the availability of new white space spectrum which may be available from the FCC for use in providing additional wireless opportunities.

Demand-Building, Digital Inclusion and Affordability: In addition to looking at the supply side of how more infrastructure can be deployed to un-served areas, the issue of building demand and focusing on digital inclusion efforts was also discussed. In general, many participants, including service providers, felt that demand-building must continue. It was stated by many that if providers got a better rate of return as a result of increased demand, they would be more likely to build out telecommunications infrastructure in un-served and underserved geographical areas.

Most participants responded that there is still a need for digital inclusion and digital literacy efforts in local communities. Most participants felt strongly that digital inclusion efforts should continue in order to ensure that all citizens have access to this service and no one is left behind.

In general, most participants responded that it is important to continue programming that focuses on public awareness of the benefits of broadband, digital literacy training, computer/laptop programs for citizens that don't have computers, and public Internet access centers. It was noted that having a good computer (with fast processing speeds) is also important in truly utilizing fast and reliable high-speed Internet service. Participants felt that local attention to these digital inclusion efforts is needed. A few participants said that demand-building activities are no longer needed but that digital literacy training access should be made available in communities that are interested.

In Alleghany County, which has a higher level of connectivity than many rural counties, participants said that high levels of connectivity alone is not the answer, the key challenges are affordability and digital inclusion. Participants suggested that more publicity and public awareness is needed around the existing public Internet access sites and their hours of operation. It was noted that while schools can provide connectivity after-hours, there are cost and transportation challenges that need to be addressed before schools can have this additional role.

Many suggested that the e-NC Authority should look at how to increase Internet access at community centers and other public sites, and how to cover the costs that would be incurred to maintain these sites and protect the equipment. It was also noted that it is important for these public access sites be used for digital literacy training and support.

Some library representatives participated in the summits. They noted that the libraries play a significant role in providing public Internet access, and many offer hands-on digital literacy training as well. The library representatives indicated that there is generally not enough funding available to keep their facilities open at nights and on weekends to better meet community demand.

As far as affordability, while individual providers generally charge the same service subscription rates in urban areas and rural areas, there was concern about the cost of high-speed Internet service and whether low-income citizens can afford access regardless of the community they live in. While rates charged by individual providers tend to be the same in rural and urban areas, the e-NC Authority did hear of examples where, due to bundling requirements in particular rural communities, the price for high-speed service may be higher. For example, if landline phone service is required in a rural area in order to receive DSL

service, this bundled price may be high, whereas an urban citizen may have naked DSL available (DSL offered without the landline phone service). There are often more options for customers in urban areas, allowing those citizens to compare prices for high-speed Internet service between multiple providers.

In terms of affordability, the question was raised as to whether citizens felt that a program similar to Lifeline/Link-Up should be considered as a model for Internet access. Lifeline and Link-Up are federal programs that offer a telephone and a subsidized telephone subscription price for consumers that fall under a certain income level. Some participants felt that this model should be explored to consider something similar for Internet access. However, others felt that subscription costs should not be subsidized and that providing some type of Internet access device (such as a computer) could be more complicated than providing a telephone.

Policy: Almost all participants agreed that accurate data is essential in mapping the existence of telecommunications infrastructure in the state, and that this data should be made available by service providers to help the state make policy decisions related to broadband and high-speed Internet. One participant felt that data should only be required by the state in cases where a legal franchise has been awarded, and another participant commented that the telecommunications data needs to be more granular, unlike the Federal Communication Commission's (FCC's) prior system of using zip codes to define coverage areas.

Some of the participants said that they would support state or federal policy initiatives to increase deployment of high-speed Internet access or broadband. But some noted that support would depend on what the policies are and how they are set up. Participants seemed in favor of the idea that it is important for the state to track federal policy issues, such as those at the FCC, as they affect state and local communities. Many participants felt that distribution of the Universal Service Fund should be revised to also provide funding for communities to deploy telecommunications services. Another participant raised the question of why providers limit bandwidth capacity and whether this is tied to increased cost.

Leadership: Most summit participants expressed support for the idea that state and local leaders need to be better educated around issues of broadband. There was also some discussion that many communities will need more technical resources to facilitate broadband planning. In general, many participants seemed supportive of the idea of having some type of regional councils or groups to work with the e-NC Authority – groups that would be wholly dedicated to increasing connectivity on the local level. There was a suggestion that regional efforts be carefully balanced to ensure that the voices of rural communities can be heard. Participants expressed support for the continuation of the e-NC Authority and its efforts.

Additional Comments: It was suggested that some people and leaders in society unfortunately still fail to see high-speed or broadband Internet access as a necessity. One person suggested that the collective voice and demand for broadband is not strong enough yet and that the general population may not be interested enough yet, or may not understand the economic benefits carried by broadband access. It was noted that communities seem to automatically understand the need to put in water lines and pay for schools, but that the collective will for broadband deployment must grow. Many participants suggested that too few people are talking to their legislators about the issue of broadband access.

It was suggested that energizing the youth, and tapping into that demographic more, could bring us closer to finding solutions to more connectivity. It was also suggested that elected leaders may understand better why this access is needed if they are shown business applications which require high-speed Internet or broadband.

Below are some additional comments from participants' surveys about why broadband is needed and how it impacts their communities:

- Look at connectivity in terms of productivity: if we are not connected, we are not productive.
- You have to have big (high-speed and high bandwidth) to be competitive.
- Money is being spent on government education programs (such as N.C. Learn and Earn), but people can't get online to participate. Funding should be spent on the infrastructure first.
- Without question, school children without access at home are at a disadvantage.
- Parents need to communicate with their children's schools online to monitor homework assignments and grades.
- At Piedmont Community College, many students have to take Web-based classes on campus because they don't have access at home.
- Web-based learning is not just for young students, but also for retired people.
- Access is needed to help facilitate training for the workforce.
- Nonprofits need broadband to carry out their work and missions.
- Broadband is needed in communities to attract technology companies.
- Almost all transcription companies require home-based workers to have high-speed Internet access.
- High-speed service is needed for in-home care applications and services for the elderly and disabled.
- Access is needed for citizen participation in government (for example for town council meetings over the Web).
- The culture of today is high-speed and fast-paced. Broadband is required to keep up with the rest of the world which has adopted this culture.
- "Ten seconds is an eternity on a computer."
- The divide between the haves and the have-nots in the state will expand exponentially with those that do not have access.

The e-NC Authority appreciates all the participants taking their personal time to attend the summits and share their input and ideas around connectivity. Nevertheless, the shared sentiment was that most citizens waiting for access don't want further debate and discussion, they just want the service.

To see videos of testimony from some of the summit participants, go to:
<http://www.youtube.com/user/ConnectingNC>.

How Other States Are Funding Broadband Infrastructure Deployment

North Carolina is recognized as a leader in state-supported efforts to extend Internet access to all of its citizens and businesses. To date, these efforts have largely been funded by a one-time start-up endowment provided by MCNC and by subsequent direct appropriations by the North Carolina General Assembly. These funds have been used for connectivity infrastructure incentives and capacity building grants and for related programmatic and operations support to the e-NC Authority and its statewide system of e-NC Business and Technology Telecenters. These efforts have been augmented by additional funds leveraged from partnering service providers, local and federal governments, public and private organizations and foundations.

The challenge going forward is how best to sustain progress made thus far and how to provide for the additional investments needed to ensure that broadband access becomes the ubiquitous competitive resource that North Carolina needs. This challenge is not unique to North Carolina; other states are facing the similar needs to support broadband access initiatives. Appendix 5 provides a brief synopsis of how benchmark states are approaching this funding challenge.

It is possible that some of the approaches used by other states or countries might serve as good models from which North Carolina might adopt or adapt innovative approaches to funding broadband infrastructure going forward. In 2009 the e-NC Authority hopes to conduct a more thorough examination of how other states' approaches might apply to the situation in North Carolina.

Conclusion

Creating a more digitally competitive and sustainable future for North Carolina will require the state leadership to see broadband as a utility that needs public subsidy for full deployment. The historical precedent is established: all other public utilities and infrastructure – water, sewer, electricity, rail and highways – began their original deployment with heavy public subsidies from the states and federal government. Private enterprise has an important role, and has gradually made inroads into the management of a number of the utilities. This is particularly the case in electricity, and it is also seen in the privatization of some water systems. While deregulation of oversight of telecommunications has taken place in a faster manner than has deregulation of the other utilities, the persistence of communities in our state and across the nation that do not have adequate Internet connectivity and speeds supports the need for continued involvement from government leaders in our state and nation.

For citizens in North Carolina and the businesses that create the local economies across our state, the utility of broadband has become a critical factor in their participation in the global economy. Investments in broadband deployment will translate in the short-term into major savings in health costs, a greener economy, and advances in the access for citizens to major new forms of information services and educational opportunities. Enhanced broadband deployment will give entrepreneurial businesses, large and small, the tools needed to compete successfully in state, national and global markets. Availability of broadband Internet has been shown to increase the number of firms, jobs, property values, and personal income.

The question has to be, how can any community, region, state or nation grow if it does not make the necessary commitment to broadband infrastructure? The citizens of our state have spoken through the Broadband Summits and the Citizens Survey; they want and expect their government, corporate and community leaders to be their advocates in bringing this important utility to their homes and businesses. The goal for broadband Internet in North Carolina must be ubiquitous access. The recommendations contained in this Internet Plan can be the blueprint for constructing the digital bridge to the world and a brighter future.

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- ⁱ Crandall, R., Jackson, C., and Singer, H. (September 2003) "The Effects of Ubiquitous Broadband Adoption of Investment, Jobs and the U.S. Economy," New Millennium Research, available at http://newmillenniumresearch.org//archive/bbstudyreport_091703.pdf.
- ⁱⁱ Ferguson, C. (2002) "The United States Broadband Problem: Analysis and Recommendations," The Brookings Institute Working Paper, available at http://www.brookings.edu/views/papers/ferguson/working_paper_20020531.pdf
- ⁱⁱⁱ Lehr, W., Osorio, C., Gillett, S. and Sirbu, M. (February 2006) "Measuring Broadband's Economic Impact," National Technical Training Assistance, Research, and Evaluation Project # 99-0713879, U.S. Economic Development Administration, available at http://www.eda.gov/imagecache/EDAPublic/documents/pdfdocs2006/mitcmubbimpactreport_2epdf/v1/mitcmubbimpactreport.pdf
- ^{iv} Ford, G. and Koutsky, T. (April 2005) "Broadband and Economic Development: A Municipal Case Study from Florida," Applied Economic Studies, available at http://www.freepress.net/files/broadband_and_economic_development_aes.pdf
- ^v Crandall, R., Lehr, W. and Litan, R. (July 2007) "The Effects of Broadband Deployment on Output and Employment: A Cross-Sectional Analysis of U.S. Data," The Brookings Institute Issues in Economic Policy Number 6, available at <http://www3.brookings.edu/views/papers/crandall/200706litan.pdf>
- ^{vi} Varian, H., Lital, R., Elder, A. and Sutter, J. (January 2002) "The Projected Economic Benefits of the Internet in the United States, The United Kingdom, France and Germany," The Net Impact Study, available at http://www.netimpactstudy.com/NetImpact_Study_Report.pdf
- ^{vii} Forum for the Future, (May 2004) "Sustainable Development in Broadband Britain," available at <http://www.btplc.com/Societyandenvironment/PDF/BroadbandBT.pdf>
- ^{viii} Forum for the Future *ibid*
- ^{ix} Horrigan, J. (July 2008) "Home Broadband Adoption: 2008," Pew Internet & American Life Project, available at http://www.pewinternet.org/~media/Files/Reports/2008/PIP_Broadband_2008.pdf

Appendix 1:

What Are the Technologies that Deliver Broadband or High-Speed Internet Access?

To begin thinking about bandwidth capacities needed for various applications and to determine how more connectivity can be delivered to consumers and at what speeds, it is necessary to understand the basic technologies that provide access to broadband or high-speed Internet. These include:

- Cable Modem Service (CMS)
- Digital Subscriber Line (DSL)
- Fiber Optics
- PCS (Personal Communications Service)/Mobile
- Wireless – Unlicensed and Licensed
- Satellite

Cable Modem Service (CMS): CMS is transmission over coaxial cable, a hybrid of coax and fiber, or through fiber itself. Service is provided by the cable companies through upgrading or replacing traditional cable television lines and equipment.

Digital Subscriber Line (DSL): DSL service is transmission over copper lines and is provided through the telephone companies by upgrading traditional telephone lines and equipment.

Fiber Optics: Transmission over optical fiber consists of data being sent as light particles over glass fibers. Fiber can run all the way to a household (fiber-to-the-home / FTTH), or to a neighborhood or node (fiber-to-the-node / FTTN), with the remaining distance to the home being covered by traditional lines like copper. As a newer infrastructure, fiber can require more initial investment but provides the most bandwidth available of any current technology.

PCS (Personal Communications Service)/Mobile: PCS is a type of wireless service, but one that operates through the cellular phone network. PCS refers to the digital mobile service available in the United States for certain mobile phones. These frequencies can also provide Internet service through data modems on “smart” mobile phones or through air cards that work in conjunction with laptop computers. Cell phone towers must be up-fitted with additional equipment in order to also provide data service. It is important to note that access to the Internet through cellular phones will not provide the dynamic broadband speeds provided that the consumer receives when the data runs over land lines, or licensed wireless with a fixed base fiber transport.

Wireless – Unlicensed and Licensed: A wireless network can provide Internet access to homes within a certain range by sending out a signal from a set location (such as a tower), which can then be received at a home through the use of a data modem. Unlicensed wireless operates on different bandwidth spectrum frequencies than licensed wireless. Various devices such as garage door openers operate on the same spectrums as unlicensed wireless used by Internet service providers. Licensed wireless operates on frequencies of bandwidth licensed by the FCC. Licensed wireless requires different equipment including higher powered transmitters and has greater coverage than unlicensed wireless.

Satellite: Satellite service is theoretically available to anyone with a view of the southern sky. Satellite equipment must be installed at a subscriber's home, and the connection then works in conjunction with a satellite in the sky and various access points on land. Satellite is unable to provide fast speeds (especially upload speeds) due to the current technology available.

Appendix 2

Who Are the Telecommunications Service Providers in North Carolina?

To determine how telecommunications infrastructure can be deployed and delivered, especially to un-served areas, it is necessary to examine who the last mile service providers are in North Carolina. Internet access is provided by the following types of companies in the state:

- Incumbent Local Exchange Carriers (ILECs)
- Competitive Local Exchange Carriers (CLECs)
- Independent Telephone Companies
- Telephone Cooperatives
- Cable Companies
- Wireless Companies – Unlicensed and Licensed
- Satellite Companies
- Municipal Companies

Incumbent Local Exchange Carriers (ILECs): ILECs are large multi-state wireline telephone companies. Those operating in North Carolina include AT&T, Embarq, Verizon, and Windstream.

Competitive Local Exchange Carriers (CLECs): CLECs were created to allow opportunities for additional telecommunications providers to compete with the large incumbent companies in their territories. However, due to cost and various regulatory factors, few CLECs are providing enough high-speed Internet service to affect the overall levels of access in North Carolina. In most cases, CLECs are only providing services to business customers.

Independent Telephone Companies: North Carolina has approximately six independent phone companies operating in the state. These independents are small, privately-held companies; most of them operate in rural parts of the state. The independent telephone companies are making high-speed Internet service available to a majority of their service territories.

Telephone Cooperatives: North Carolina has nine telephone membership corporations in operation. The telephone co-ops only operate in rural parts of the state and they generally provide high-speed Internet service in a significant majority of their respective coverage areas. Many of the co-ops have efforts under way to offer fiber services directly to some homes in their customer base. For more information on these companies and CarolinaLink, the North Carolina Telephone Cooperative Coalition, visit www.carolinalink.org.

Cable Companies: There are approximately 28 companies providing cable television service in North Carolina. Of these, most are also providing high-speed Internet service. For more information on these companies and the North Carolina Cable Telecommunications Association, go to www.nccta.com.

Wireless Companies – Unlicensed and Licensed: There are some multi-state providers, as well as many local providers of wireless Internet access in North Carolina. There is a range of technologies available within this industry. Most companies currently operating in North

Carolina use unlicensed frequencies. One provider, Clearwire, uses licensed wireless and operates predominantly in urban pockets of the state at this time.

Satellite Companies: There are three companies that offer satellite-based Internet access in multiple states, including North Carolina.

Municipal Companies: Municipalities and local governments around the state are beginning to assess how they can be involved in increasing the availability of high-speed or broadband Internet service in their areas. In some cases, where a community has deemed that the needed service is not being provided to an area, some local governments are looking into building networks or providing service directly to residents. At this time, we are aware of two municipalities in the state that are providing high-speed Internet service to their citizens and several others that are considering it.

Appendix 3

High-Speed Internet Access in North Carolina: A 100 County Report

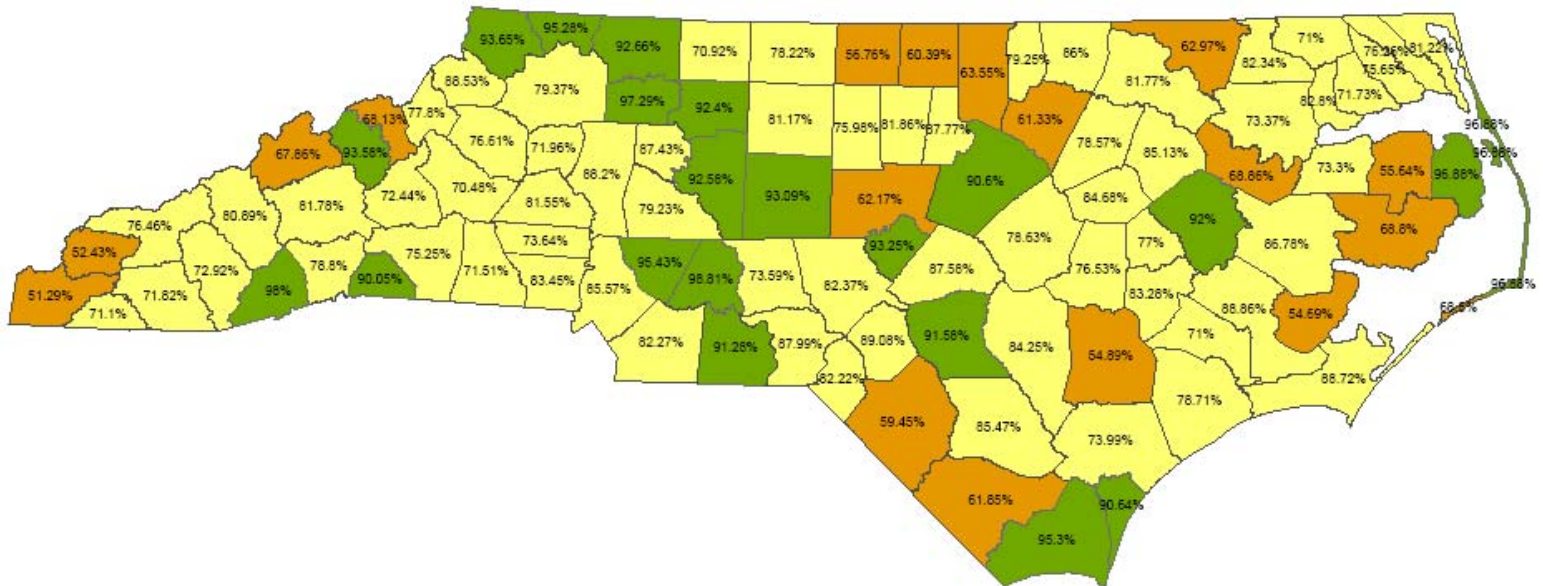
2007 Connectivity Challenged *

	County	Composite Hholds		County	Composite Hholds				
	State	83.33%							
1	Alamance	75.98%	51	Johnston	78.63%				
2	Alexander	71.98%	52	Jones Note 1	41.83%				
3	Alleghany	95.28%	53	Lee	93.25%				
4	Anson	91.28%	54	Lenoir	83.28%				
5	Ashe	93.65%	55	Lincoln	73.64%				
6	Avery	77.80%	56	McDowell	72.44%				
7	Beaufort	88.78%	57	Macon	71.82%				
8	Bertie	73.37%	58	Madison	67.86%				
9	Bladen	85.47%	59	Martin	68.88%				
10	Brunswick	95.30%	60	Mecklenburg	85.57%				
11	Buncombe	81.78%	61	Mitchell	68.13%				
12	Burke	70.49%	62	Montgomery	73.59%				
13	Cabarrus	95.43%	63	Moore	82.37%				
14	Caldwell	76.61%	64	Nash	78.57%				
15	Camden	76.26%	65	New Hanover	90.64%				
16	Carteret	88.72%	66	Northampton	62.97%				
17	Caswell	58.76%	67	Onslow	78.71%				
18	Catawba	81.55%	68	Orange	81.86%				
19	Chatham	62.17%	69	Pamlico	54.69%				
20	Cherokee	51.29%	70	Pasquotank	75.65%				
21	Chowan	82.80%	71	Pender	73.99%				
22	Clay	71.10%	72	Perquimans	71.73%				
23	Cleveland	71.51%	73	Person	60.39%				
24	Columbus	61.85%	74	Pitt	92.00%				
25	Craven	88.86%	75	Polk	90.05%				
26	Cumberland	91.58%	76	Randolph	93.09%				
27	Currituck	81.22%	77	Richmond	87.99%				
28	Dare	96.89%	78	Robeson	59.45%				
29	Davidson	92.58%	79	Rockingham	78.22%				
30	Davie	87.43%	80	Rowan	79.23%				
31	Duplin	54.89%	81	Rutherford	75.25%				
32	Durham	87.77%	82	Sampson	84.25%				
33	Edgecombe	85.13%	83	Scotland	82.22%				
34	Forsyth	92.40%	84	Stanly	98.82%				
35	Franklin	61.33%	85	Stokes	70.91%				
36	Gaston	83.45%	86	Surry	92.66%				
37	Gates Note 1	54.47%	87	Swain	76.46%				
38	Graham	52.43%	88	Transylvania	98.00%				
39	Granville	63.55%	89	Tyrrell	55.64%				
40	Greene Note 1	58.68%	90	Union	82.27%				
41	Guilford	81.17%	91	Vance	79.25%				
42	Halifax	81.77%	92	Wake	90.60%				
43	Harnett	87.58%	93	Warren Note 1	50.65%				
44	Haywood	80.89%	94	Washington	73.30%				
45	Henderson	78.80%	95	Watauga	88.53%				
46	Hertford	82.34%	96	Wayne	76.53%				
47	Hoke	89.08%	97	Wilkes	79.37%			Data from e-NC Authority	
48	Hyde	68.80%	98	Wilson	84.68%			www.e-nc.org	
49	Iredell	88.20%	99	Yadkin	97.29%			12/4/2008	
50	Jackson	72.92%	100	Yancey	93.58%				
	Bold	Urban Counties	Note 1	07 e-NC Authority grant brought all above 70%					
		Connectivity challenged <70% access							
	*	Broadband service percentages presented were derived from e-NC's analysis of data from providers, census tract data, cable and DSL service areas, and interpolation of all such data. Composite percentages are not averages of Broadband service providers' percentages. Composite percentages are affected by overlapping service areas, population and housing reporting data, geographical variations and other variables.							

Appendix 4

Statewide Maps of Connectivity Levels by County

2007 High-Speed Internet Access: DSL and Cable Composite



Average High Speed Availability DSL & Cable Modem Composite 2007

- 0% - 49%
- 50% - 69%
- 70% - 89%
- 90% - 100%

Broadband service percentages presented were derived from e-NC's analysis of data from providers, census tract data, cable and DSL service areas, and interpolation of all such data. Composite percentages are not averages of Broadband service providers' percentages. Composite percentages are affected by overlapping service areas, population and housing reporting data, geographical variations and other variables.

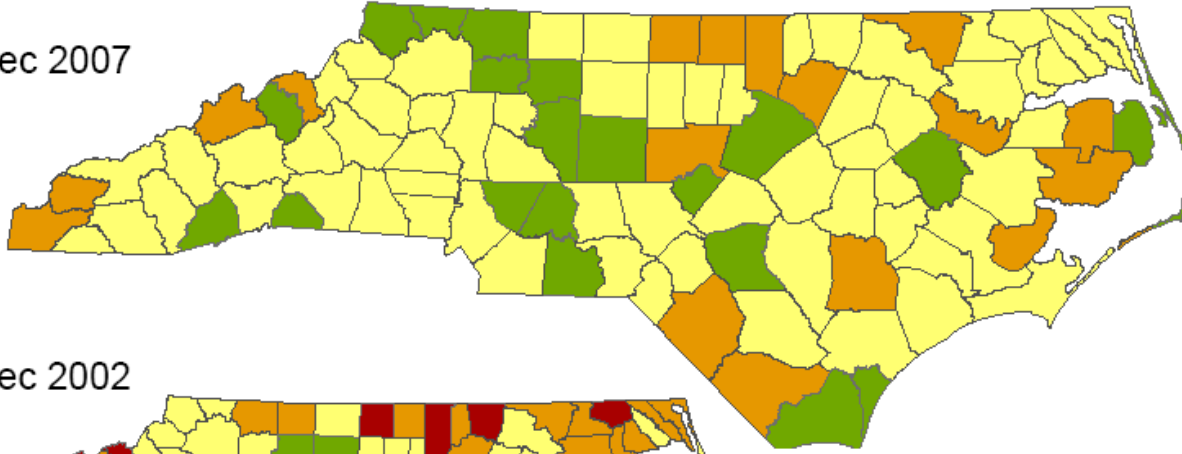
Data current as of December 31, 2007.



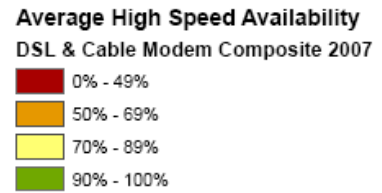
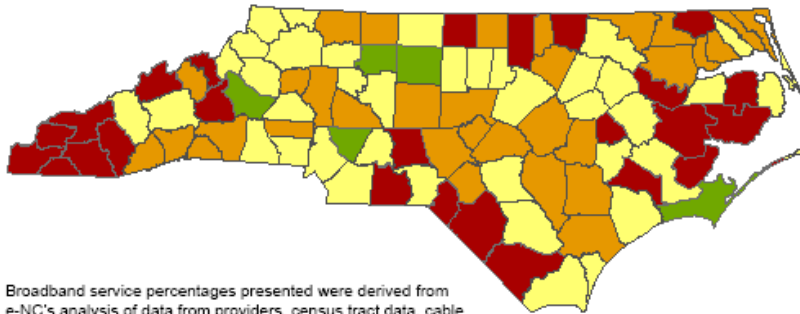
Appendix 4, (cont.)

Progression of Counties Toward 100% High-Speed Availability

Dec 2007



Dec 2002



Broadband service percentages presented were derived from e-NC's analysis of data from providers, census tract data, cable and DSL service areas, and interpolation of all such data. Composite percentages are not averages of Broadband service providers' percentages. Composite percentages are affected by overlapping service areas, population and housing reporting data, geographical variations and other variables.

Data current as of December 31, 2007.

Appendix 5

How Other States are Funding Broadband Infrastructure Deployment

ALASKA

Rural Alaska Broadband Internet Access Grant Program

For a period of at least two years after completion of expansion projects, rates for rural residents are subsidized, as comparable to those paid by residents of Anchorage, Fairbanks or Juneau.

<http://www.state.ak.us/local/akpages/ADMIN/info>

ARKANSAS

Arkansas Technology Infrastructure Fund

This Fund provides funds for state agencies and institution (such as higher education) to implement enterprise-level information technology projects. This support should provide incentives to state agencies to compete and determine creative applications that will enable greater efficiency in service delivery to citizens.

<http://www.arkleg.state.ar.us/ftproot/acts/2005/public/act2248.pdf>

CALIFORNIA

California Advanced Services Fund

This is a \$100 million fund to provide grants to “telephone corporations” that promote broadband services in un-served areas of California. Monies are collected through a .025 percent surcharge to all end-users on customers’ telecommunications bills.

<http://www.cpuc.ca.gov/PUC/hottopics/2Telco/D0712054.htm>

California Telehealth Network (CTN)

Created in 2007 by a \$22 million, 3–year grant from the FCC’S Rural Health Support Mechanism, CTN will enable the University of California to establish a statewide telehealth network.

<http://www.caltelehealth.org>

Proposition 1D

California voters approved a \$10.4 billion statewide education bond that made approximately \$200 million available to the University of California for investment to build and enhance telemedicine services statewide.

http://www.sos.ca.gov/elections/vig_06/general_06/pdf/proposition_1d/entire_prop1d.pdf

COLORADO

Rural Technology Enterprise Zone Credit

Colorado designated boundaries for areas in need of Internet infrastructure development. Taxpayers who invest in technology infrastructure and meet certain requirements may qualify for a tax credit.

<http://www.revenue.state.co.us/fyi/html/income36.html>

GEORGIA

The One Georgia Authority

This Authority was created with funds received by the tobacco buy-out program. Grants can be given for telecommunications programs and pilots that have been identified across the state.

<http://www.onegeorgia.org/>

IDAHO

Idaho Rural Broadband Investment Program

Funded by the Idaho state government, this \$5 million fund provides matching grants for rural broadband investment. By April 2007, the state had awarded funds to four broadband providers.

<http://adm.idaho.gov/adminrules/rules/idapa09/0301.pdf>

Idaho 3 Percent Broadband Telecom Tax Credit

Businesses are provided a 3 percent investment tax credit of up to \$750,000 in any one year for qualified broadband equipment and infrastructure that is used to provide services to public subscribers. This credit may be carried forward up to 14 years.

[http://cl.idaho.gov/publications/Financial Incentives & Tax Credits Overview.pdf](http://cl.idaho.gov/publications/Financial_Incentives_&_Tax_Credits_Overview.pdf)

ILLINOIS

Program to Foster Elimination of the Digital Divide

Illinois consumers may contribute to this program through donations on their telephone bills. Contributions are used to fund grants to public and private organizations that seek to reduce the digital divide in Illinois.

[http://www.illinoisbiz.biz/dceo/Bureaus/Technology/Technology+Grants+Programs/LEC Contributions.htm](http://www.illinoisbiz.biz/dceo/Bureaus/Technology/Technology+Grants+Programs/LEC_Contributions.htm)

IOWA

Iowa Broadband Initiative

Local exchange carriers are allowed to implement a \$2 surcharge on residential and business telephone lines. The revenue increase must then be applied to subsidize broadband deployment to un-served communities within the local exchange areas of the carriers. The carriers must also set affordable rates.

http://www.state.ia.us/government/com/util/docs/orders/2003/0703_rmu039.pdf

KENTUCKY

ConnectKentucky

ConnectKentucky is a public-private partnership with a mission to encourage growth of technology in support of enhanced education, more effective government, health care improvement and community and economic development growth.

<http://www.connectkentucky.org>

LOUISIANA

Delta Development Initiative

Funding is available for rural entrepreneurship operated by the Center for Rural Initiatives and this has a business incubator program for provision of high-speed Internet access to Delta region businesses.

MAINE

Connect ME Authority

Funds are provided by a 0.025 percent surcharge of all communications, video and Internet service bills in Maine. This is added to a \$2.5 million cash contribution from Verizon through its agreement with the Maine Public Utilities Commission, as a condition of the sale of its local telephone lines to FairPoint Communications.

<http://www.maine.gov/connectme/>

MARYLAND

Rural Broadband Communication Services Act

Passed in 2006 by Maryland state government, the Act set up \$10 million for a 3-year fiber-optic backbone line deployment to counties on the Eastern Shore and in the southern part of the state. The private sector provides last mile connections from the fiber backbone to residences and businesses.

<http://www.nga.org/Files/pdf/0805Broadbandaccess.pdf>

MASSACHUSETTS

Massachusetts Broadband Incentive Fund

Massachusetts will sell bonds, up to \$25 million, to fund this \$40 million initiative. These funds will be used for a program to achieve deployment of affordable and ubiquitous broadband access for every citizen of the commonwealth.

<http://www.mtpc.org/broadband/index.html>

MICHIGAN

Digital Divide Investment Program

The U.S. Housing and Urban Development department gave funds to assist low and moderate income families have access to broadband service. The program was discontinued in 2007.

<http://www.michigan.gov/gov/0,1607,7-168--100956--,00.html>

MISSISSIPPI

Mississippi Broadband Technology Development Act

In 2003, tax breaks were legislated for telecommunication providers deploying broadband technologies. This will continue until July 1, 2013. This tax incentive covers 5-10 percent of the equipment cost that is utilized when deploying broadband.

<http://www.mscode.com/free/statutes/57/087/index.htm>

MONTANA

Advanced Telecommunications Tax Credit

In 1999, the Montana state legislature authorized a tax credit of 20 percent for telecommunications carriers that deploy advanced telecommunications services.

<http://data.opi.state.mt.us/bills/BillHtml/SB0172.htm>

NEW YORK

New York State Council for Universal Broadband

This council is working to ensure that every New York citizen has access to affordable high-speed Internet service. Grants were announced in March 2008.

<http://www.oft.state.ny.us/oft/UniversalBroadband/overview.htm>

NORTH CAROLINA

The e-NC Authority

The e-NC Authority was established in 2000 with a legislative mandate to track telecommunications infrastructure statewide, by county. The organization is also tasked with technology-based economic development goals through programs that build demand and digital literacy skills. Funds for grant-making, operations and initial development of the e-NC Business and Technology Telecenter program were initially received from MCNC, a nonprofit in Research Triangle Park. In 2005, the state appropriated the first funding for operations. In recent years, over \$2 million has been made available for matching grants to telecommunications providers that deploy to un-served rural communities. Over \$3 million has been invested via state grants to develop e-NC Business and Technology Telecenters.

<http://www.e-nc.org>

OREGON

Oregon Broadband Tax Credit

A tax credit of up to 20 percent of the cost of deploying advanced telecommunication infrastructure is made available to providers. Additional funds are available for installation of similar facilities in schools, libraries and rural clinics.

<http://www.leg.state.or.us/01orlaws/sess0900.dir/0957ses.html>

PENNSYLVANIA

Broadband Outreach and Aggregation Fund (BOAF)

This fund supports outreach program for political subdivisions, schools, economic development, and other local community organizations. These are seed grants to aggregate citizen demand in communities without broadband access.

<http://www.newpa.com/default.aspx?id=200>

SOUTH CAROLINA

South Carolina Fund for Rural Infrastructure

The fund supports construction and improvement for rural infrastructure, including public and private telecommunications systems. This fund makes loans available to municipalities, counties, public service districts and public works commissions.

http://www.scstatehouse.net/sess117_2007-2008/bills/3666.htm

TEXAS

Telecommunications Infrastructure Fund (TIF)

The Fund has been supported by a 1.25 percent tax on telecommunications services in Texas.

<http://www.utexas.edu/lbj/21cp/TIF.html>

UTAH

Rural Broadband Service Fund

In July 2007, the Utah state government created a \$1 million fund to provide matching support to telecommunications providers who build broadband infrastructure to un-served rural areas.

http://www.goed.utah.gov/business_development/incentives/Rural_Broadband/Rural_Broadband.html

VERMONT

Vermont Broadband Grant Program (BGP)

In 2004, the Vermont state legislature provided funds to local governments in order to create partnerships with wireless broadband providers that would serve areas with little access. As of summer 2008, more than \$800,000 has been provided. Vermont has also used bonding in order to fund broadband deployment.

<http://www.telecomvt.org/press.php>

WASHINGTON

Sales and Use Tax – Washington Revenue Code section 82.14.370

In 1997, the Washington state legislature allowed rural counties to use sales taxes for the purpose of building and maintaining telecommunications infrastructure.

<http://apps.leg.wa.gov/RCW/default.aspx?cite=82.14.370>