Helping New Jersey

2014

Plan for Next Generation Broadband

An Economic Development Strategy to Lead in a Global Digital Economy

ConnectingNJ

The New Jersey State Broadband Initiative

1/14/2014

CONNECTING NJ
The New Jersey State Broadband Initiative

NJ OIT

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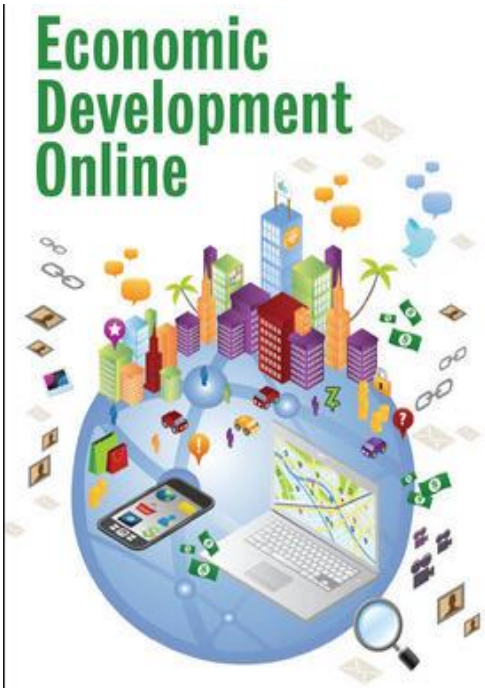
Introduction



Broadband technology, which refers to high-speed internet connections, has become foundational to our infrastructure, quality of life and economic growth. As digital technology continues to evolve, broadband speed requirements continue to increase. This has created attention at the global and national level to ensure that countries are addressing the need for next generation broadband infrastructure. Countries, states, communities and local economies require high-speed broadband networks to compete in a 21st Century global digital economy. In fact, a growing number of case studies demonstrate that communities that are deploying next generation broadband fiber networks are stimulating economic growth and driving significant opportunities in workforce development, education, healthcare, public safety, and government services.

To be globally and locally competitive in the current information age, communities are rebuilding and upgrading their infrastructure and facilities to meet the needs of today's fast evolving future. Rural areas, underserved and depressed communities are transforming their economies by leveraging broadband to bridge the digital divide and level the playing field between rural and urban, underserved and developed areas.

Numerous states and communities have already begun implementing these goals and have utilized federal grants and other forms of funding sources to build super-fast broadband "gigabit" cities and networks. Benefits are already being realized and in some cases have even exceeded expectations. In order to implement these goals, state and local economies need to put in place their own state and regional plans for building out next generation broadband infrastructure and community broadband networks. The fastest broadband networks are being built by local government to create self-reliant communities through different operating models that reduce dependency on providers' economic models. Rural and underserved areas across the country are creating and meeting demand with next generation "gigabit" broadband infrastructure and attracting businesses from neighboring states.

This importance of broadband is recognized at a global scale by the United Nations Broadband Commission for Digital Development. The Commission is comprised of high powered leaders who believe strongly in a future based on broadband and who are promoting the roll-out of broadband plans and infrastructure across 134 countries. According to a number of studies, the US lags behind in speed and adoption. The World Economic Forum ranks the United States 35th out of 148 countries in Internet bandwidth. Other studies rank the United States anywhere from 14th to 31st in average connection speed.

As part of this global effort, the United States has developed a National Broadband Plan with some significant goals for the country to implement at a state and local level. These goals include building the fastest most extensive networks, providing affordable access to citizens and institutions, and developing programs to help build the skills needed to adopt broadband-enabled technologies.

The New Jersey Office of Information Technology was awarded a federal grant by the National Telecommunications Information Administration (NTIA) to promote and build awareness of next-generation broadband benefits in New Jersey and to collect data on the current broadband infrastructure in the state. This grant is due to end in January, 2015.

New Jersey's State Broadband Initiative, ConnectingNJ, has found that New Jersey is lagging behind many states in implementing next-generation broadband community networks. Ongoing efforts are underway to build awareness about this need and to emphasize to public planners the need to integrate broadband planning into their economic development strategies and master plans.

What Is Meant by Broadband?

The term 'broadband' refers to high-speed Internet access using connections which are always on, as opposed to narrow-band Internet which typically refers to the far slower dial-up and ISDN connections. Broadband technologies currently in use include DSL, cable, fiber-optic, satellite and power line networks.

The Federal Communications Commission (FCC) defines broadband based on minimum speed requirements and differentiates between household and commercial speed requirements. Any connection which meets minimum download requirements of 4Mbps for households and 100Mbps for institutions is considered to be current-generation broadband.

As technology continues to advance, requirements of ever faster connections are being redefined for next generation broadband. Next generation broadband promises to deliver much faster download and upload speeds through technologies such as fiber-to-the-home, 4G and next-generation satellite networks.

	CURRENT GENERATION	NEXT GENERATION
HOUSEHOLD	4 Mbps	100 Mbps
INSTITUTION	100 Mbps	1 GB

In terms of speed, *next-generation* broadband is defined as connections with download speeds of at least 100Mbps for households and 1Gbps for institutions.

Broadband speed requirements vary depending on the type of application being used. Higher speeds allow fast connections to enable clear streaming of video and audio, fast downloads and uploads of large files and fast access even with heavy usage on the network. Some typical uses include:

- Browsing, audio streaming and voice communication
- Standard-definition streaming video, remote surveillance
- File sharing, gaming, online television
- High-definition streaming video, remote education
- High-definition video surveillance, video conferencing
- Cloud super-computing, large-scale video conferencing
- Real-time data collection and medical imaging

The next technology game changer is LTE Advanced, mobile broadband, gigabit fiber networks and Smart grid technologies. Many communities are building and implementing these networks to enable global competitiveness, rural and community development, innovation and economic growth.

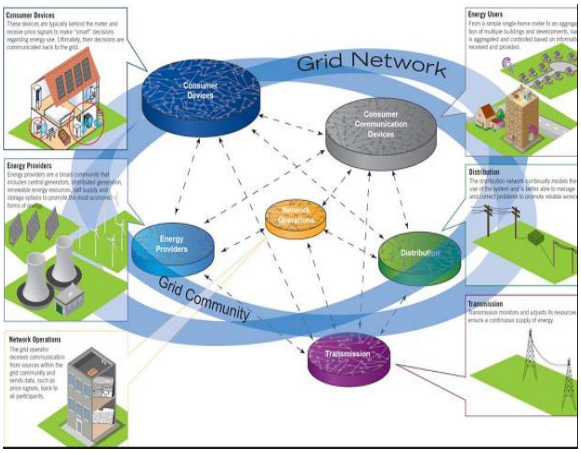
Why Broadband Matters

Broadband is a great deal more than just a technology. It has become the platform for innovation, economic growth, and social communication and the foundation of our infrastructure. In fact, the entire economic infrastructure is becoming heavily dependent on the increasing range of possibilities afforded by new and emerging broadband technologies.

Infrastructure Dependence on Broadband

Almost all of the critical aspects of our infrastructure, from transport management to emergency response communications, are currently reliant on broadband. Examples of critical infrastructure dependent on broadband include:

- Transportation management
- Utility systems
- Waste and water management systems
- Environmental conditions
- Capacity demands on networks
- Automated and responsive detection and correction of infrastructure failures
- Mobile technologies
- Emergency response
- Communications on infrastructure outages
- GPS technology
- Commerce



Economic and Community Development Impacts of Broadband

Broadband is increasingly a vital part of our community and contributes significantly to better delivery of services.

With high-speed broadband available and affordable to residents, businesses, institutions, and non-profit organizations, communities can attract, retain and generate business and provide citizens with the best quality education, healthcare, government services and an overall better quality of life.

Businesses – Large and Small

Today broadband is critical to the growth, efficiency, and effectiveness of any business. It is at the center of a business ecosystem and is essential across all business processes - including marketing, sales, operations, recruiting, financial management, customer management and employee communications. Broadband also helps companies bring innovation and leading-edge services to market to create competitive advantage.

Underserved Communities

Broadband access is increasingly a requirement of socio-economic inclusion. It has raised the costs of digital exclusion for low-income underserved rural and urban communities and other vulnerable populations, who often lack regular Internet access, Internet proficiency, and consequently lack social and economic participation - from job searches to education—that increasingly take place online.

Broadband Impacts on Critical Community Services

Education

Broadband enables educational institutions to expand beyond the classroom, making remote education possible along with access to educational resources all over the world. It also helps to increase access to areas where there are no traditional educational options available by creating specialized online courses and other programs.

Libraries

Libraries are a valuable resource to residents and communities. They provide opportunities for people with either no broadband access, or with reliability and speed issues. Libraries are also instrumental in providing technical assistance on internet use, computer instruction and digital literacy training.

Healthcare

Broadband plays a major role in improved healthcare. Gigabit networks for institutions make real-time medical imagery transmission possible. This helps to facilitate remote monitoring and improved patient care. Faster connections do away with many of the geographical barriers which are currently hindering progress in the industry. Other healthcare trends, such as online medical records and prescriptions are also facilitated by increased broadband adoption.

Government

On state and federal government levels, faster and more accessible broadband makes it possible for governmental institutions to easily reach out to the entire public by way of online services, social media and collaboration tools. Broadband also enables government operations to be streamlined, lowering cost of services and increasing service responsiveness.

Public Safety

Faster Internet also plays a critical role in emergency response and public safety. It enables instantaneous public alerts, faster emergency response times and improved communication with the public overall. Making this possible by using the federal grant is one of the first and most important goals of the New Jersey Office of Information Technology.

Rural Areas

Expansion of broadband into remote and rural areas helps to bridge the digital divide and enables agri-businesses to manage markets, crops, land, livestock, commerce and equipment – all of which require broadband today for farmers to compete.

Broadband availability in rural areas attracts businesses and provides opportunities to health care providers and educational institutions to provide high quality services even in low population areas. It also enables residents and small businesses to operate remotely and participate in the digital economy.

Broadband Matters at the National and Global Levels

Wider broadband adoption and the increased availability of newer, faster and more reliable technologies is not just about local economies and a better quality of life. Its role is every bit as essential on both national and global levels. Broadband plays a major role in the global economy, and is part of what enables developed countries to maintain their leading roles in the world.

The Broadband Commission of Digital Development is a joint initiative involving the United Nations and the International Telecommunication Union founded in May, 2010.

Make broadband policy universal
Make broadband services affordable
Increase Internet Usage
Increase household connectivity

With extensive broadband adoption now considered a critical component of any modern economy, its goal is to help promote the development of new broadband technologies and increased access and adoption on a global scale.

Their four key goals are to make broadband policy universal, make broadband services affordable, increase internet usage and increase household connectivity.

In the United States, the National Broadband Plan was unveiled on March 16, 2010 by the Federal Communications Commission. The plan defines the following goals:

1. For 100 million homes in the US to have affordable access to broadband connections with download speeds of 100Mbps or greater by 2020.
2. For the US to become the global leader in adoption of faster mobile (4G LTE) networks.
3. For all US citizens to have affordable access to fast broadband as well as the necessary skills to utilize it to its fullest potential.
4. To provide every community with the ability to have affordable access to at least 1 gigabit broadband service.
5. To provide first responders with access to a nationwide wireless interoperable broadband public safety network.
6. For America to lead in the clean energy economy and for every American to have the ability to track and manage their real-time energy consumption.

In order to meet these goals, federal grants have been provided for underserved areas and institutions in all areas of the United States. Some of these grants include the Connect America Fund, the Farm Bill Broadband Program, the Healthcare Connect Fund, the ConnectED Initiative and the Community Connect Broadband Grant Program. Several grants are also in place for broadband adoption on a domestic level, particularly to low income areas of the country. You can learn more about some of the available broadband funding programs on our website.

Where In the World Do We Stand?

In spite of being the main birthplace of the Internet, the United States lags behind many other countries with respect to available broadband speed and household adoption.

The United States sits at nineteenth place regarding average fixed-line broadband speeds and at eighteenth place in peak mobile broadband speeds

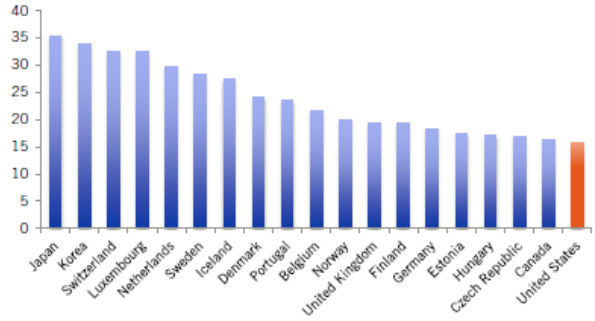


Figure 21: Net Index by Ookla Speed Rankings, February 2013 (Mbps)[92]

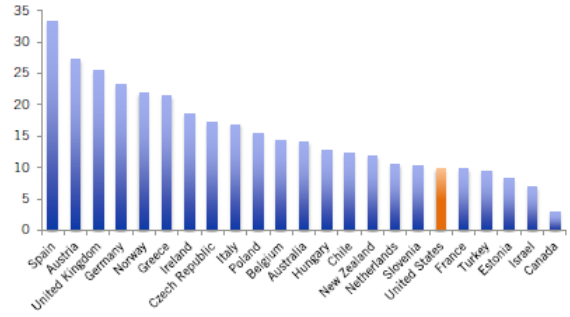


Figure 22: Peak Mobile Broadband Speeds, 3Q 2012 (Mbps)[95]

Additionally, according to technology experts and an array of recent studies, the United States is falling dangerously behind in offering high-speed, affordable broadband service to businesses and consumers.

Household adoption of broadband currently sits at fifteenth place, with a penetration rate of 68.2%. This compares to 97.5% in South Korea, the current world leader in broadband adoption.

Household Adoption

Rank	Country	Share of Households Subscribing to Wired Broadband
1	Korea*	97.5%
2	Iceland	87.0%
3	Norway	82.6%
4	Sweden	82.6%
5	Denmark	80.1%
6	Netherlands	79.5%
7	Switzerland**	77.8%
8	Finland	75.8%
9	Germany	75.2%
10	Australia**	73.8%
11	Canada**	73.6%
12	United Kingdom**	73.5%
13	Luxembourg	70.3%
14	Belgium	70.0%
15	United States	68.2%
16	France	66.8%
17	New Zealand**	66.0%
18	Estonia	64.5%
19	Austria	63.7%
20	Japan	63.4%

Source: ITIF's Report - p.29

The speed ranking is an average speed. However, across the United States, speeds vary widely. The fastest speeds are in the Northeastern corridor between Boston and the Washington, D.C., region with cities who have implemented some of the fastest high speed networks.

The State of New Jersey sits at sixth place for average Internet speed and at a modest twelfth place on a national level, with a penetration rate of 73.5%.

RANK	STATE
1	Washington
2	Massachusetts
3	Delaware
4	Maryland
5	California
6	New Jersey
7	Vermont
8	Virginia
9	Utah
10	New York

Technet's 2012 State Broadband Index Report

Along with most other states which have higher than the national average of broadband penetration, New Jersey has not had fast growth rates in the industry over the past couple of years, and a number of more remote areas still remain completely without Internet access.
Also citizens in rural counties are reporting unreliable service making it impossible to work remotely or operate a business.

Although these rankings are interesting to people, they have been seen as a snapshot in time in an ever changing landscape. It is important to understand that they exist, but what is more important is to understand that there is significant progress being made across the world in some regions of the United States, and the need for speed is only going to increase.

What We Need to Do to Move Forward

The digital requirements of both consumers and institutions continue to evolve, making the need for increased broadband availability and adoption critical for New Jersey to stay competitive. Today, slower broadband connections are no longer adequate enough for the modern Internet. Cloud computing, digital software and media distribution are just some of the things which now play a major part in modern life and the reasons why bandwidth requirements continue to increase. In short, there is an important correlation between the adoption of faster broadband and economic growth and the quality of life.

Lagging behind on a national or global level means that New Jersey can miss out on future opportunities. In order to take advantage of new opportunities and remain competitive in the fast-moving modern world, it is essential that the state plans effectively for next generation broadband infrastructure. The risk of standing still can have an impact on everything from the quality of life to the economy of the state.

Growing Trends and Best-Practices

The various new broadband trends seen across the United States and in various other countries around the world need to be more widely adopted to ensure that state and local economies realize the benefits of next generation broadband. In reviewing case studies across the nation and in compiling best practices from our research, below is a summary of the trends and findings:

- Community gigabit networks are being built to help jump-start the growth of super-fast broadband in both cities and smaller communities.
- The fastest broadband networks are being built by local communities and state governments using federal funding and other funding sources.
- Local self-reliance is one of the most significant trends in the development of modern broadband networks.
- Both state and federal legislation is being modified to help facilitate broadband access and adoption on both local and national scales.
- Community broadband networks continue to provide solutions in the areas where they operate.
- Public and private partnerships are being formed to create win-win outcomes.

Benefits Being Realized from Community Broadband Networks

The above trends are nothing new in many states and other countries around the world. Global leaders in broadband adoption, such as Korea and Japan, have already shown the great potential of community gigabit networks to rapidly increase adoption of and access to faster Internet in both urban and rural areas. Community broadband networks are already showing some of the following benefits in the United States as well.

- Local communities have more control in providing affordable broadband and generating revenue.
- Community broadband networks make it easier to control energy consumption and reduce environmental impact by way of smart grid technology.
- Increased opportunities for local businesses, healthcare, education and governmental institutions.
- Bridging the digital divide between urban and rural areas and helping smaller communities to keep up.
- Reducing the dependency on federal organizations and providers by creating self-reliant community networks.

Funding Sources for Broadband

There is no escaping the fact that planning for New Jersey's broadband future and making its goals come to fruition will be noteworthy undertaking. However, there are also many options being used to fund these localized broadband networks. These include:

- federal grants
- state funds
- cross-sector funds
- municipal bonds
- funding through publicly-owned utility companies
- non-profit funding
- community funding
- crowd funding
- private funding
- private/public partnerships

Changes in both federal and state legislation and policies are also required in order to help maximize the potential of new broadband technologies and wider adoption.

Policy Impacts on Achieving Broadband Goals

Legislative leadership is critical to ensuring policies and legislation are in place to build out infrastructure and promote adoption of broadband. Some examples of policy changes include:

- Promoting market liberalization
- Reviewing and updating Legislative and regulatory frameworks
- Considering Open Access to Infrastructure to share across sectors
- Balancing incentives for investment while supporting competition
- Utilizing Universal Service Funds (USF's) and other funding sources especially in areas where the private firms may be less willing to invest. Include funding for adoption programs, devices, content, and training.
- Creating incentives and use government funds as direct investment
- Reviewing policy frameworks for spectrum
- Providing access to utility poles and rights of way
- Improving policies for wireless facilities and other infrastructure
- Supporting accurate and timely statistical modeling to monitor broadband availability, affordability and adoption by individuals, businesses , public sectors and community anchor institutions.

Learn How Others Are Moving Ahead

Best-practices are coming out of different countries and states. Many have established statewide broadband goals and have been working at this for years.

We have compiled case studies on our website to review some of the top stories and implementations of next generation broadband networks across the nation.

To learn more about the efforts undertaken and benefits being realized in different communities, cities and states, visit our website at http://Connectingnj.state.nj.us/resources/news.

Next Steps

It is important to take next-generation broadband into account when planning for economic growth and infrastructure development. At the same time, the current broadband landscape needs to continue to be monitored in order to determine trends in affordability and adoption.

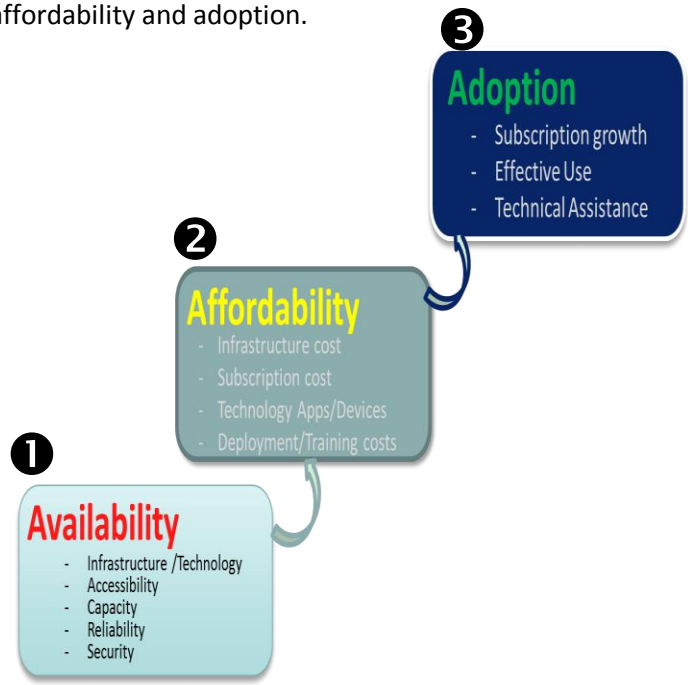
In order to remain competitive on both national and global levels, New Jersey needs to determine where it wants to be positioned in this fast-moving digital world with respect to next-generation broadband. In doing so, it also needs to use cost-effective methods to make the necessary upgrades to the infrastructure while leveraging best-practices from other states and communities that have already started on this journey.

Proposed Strategy to Integrate Broadband into the State's Planning Efforts

As a way to get started, broadband can be integrated into existing planning efforts across the state. Below are some proposed key areas to consider for getting started:

1. Incorporate broadband goals into the State Strategic Plan
2. Promote broadband planning to public planning officials to include in their master plans
3. Identify and align with regional planning committees across the state
4. Identify and align with current and future initiatives that have broadband impact or dependence
5. Identify legislation and policies needed for building out next generation infrastructure
6. Add broadband incentives or bonus credits to the New Jersey Economic Opportunity Act
7. Promote adoption of community broadband networks
8. Maintain the State Broadband Map with the current data from providers and institutions
9. Evolve the Broadband Program Office to support statewide broadband-related initiatives
10. Establish and kickoff a Statewide Broadband Advisory Team to define goals, provide vision, standards, direction and best-practices to regional and local planning boards.

In assessing broadband, there are three essential levels that need to be taken into account: availability, affordability and adoption.



Availability – takes into account the existing landscape to determine what broadband speeds and infrastructure exists, what networks exist and what institutions are currently utilizing. The focus is on the technology, accessibility, capacity, reliability and security.

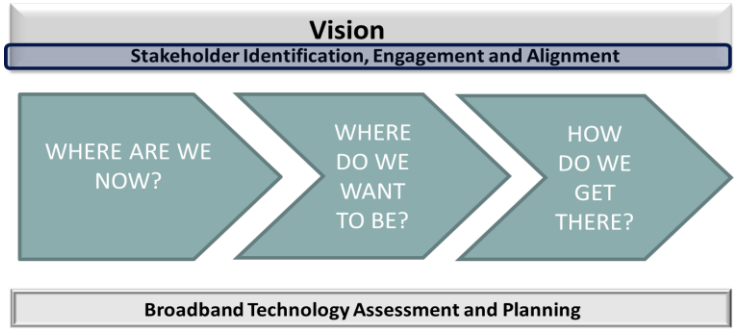
Affordability - ensures a funding strategy is in place to make it **affordable** on both state and consumer levels. Factors to take into account include the capital investment and ROI.

Adoption – requires a solid deployment and outreach plan to ensure stakeholders have been identified and a plan has been put in place to build awareness and provide the technical assistance needed for successful adoption.

NJOIT's Suggested Broadband Planning Framework

Planners, planning commissioners, local officials can integrate broadband planning into city and county planning processes by adopting a structured approach to assessing broadband needs.

To include broadband in your planning efforts, you can begin by determining where you are, where you want to be and how you want to get there.



Some of the areas to assess when reviewing **where you are** now can include:

- Existing issues related to availability, affordability and adoption
- Current Broadband coverage landscape (from broadband map)
- Assets and inventory including existing and planned Community broadband networks
- Existing community anchor institutions and subscriber speeds
- Stakeholder needs and services relying on broadband
- Demographics of residents/CAIs
- Current initiatives and future demand and plans
- Legislature/policies that may be barriers to growth
- Franchise/leasing agreements
- Funding sources

In determining **where you want to be**, some of the areas to consider include:

- Emerging broadband uses/trends/best-practices/innovative use
- Future broadband-related initiatives
- Projected and planned growth
- Policy changes
- Tax incentives/Government funding
- Demand aggregation possibilities
- Public/private partnerships
- Opportunities and options
- Vision and goals

And in defining **how to get there**, you can take the following into account:

- Identify and appoint a broadband champion for your local community, sector or region
- Establish governance through a Broadband Advisory Team to collaborate statewide
- Formalize a shared vision with stakeholders
- Identify needs, opportunities and priorities
- Develop a State Broadband Plan and goals that are integrated into regional plans
    - Develop a Broadband Infrastructure Plan
    - Determine Funding strategies
    - Develop a Deployment and Outreach Plan
- Execute and manage plans
- Determine team meeting frequency to report on progress and share on an ongoing basis

The New Jersey State Broadband Map and Broadband Data by CAI and County

One of the first tasks undertaken with the New Jersey State Broadband Initiative was to develop a state broadband map that provides information on the broadband infrastructure and availability.

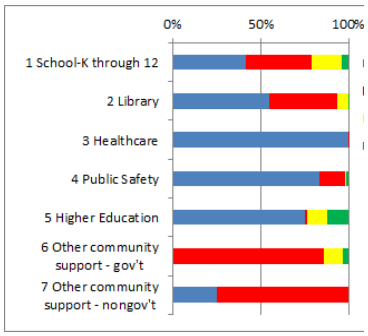
There are two types of broadband data that are collected and uploaded to the map every six months:

Provider data – Data that is provided by the service providers in the state. Currently there are approximately 30 providers. The data includes their coverage areas, average download and upload advertised speeds, technologies (such as mobile, cable, fiber, satellite and DSL) and a summary of the number of providers available in a given area.

Community Anchor Institution Subscriber Data - Data provided by community anchor institutions (CAI) on the speeds, service and reliability of their broadband service. CAIs have been categorized by the National Telecommunications Information Administration into seven different institutional groups that anchor our communities, namely: schools, libraries, higher education, healthcare, public safety, government and other non-government facilities that are important to the vitality of a community.

The data is color coded based on the minimum broadband speeds as defined by the FCC and is summarized by community anchor institution groups and by county.

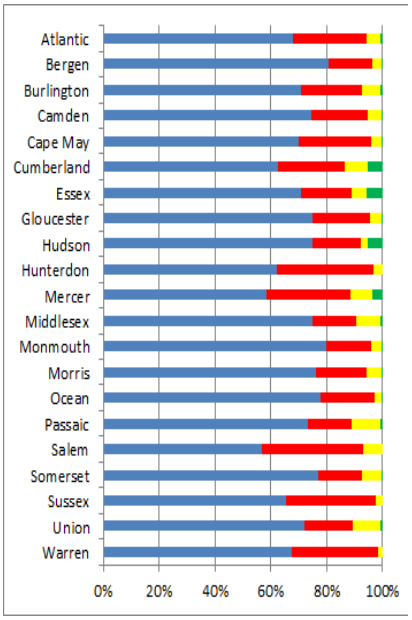
- **Red** signifies broadband data speeds less than the 4mbps
- **Yellow** signifies Broadband data between 4 mbps < 1 gbps
- **Green** identifies next generation broadband speeds of 1 gbps.



Blue signifies missing broadband data. What that means is that we have the locations and names of the institutions, but not the broadband data.

With current data we have collected so far, New Jersey shows very little green.

If you are interested in viewing this data, you can request a download through our contact form on the website.



This data is collected and updated every six months. As of this report in January 2014, only two more updates are remaining before the federal grant expires in January 2015.

Benefits of the New Jersey Broadband Map

The New Jersey Broadband map is the official tool of the FCC for assessing the broadband situation across the country. It is an essential resource for providing policy makers, broadband service providers and other related institutions with the information that they need to more effectively plan and develop the required infrastructure. On a more localized scale, it provides both consumers and businesses with important information to help make decisions related to high-speed broadband adoption and requirements.

For more information about the State Broadband map, visit our website at http://connectingnj.state.nj.us/map/about/

Help New Jersey Leverage Broadband for Economic Growth

Planning for next generation broadband can help better position the State to lead in a competitive global digital economy.

Public planning teams, county planners, and regional planning boards across New Jersey can be instrumental in building their community, local and state economies. The proposed teams can help in the following ways:

- set the goals for the state as part of a statewide broadband plan
- provide direction
- align current and future broadband-related initiatives
- aggregate demand to drive down cost
- help identify economic development and community development opportunities
- leverage best practices and trends in the industry.

The New Jersey Office of Information Technology (NJOIT) is also proposing to form a statewide Broadband Advisory Team consisting of representatives from a wide selection of governmental, educational, healthcare, business and other institutions.

The objective of the team is to formalize the state's strategy in planning for next-generation broadband technologies. The Broadband Advisory Team seeks representatives from community anchor institutions to help raise awareness about the benefits of next-generation broadband and expose any hurdles which lie ahead.

If you are interested in helping make a difference in your community contact us through our website, or send us a note at connectingnj@oit.state.nj.us.

About the New Jersey Broadband Initiative

New Jersey's State Broadband Initiative (SBI) is a federally funded program to build the State Broadband Map, raise awareness of broadband benefits, provide technical assistance on using the broadband map, and other resources.

Our mission is to gain and provide better insight into broadband availability, issues and needs, and determine how New Jersey can increase adoption in ways that can help bring more growth opportunities, improved services and better outcomes for our Community Anchor Institutions and our State's overall economic growth.

Resources

The National Broadband Plan

- PDF Version 12.15 MB

Planning for Progress

Planning and Broadband: Infrastructure, Policy and Sustainability

State of the Internet
Akamai Report

The State of Broadband 2013 Report

The Whole Picture: Where America's Broadband Networks Really Stand

Technet's 2012 State Broadband Index

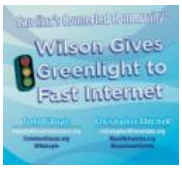
Burlington's Next Step: Become a Gigabit Community
October 2013

Bigger than Google Fiber LA plans citywide gigabit For homes and businesses
November2013

ECFiber: Significant Expansion in the Vermont Crowd-Funded Network
October 2013

How Chattanooga, Bristol, and Lafayette Built the Best Broadband in America
April , 2012

Illinois Governor Announces Gigabit Community
January 2013



Wilson's Greenlight Leads North Carolina in Fast Internet
December 2012

Spectrum Policy in the Age of Broadband: Issues for Congress

Broadband 's Contribution to Economic Health in Rural Areas: A Causal Analysis
March 2013