

New York State
Broadband Program Office
2011-12 Annual Report



Letter from the Program Director

Dear Readers:

I am pleased to present the New York State Broadband Program Office 2011-12 Annual Report. The report highlights the important work New York State is doing to address the goal of providing universal broadband access to all of our State's citizens and businesses.

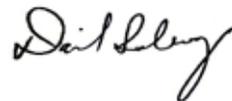
Broadband is a powerful tool for economic development. It is essential for economic growth and can dramatically increase access to health care, education, and job training; can create jobs; and can support public safety needs. Existing businesses and entrepreneurs who effectively leverage broadband are best equipped to compete in the global market and are most likely to remain in the State and expand their business. Alternatively, communities with high-speed Internet access find it easier to attract new employers and encourage local entrepreneurship.

Although New York's availability rate is approximately 96%, the number of New York citizens without access to high-speed Internet is more than the entire population of Vermont. New York State has a broadband adoption rate of 70%, which translates to 6.4 million people who cannot or do not subscribe to broadband. In short, too many New Yorkers lack access to affordable broadband services.

In December 2011, Governor Cuomo awarded more than \$2 million in funding for broadband projects during the first round of the Regional Economic Development Council grants and committed an additional \$25 million during round two to expand broadband into rural and under-served urban areas.

With Governor Cuomo's direction and continued leadership, the New York State Broadband Program Office will continue leading the way in executing strategies for the implementation of broadband and position New York State as a leader in our global economy.

Sincerely,



David Salway
Director



New York State

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1.0 Introduction

The New York State Broadband Program Office, established in 2008, serves as the single point of contact for New York State broadband development and deployment efforts. The Program Office performs a variety of functions to advance Governor Cuomo's New York State Broadband Initiative. The mission of the Broadband Program Office is to ensure every New Yorker has access to affordable, high-speed Internet service. Each year, the Broadband Program Office reports the status and progress of broadband service in New York State to the Governor and Legislature.

This assessment of the broadband landscape in New York State, as reported in the 2011-12 Broadband Annual Report, is the result of data collected by the **Office of Cyber Security (OCS) in the New York State Division of Homeland Security and Emergency Services (DHSES)**. The National Telecommunications and Information Administration (NTIA) awarded OCS **\$8.9** million as part of a State Broadband Initiative (SBI) grant funded under the American Recovery and Reinvestment Act (ARRA). While much of the funding is dedicated to collecting the most current broadband availability data, \$1.2 million supports the operation of the Broadband Program Office for State broadband capacity building initiatives and **\$1.2** million supports digital literacy efforts in libraries across the State.



2.0 What is Broadband?

The term broadband refers to high-speed Internet access with a connection that is always available. Broadband can provide access to a diverse range of information, with the potential to enhance quality of life in a variety of ways.

Broadband includes several methods of wireline and wireless high-speed data transmission technologies. Wireline technologies include Digital Subscriber Line (DSL), Cable Modem and Fiber, while wireless options include mobile broadband, fixed wireless, and satellite. (See page 15 for notes about mobile broadband and satellite service.) Newer broadband technologies such as White Space and Broadband over Power lines (BPL) are also being explored. Nearly **94%** of New Yorkers can access DSL and Cable Modem broadband service, while the availability of fiber is approximately **42%**.

In order to effectively measure broadband availability, we must first understand how broadband technology works and the speeds required for certain applications. One of the challenges of effectively measuring broadband availability is the increasing requirement of applications which need higher speeds. Just ten years ago, dial-up connections to access the Internet were completely adequate for the applications of the day. While there is no agreement on a precise minimum speed to suit all applications, there is agreement that the broadband speeds of today will become the dial-up connections of yesterday.

In 2009, the FCC increased the minimum speed threshold for broadband to **4 Mbps** download and **1 Mbps** upload. This is the basis for measuring broadband availability in this report. However, this comes with the acknowledgment that many applications are demanding higher speeds and the FCC is likely to consider an increase in the minimum speed threshold definition in future reports.

Recent surveys rank New York 5th in the nation in Internet speeds. Approximately 900,000 residents do not have access to broadband at the closest speed tier meeting the FCC's threshold (6 Mbps download). **Figure 2.1** shows minimum and maximum download speeds for certain broadband carrier technologies and **Figure 2.2** shows the speed needed for specific broadband applications.



Figure 2.1: Broadband Speeds

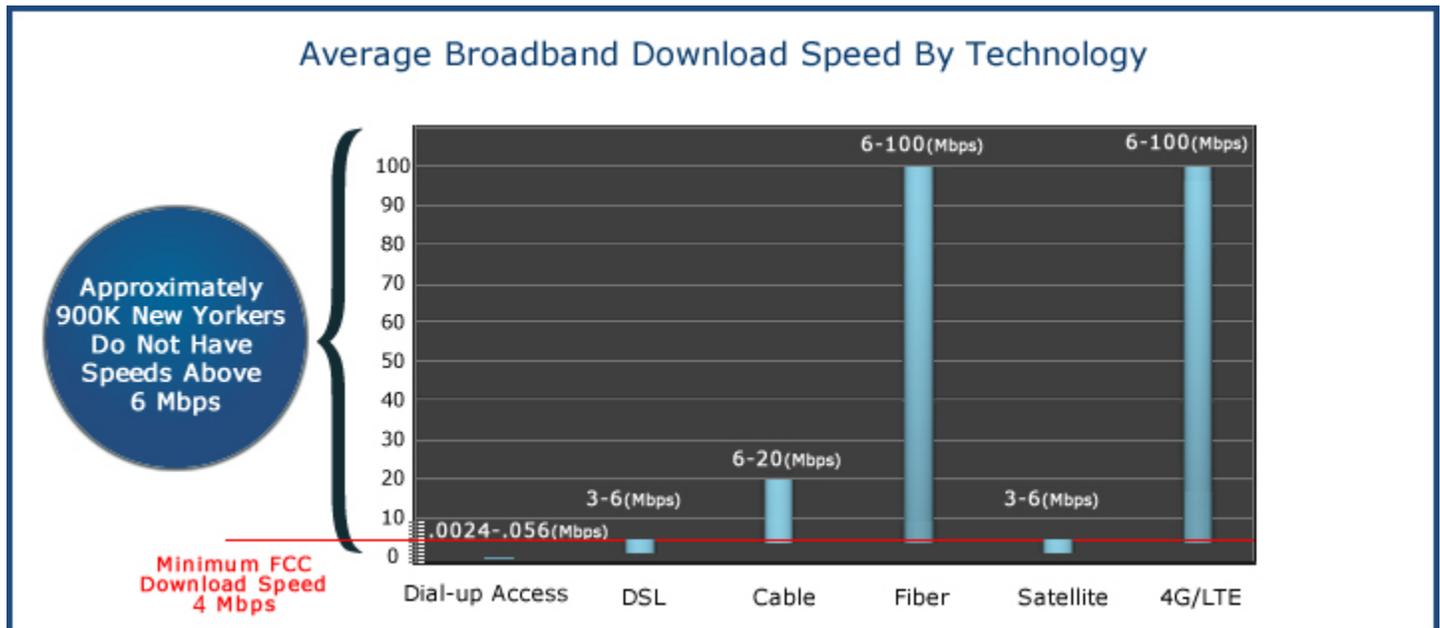




Figure 2.2: How Much Speed Do You Need?

Depending on the application, the connection speed will often determine whether it is possible to run the application effectively and how quickly the information can be accessed. **Figure 2.2** shows how much speed is needed to run common applications.

Download Speed	Application
768K-1.5 Mbps	Email, Web Browsing, Voice Over IP (Vonage)
1.5-3 Mbps	Streaming Music, Standard Definition Video, Remote Surveillance, Telecommuting
3-6 Mbps	File Sharing, Internet Protocol Television (IPTV)
6-10 Mbps	Online Gaming, Video On Demand
10-25 Mbps	Telemedicine, Remote Education, IPTV High Definition
25-50 Mbps	HD Video Surveillance
50-100 Mbps	Video Conferencing, Remote Super computing
>100 Mbps	Real-Time Data Collection, Real-Time Medical Image Consultation



3.0 Executive Summary

Broadband for Economic Recovery and Job Growth in New York

Broadband has become the universal enabler for applications which are transforming every major sector of our economy. No single technological advance compares to the potential broadband has when it comes to improving quality of life for individuals; economic prosperity for businesses; and unprecedented opportunities for disadvantaged members of our population.

A key initiative aimed at New York's long-term economic development is the **State's Universal Broadband Initiative**. The Universal Broadband Initiative has laid the groundwork to ensure the welfare of New York's citizens and to support continuous economic development by maximizing broadband capabilities in New York State.

To meet the goal of universal broadband access for all New Yorkers, the **New York State Broadband Program Office** has been researching and implementing innovative solutions to create affordable high-speed Internet access for underserved and unserved, urban and rural communities throughout our State; identifying needs for further development and deployment of broadband; and positioning New York to maximize available funding.

Broadband technologies are fast becoming the cornerstone of economic growth in the 21st century. There is no single solution that will solve our broadband problems and propel the United States to first in broadband penetration. The problems are too complicated and the marketplace too diverse to adopt a "one-size-fits-all" approach.

The **New York State Broadband Strategy**, guiding the work of the Broadband Program Office, provides a balanced approach to address the State's broadband problems. This includes a combination of broadband infrastructure build-out, joined with effective community outreach programs to stimulate demand and educate disadvantaged and uninformed populations. These goals are best attained by encouraging public/private partnerships and executing sound fiscal management practices, such as leveraging State-owned assets and exploiting State procurement models for efficiency.

"Providing affordable access to broadband infrastructure in unserved areas will help connect New Yorkers to the world economy. Broadband (or high speed internet service) for businesses is critical in the modern age. Broadband allows businesses to tap markets normally unavailable to them, reduces business costs and increases productivity."

- Governor Andrew M. Cuomo
NY Works, Getting NY Back to Work, Cuomo 2010 (3rd in a Series)

Quick Facts - The Economic Benefits of Broadband

- If All Homes had Basic Broadband Services – The U.S. Economy Would Gain 1.2 Million Jobs and \$500 Billion Per Year
- 1/3 of U.S. Productivity Growth in Past 10 Years is Due to Investments in Broadband and Related Information Technology
- Every \$1 Spent Online Influences an Additional \$3.45 Spent in Stores
- The Internet Employs 1.2 Million People for 3 Million Jobs Totaling \$300 Billion

New York State Broadband Strategy Goals

- Establish 1/3/5 Year Availability, Speed, and Adoption Goals; Universal Broadband Access By 2015 – **A Technology Plan To Keep Pace With Innovation And Growing Speed Requirements.**
- Ensure Community Anchor Institutions such as schools, universities, libraries, community centers, job training centers and hospitals have high-speed internet access of at least 1 gigabit per second (Gbps) – **Community Anchor Institutions Are Often the Single Source for Broadband Access to Many New Yorkers.**
- Close the broadband gap in New York; Complete last-mile access in underserved, rural and remote areas of the State – **Last Mile Access is Often the Most Costly Component of Broadband Infrastructure Projects.**
- Provide affordable broadband access for All New Yorkers to create and retain jobs, stimulate investment and expand economic opportunities for New Yorkers – **Adopt Strategies to Address Affordability, Digital Literacy, and Encouraging Demand for Broadband.**

Our strategy also requires creating more “e-citizens” who are digitally literate and connected to affordable Internet access.

Broadband Availability in New York: Where are we?

At the end of 2011, an estimated 700,000¹ New Yorkers lacked access to broadband at home. Although New York is making steady gains in broadband penetration, too many New York households are still not full participants in the information age because broadband access is not available where they live.

Due to the high costs of building networks in areas where population is sparse, New York rural communities continue to fall behind. New York’s broadband mapping initiative, introduced in 2010 and expanded upon last year, has enabled the State to clearly understand the existing broadband availability landscape, by identifying unserved and underserved areas of the State, necessary to close broadband availability gaps and ensure all communities are connected.

Many of New York’s coverage gaps exist because of the costs associated with “last-mile” access. Simply put, providers generally have a presence in many New York unserved areas, but are unable to provide service to many New York residents due to the prohibitive costs of extending fiber to the home or business. This is especially true in rural areas, where housing densities are much lower.

There are many New York examples of widely available broadband coverage within one rural census block, while neighbors a few houses away are unable to connect. In fact, most unserved citizens in New York live in small pockets such as those described above, which makes

closing the availability gap a very challenging proposition. As would be expected, current broadband mapping data illustrates a strong correlation between low population densities and lower broadband availability. While the lowest population densities in the State are in the North Country region, the five boroughs of New York City comprise the region with the highest population densities. (See Appendix A – Broadband Availability by County, Sorted by Population Density). Almost every county in the North Country region has an estimated percentage of unserved residents in the double digits. The five boroughs of New York City have the lowest percentage of unserved residents. However, the number of people unserved by broadband in New York City is much higher because the total population is so much larger. This suggests a solution tailored to the unique availability challenges faced in each region. While “last-mile” access and sparsely populated areas pose the greatest challenges in rural areas, problems such as aging network infrastructure and increasingly large bandwidth requirements to support the exponential growth of technology companies is more applicable in New York City.

With data gathered by the Division of Homeland Security and Emergency Services, Office of Cyber Security, (OCS), New York State can analyze broadband availability gaps at the State, regional, county, municipal and neighborhood level. As a reference to the regionally specific available data presented in this report, **Figure 3.1** shows the 10 regions created by Governor Cuomo in 2011 and **Figure 3.2** shows county boundaries.

¹ See page 15 for data disclaimer in regard to estimated number of New Yorkers without broadband access.

Figure 3.1: Breakdown of New York by Region

Last year, Governor Cuomo created 10 Regional Economic Development Councils (REDC) to develop long-term strategic plans for economic growth for each region. A key component of Governor Cuomo's transformative approach to economic development, these councils are public-private partnerships made up of local experts and stakeholders from business, academia, local government, and non-governmental organizations.



Figure 3.2: Breakdown of New York by Region

There are 62 counties in the State of New York. Five of New York's counties are located within the five boroughs of New York City, which comprise almost half of New York State's total population (approximately 8.2 million people). See Appendix D for a U.S. Census Bureau profile of New York State demographics.



With this data, New York State is better positioned to eliminate the digital divide and ensure New Yorkers have the technological resources to thrive in a modern, digital economy. However, while New York State gained momentum over the past year, the State still continues to lag behind many foreign and domestic competitors and there is still much more work to do to regain and sustain a leadership position in the national and global economy.

The availability data collected by OCS also found:

- Approximately 4%, or 700,000 people, in New York State lack access to home broadband service (see data disclaimer on page 15). **Figure 3.3** shows the percentage and number of people with no wireline or fixed wireless in each region of the State.

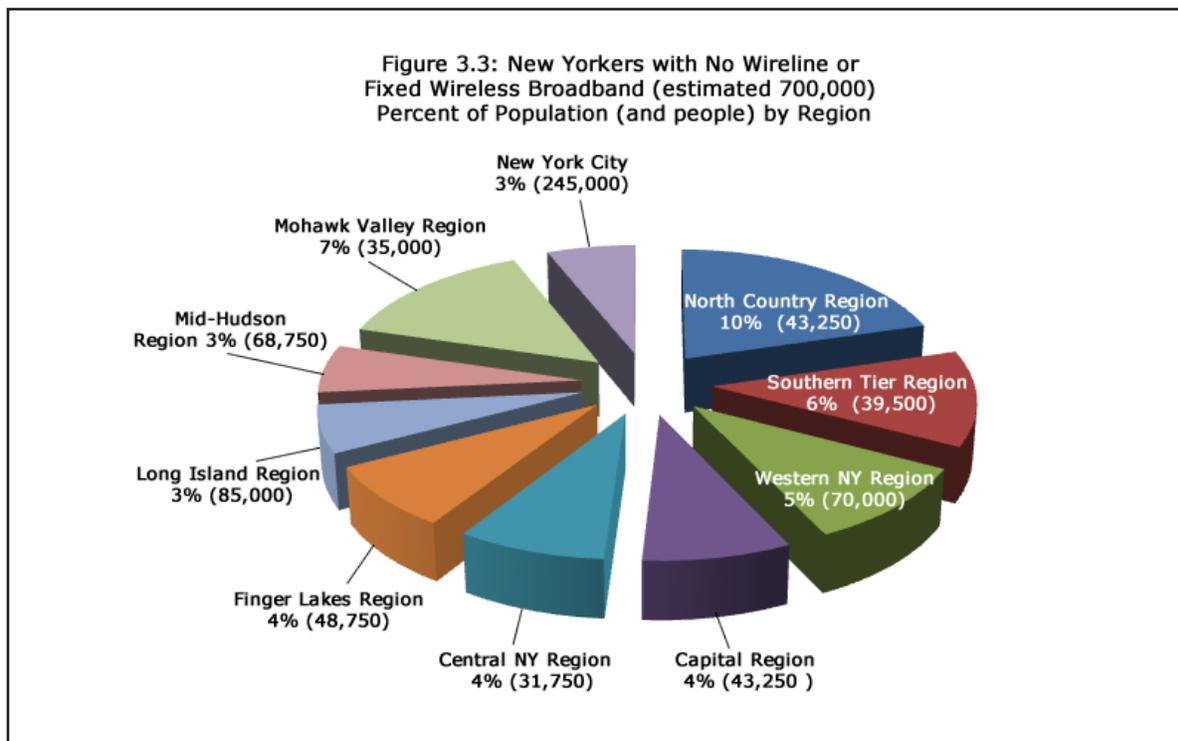
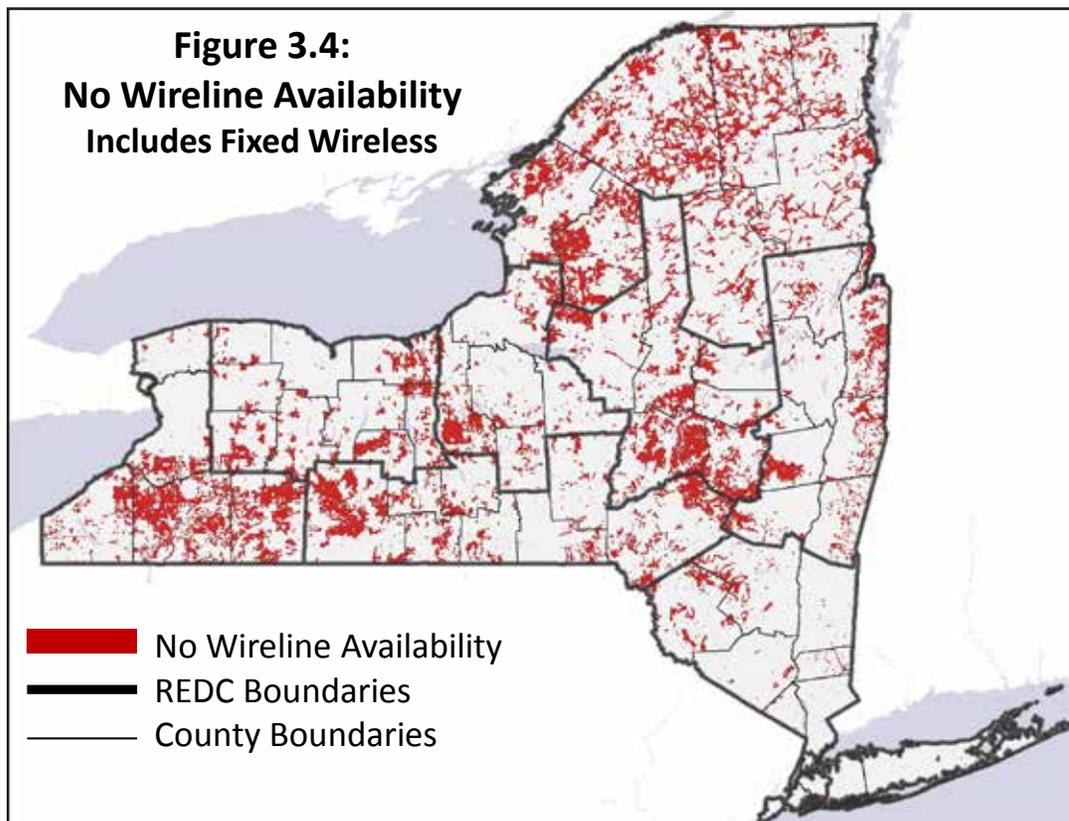


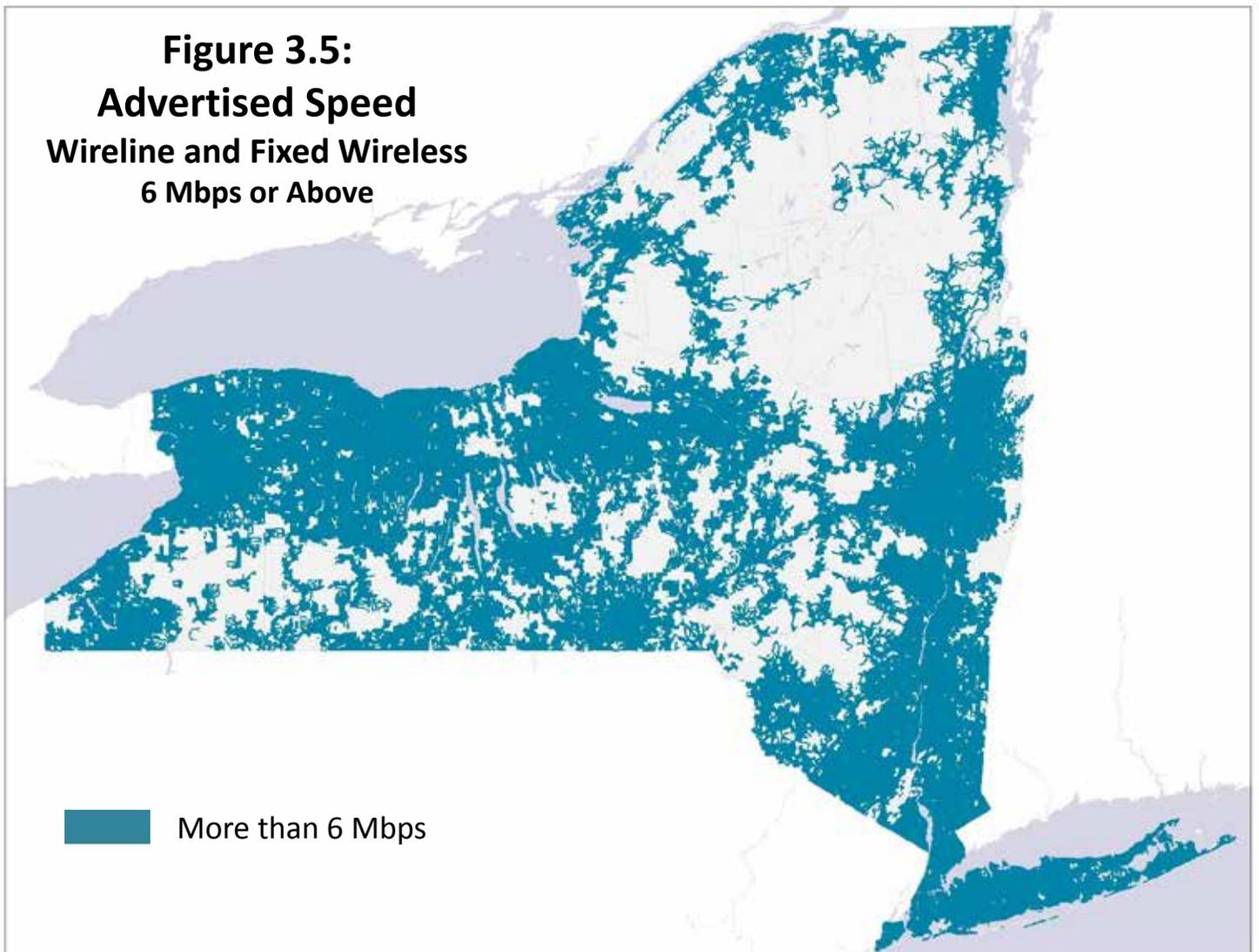
Figure 3.4 shows the areas of New York State with no wireline or fixed wireless availability.



Broadband Speeds Keeping Pace in New York

Although New York's Internet speeds have improved over the last five years, newer innovative applications continue to demand higher and higher speeds. Recent broadband studies indicate that New York is keeping pace with the national average when compared to other states. However, many New Yorkers cannot access broadband at speeds greater than the FCC threshold.

When analyzing access to broadband speeds of more than **6 Mbps** (the speed required to conduct most online activities and the most comparable speed tier to the FCC's definition of broadband 4 Mbps download / 1 Mbps upload) the percentage of New Yorker's who are served vary widely. **Figure 3.5** shows the areas of New York State where advertised download speeds of 6 Mbps or above are available.



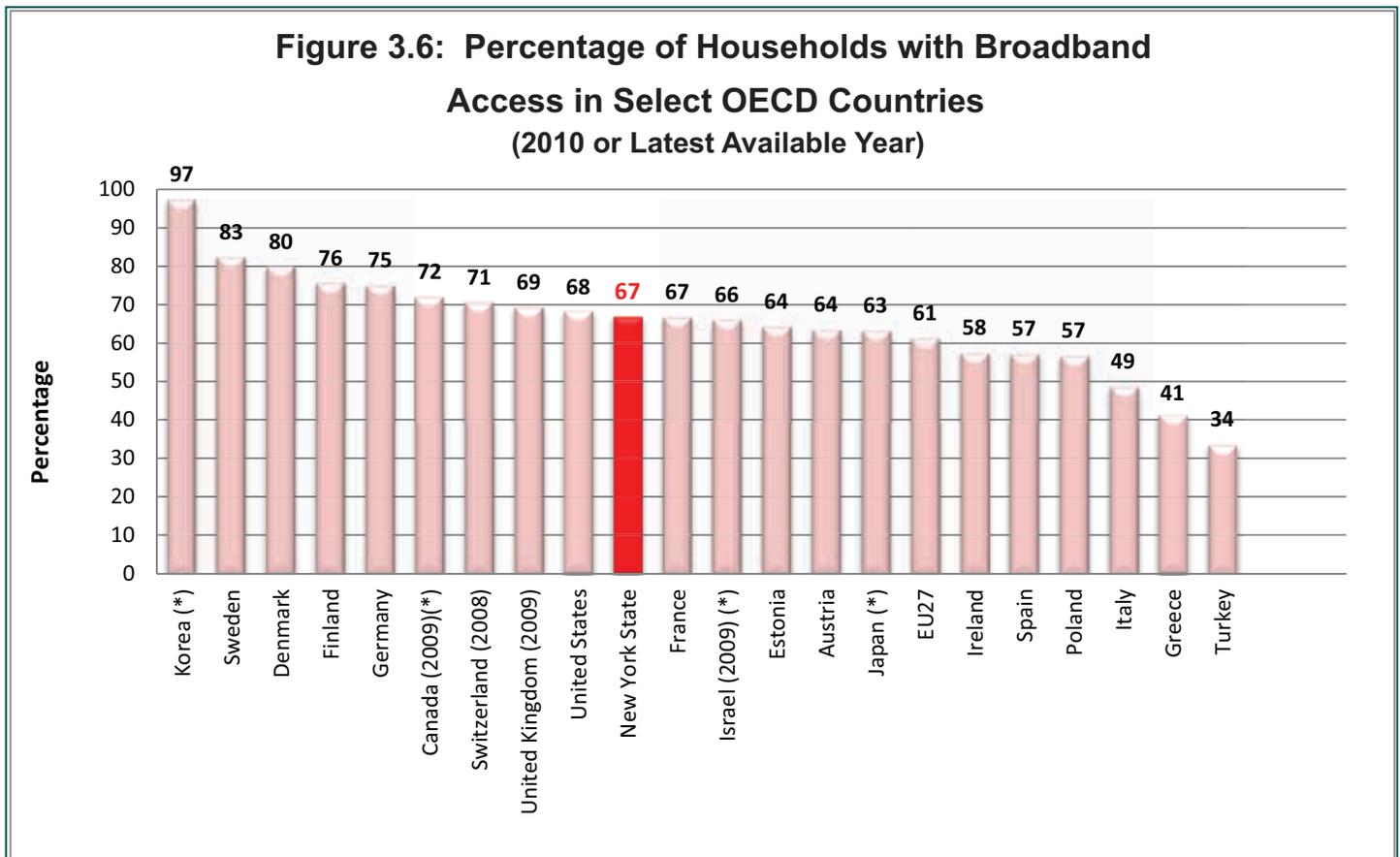
Broadband availability data further indicates:

- Approximately **81%** of the people living in the North Country can access download speeds of 6 Mbps or above.
- Approximately **87%** of people living in either the Mohawk Valley or Southern Tier regions are able to access broadband at download speeds equal to, or higher than, 6 Mbps.
- Approximately **97%** of people living in the five boroughs of New York City are able to access broadband speeds of 6 Mbps or more, leaving approximately 250,000 unable to access speeds greater than the FCC minimum.
- Approximately **43%** of all New Yorkers are able to receive broadband at advertised speeds greater than 100 Mbps. The goals of the National Broadband Plan include at least 100 million U.S. homes having affordable access to actual download speeds of at least 100 megabits per second by 2020.

Broadband Adoption in New York State

Access to broadband is not the only problem facing New York State. The adoption of broadband by New Yorkers is an even larger issue. Based on results gathered from the New York State Broadband Adoption Rate Study conducted in June 2010, the State has a broadband adoption rate of **70%**, which translates to 6.4 million people who are either unable to subscribe to broadband or do not see the value in subscribing. Notable disparities between demographic groups continue. People with lower incomes, lower education levels, minorities, non-family households and the non-employed tend to lag behind other groups in home broadband use. The major barriers to adoption include affordability, perception of need, and digital literacy. The results of the New York State survey align with other national adoption rate results.

- Using the most currently available adoption rate data, and when compared to the Organisation for Economic Co-operation and Development (OECD) global broadband rankings, New York State ranks 21 out of 35, slightly behind the overall U.S. rank of 22nd place. **Figure 3.6** highlights New York's adoption rank compared to select OECD countries.



- According to the latest National Telecommunications and Information Administration (NTIA) Broadband Adoption Report, New York ranked **23rd** in the nation for broadband adoption using data collected by the FCC.
- Broadband adoption in New York State varies considerably between demographics, such as level of income, race, education level, age, and employment status.
 - **Income:** The adoption rate for New Yorkers earning less than \$20,000 was 37%, compared to an adoption rate of 84% for those earning between \$60,000—\$100,000.
 - **Race:** The adoption rate for Asian New Yorkers was 82%, compared to non-Hispanic White New Yorkers at 69%, and African-American New Yorkers at 60%.
 - **Education:** While New Yorkers with a Bachelor's Degree subscribed to broadband at a rate of 84%, those with only a High School Diploma subscribed at a rate of 58%.
 - **Age:** In general, younger New Yorkers tend to use broadband at much higher rates than older New Yorkers, with those in the 18-24 year old range adopting at an 82% rate, followed by 73% for 25-34 year old, leaving those at 65 years old or above adopting at the lowest rate of 39%.
 - **Employment:** New Yorkers with a full-time job adopted at almost 80%, while those who have been out of a job for more than one year adopt at a rate of 53%.

Federal, State, and Private Investments are Funding Major Broadband Projects in New York

Significant broadband investments were announced by Governor Cuomo during the first round of Regional Economic Development Council (REDC) grants. In December 2011, Governor Cuomo awarded more than **\$2 million** in funding for broadband projects (see **Figure 7.1**) and in early 2012 committed an additional **\$25 million** during round two to expand broadband into rural and underserved urban areas.

In addition to State funding, more than **\$160 million** in Federal Broadband Stimulus Funding was awarded through the American Recovery and Reinvestment Act (see **Figure 7.2**). Capitalizing on the federal funding, New York State public and private entities have several projects well underway. These projects will expand broadband coverage in underserved and unserved rural and urban communities; advance digital literacy proficiency levels in communities at or below the poverty level; and most importantly, save and create jobs.

Moving Forward

The goal of New York's Broadband Strategy is to provide universal broadband access to every New Yorker; encourage the use of broadband related services, encourage e-government programs and telemedicine initiatives; and provide digital literacy programs to foster sustained use of the Internet to enhance quality of life. With the leadership Governor Cuomo has demonstrated in ensuring that New York receives its fair share of all federal funding, and the well thought-out Broadband Strategy the New York State Broadband Development and Deployment Council established – we are ready to make New York a leader in broadband availability and adoption.

The advancement of broadband capabilities is vital for New York to remain competitive on a national and global scale. The Broadband Program Office will continue to advance New York's broadband agenda. With continued support from the Office of Cyber Security's data collection and mapping efforts, and with Governor Cuomo's vision, we will ensure New York becomes a national leader of broadband development for the benefit of our State's citizens, businesses, and visitors. Only then, can New York achieve and sustain a national and global competitive advantage.

Notes About the Data Presented in This Report

Population numbers, percentages, and summed totals depicting broadband availability are rounded estimates adjusted to compensate for the prescribed data reporting methodology which assumes ubiquitous broadband availability in every reported census block.

Rounding Methodology:

The rounding method used to present the data estimates at the appropriate level of precision is:

<u>Values</u>	<u>Rounded To Nearest</u>
≥ 10,000,000	250,000
≥ 1,000,000	25,000
≥ 500,000	12,500
≥ 100,000	2,500
≥ 50,000	1,250
≥ 10,000	250
≥ 1,000	25
≥ 100	5

All Availability Data and Maps Provided:



Mobile Wireless Service Excluded

All references to “Home Broadband” service include wireline (DSL, other copper wireline (e.g. T1), cable modem, and fiber to the home - FTTH) and fixed wireless technologies. While mobile wireless service continues to expand in New York and the rest of the country, and this technology has the potential to reach speeds comparable to some wireline broadband technologies, mobile wireless access is not included in the definition of home broadband service in this report.

The FCC currently does not consider mobile broadband service as an indicator of home broadband availability, as measured and reported in the FCC’s Annual Broadband Progress Report.¹ Additionally, usage caps and usage based pricing present formidable challenges for some unserved residents to use this technology for primary home broadband Internet access. While the FCC currently excludes mobile broadband service from its definition of home broadband, this may be revised in future reports.²

Satellite Broadband Service Excluded

New York is 100% served by satellite broadband providers, which is often the only service option for many rural New Yorkers. While satellite broadband service can provide speeds higher than dial-up access, technical limitations, usage caps, and usage-based pricing exclude this technology for reporting the availability of home broadband Internet access.

1. From the FCC Seventh Broadband Progress Report – May 20, 2011:

“Recognizing that mobile technology is evolving rapidly, and that mobile services capable of actual speeds above the 4 Mbps/1 Mbps benchmark are becoming increasingly common, we intend to revise our approach in future reports as we receive updated and improved data. We recognize that the mobile wireless broadband data NTIA collected are useful for many purposes and were gathered for reasons other than enabling the Commission to prepare its 706 reports (FCC Broadband Progress Reports). We invite suggestions as to how the Commission could obtain mobile wireless broadband data that reliably shows the extent to which subscribers are able to obtain the 4 Mbps/1 Mbps speed threshold.”

2. From the FCC Notice of Inquiry for FCC’s Eighth Broadband Progress Report:

“In the 2011 Seventh Broadband Progress Report, the Commission did not include mobile wireless data in its analysis of the SBDD Data in part due to serious concerns about the accuracy of data regarding mobile broadband speeds. The Commission noted that the SBDD Data reflected network status as of June 30, 2010. At that time, most mobile broadband services relied on either Evolution- Data Optimized (EV-DO) or High Speed Packet Access (HSPA), two 3G technologies that—as deployed at that time—were unlikely to reach the broadband benchmark. Notwithstanding that fact, many providers reported their 3G mobile broadband offerings as providing 3 Mbps/768 kbps. With other technologies—such as HSPA+, LTE, and mobile WiMAX—being rolled out in more areas, and with updated and improved SBDD Data, should the Commission include mobile wireless in its analysis of SBDD Data in the next report? To the extent the Commission is unable to rely on SBDD Data to estimate mobile broadband deployment, we invite comment on whether and how the Commission should use other data sources, such as Form 477 and American Roamer, to analyze mobile wireless broadband deployment. Are there any other wireless-specific issues relate to the SBDD Data that we should consider in the next report?”

4.0 State of Broadband Availability in New York



Broadband availability continues to be an issue in parts of New York. Approximately 700,000 New York citizens (325,000 households) do not have access to any broadband connection. The number of New York citizens without high-speed access to the Internet is more than the entire population of Vermont (and nine other states and U.S. territories). These citizens are truly the “unserved” residents of New York. Ensuring universal broadband access for every New Yorker should start by facilitating broadband access in the unserved areas of the State.

One of the first steps toward achieving this goal is to clearly understand the existing broadband landscape. In 2010, New York launched the first statewide map depicting the availability of high-speed Internet service. Citizens were invited to explore the map and find out about the availability of broadband in their own backyards. By entering a street address, visitors can see a list of broadband providers who offer service in their neighborhoods, the types of broadband service and advertised service speeds, and provider contact information to subscribe for service. The map also allows visitors to view other relevant information, including the availability of each type of broadband service including Digital Subscriber Line (DSL), cable modem, direct fiber connection, wireless, as well as the number of competitive service types in each neighborhood. Finally, the map permits visitors to display those areas of the State without broadband coverage.

The data to populate the map is obtained from broadband providers aggregated and presented on the map.

“The Office of Cyber Security continues to work closely with the Broadband Program Office to expand high-speed Internet service in New York and to ensure that all State citizens benefit from the availability of service. Highly-accurate, current broadband availability data will help the State maximize the efficiency of its investments in the expansion of broadband service.”

– Thomas D. Smith, Director,
NYS Office of Cyber Security

Visit the New York State Broadband Map to find out how connected your community is and about broadband at your address. www.broadbandmap.ny.gov.

The screenshot displays the New York State Broadband Map interface. At the top, it shows the state logo, navigation links for State Agencies, Home, The Basics, The Program, In Depth, Compare Areas, Glossary, Participating Providers, and Contact Us. The main map area shows a street grid in Utica, NY, with a red pin and a red box highlighting the location of 1 Kennedy Plaza. A dialog box titled "Location Confirmation" is overlaid on the map, asking "Is this the correct location for: 1 Kennedy Plaza Utica, NY 13502" and providing "Yes" and "No" buttons, along with a checkbox for "Don't Show This Message Again".

On the right side, a search results panel is visible. It includes a search bar, a "Find" button, and a "Results" section. The results are categorized by "Wireline", "Wireless", and "Satellite". Under "Wireline", there are three providers listed: "Level 3 Communications", "One Communications", and "Time Warner Cable". The "Time Warner Cable" entry is expanded, showing a table of speeds:

Cable	
Max Download Speed:	50 mbps
Max Upload Speed:	5 mbps
Plan 2 Download Speed:	30 mbps
Plan 2 Upload Speed:	5 mbps
Plan 3 Download Speed:	10 mbps
Plan 3 Upload Speed:	1 mbps

Below the table, it states "All speeds listed are advertised speeds." Under "Wireless", there is one provider listed: "Verizon New York". At the bottom of the results panel, there are buttons for "Report an Unserved Address" and "Clear Results", and a "Layers" section.

In addition to availability, another key aspect is whether the broadband service available in communities across the State is fast enough to support specific applications. For example, a hospital would need download speeds of at least 10-25 Mbps to effectively use broadband for telemedicine – anything less would be insufficient to meet the speeds required to support the transmission of large files.

In 2010, www.speedmatters.org ranked New York State **5th** in the nation for broadband download speeds. Although keeping pace on a national level, New York still lags behind a number of smaller, less populated States. **Figure 4.1** shows how New York State has historically ranked among the top 10 States for broadband speed.

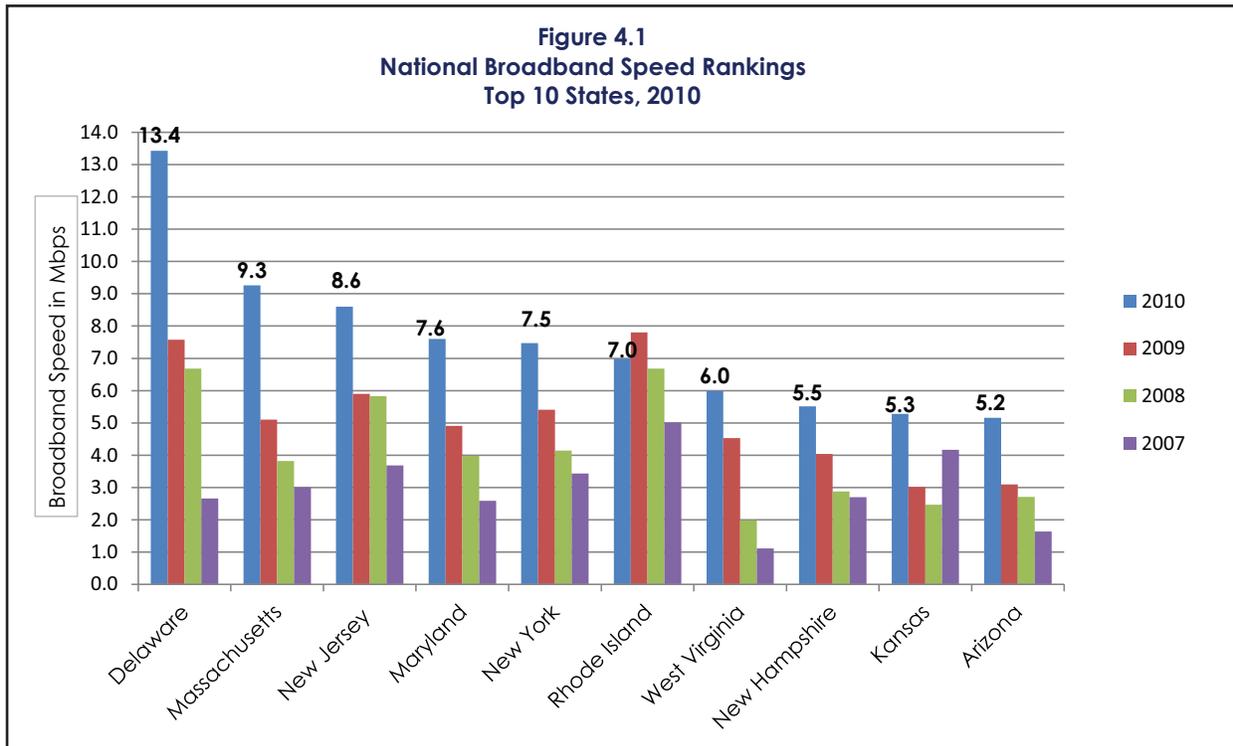


Figure 4.2 provides comparisons based on population, square miles and counties per region.

Figure 4.2 Availability of Home Broadband Speeds At or Above 6 Mbps*

NYS DED Region	# of Counties in Region	Area (sq miles)	Population 2010	Estimated Population Speeds ≥ 6 mbps	Estimated % Population Speeds ≥ 6 mbps	Estimated # of People Without Access to Speeds ≥ 6 mbps
Mid-Hudson Region	7	4,764	2,290,851	2,225,000	97%	66,250
Long Island Region	2	2,819	2,832,882	2,750,000	97%	82,500
New York City	5	470	8,175,133	7,925,000	97%	250,000
Finger Lakes Region	9	6,757	1,217,156	1,150,000	94%	67,500
Western NY Region	5	6,233	1,399,677	1,300,000	93%	100,000
Capital Region	8	5,333	1,079,207	1,000,000	93%	78,750
Central NY Region	5	4,250	791,939	725,000	92%	67,500
Southern Tier Region	8	6,251	657,909	575,000	87%	82,500
Mohawk Valley Region	6	5,295	500,155	435,000	87%	65,000
North Country Region	7	12,399	433,193	350,000	81%	83,750
NYS Totals:	62	54,571	19,378,102	18,500,000	95%	875,000

DISCLAIMER: Population numbers, percentages, and summed totals depicting broadband availability are rounded estimates adjusted to compensate for the prescribed data reporting methodology which assumes ubiquitous broadband availability in every reported census block.

*Broadband speed data was collected based on advertised speeds within defined tiers, per guidelines established by NTIA. 6 Mbps is the closest speed tier comparison to the FCC's minimum broadband speed of 4 Mbps Download / 1 Mbps Upload.

The State Office of Cyber Security (OCS) is also conducting a "New York State Speed Test" to collect actual broadband speeds consumers are experiencing and where they are located. To test your computer's broadband connection speed, visit www.nyspeedtest.org/.

Broadband Project Spotlight

White Space and the Town of Thurman

The Town of Thurman, located in the western part of Warren County and home to approximately 1200 residents, is an example of the challenges many small communities face when it comes to broadband access. Covering an area of just about 93 square miles, more than one-third of Thurman residents do not have access to broadband.



The town is served by two wireline providers, who cannot justify an investment in expensive infrastructure with a low return on investment. With a very low housing density, the cost to build a wireline network in rural areas can exceed \$20,000 per mile, making investments prohibitive for most private providers. After investments in physical infrastructure (fiber, network equipment, home devices), make-ready costs (permits, pole attachment fees, easements, franchise fees), and network maintenance expenses, broadband providers have no guarantees that customers will subscribe to their service.

Recognizing the value of high-speed Internet access and the tremendous benefits broadband brings to small rural communities like Thurman, town officials set out to explore innovative solutions to solve the access problem. In May 2012, the Town Board approved the use of a new wireless broadband technology called "White Space." White Space for broadband uses the frequencies between analog television signals to transmit broadband signals wirelessly.

Already popular in Europe, the Federal Communications Commission (FCC) only recently approved the new technology. "White Space is similar to WiFi technology, but is widely considered better-suited to rural areas because the signal isn't impeded by trees, buildings or even mountains," the FCC reports. New York has a very diverse terrain and the Adirondack Park's mountains and valleys impede line-of-sight technology. White Space can offer unique advantages to providing broadband access to the geographically challenged areas of the State.

"Unleashing white space spectrum has the potential to exceed even the many billions of dollars in economic benefit from WiFi," said FCC Chairman Julius Genachowski when announcing the approval.

Town of Thurman Supervisor Evelyn Wood is exploring a partnership between the town and a nearby broadband provider to use the new technology. Utilizing specialized equipment and a technology solution comprised of both wired and wireless access, White Space can provide a solution for remote areas of the State, where trees and mountains limit traditional wireless broadband options, and are cost prohibitive for wireline technologies.

"The importance of access to broadband in rural areas, particularly in the Adirondacks, cannot be emphasized enough. Today's society and economy requires high-speed Internet access. The growth and competitiveness of business, the quality of our children's education, access to telemedicine - even our ability to sell homes, depends upon our ability to offer high-speed Internet access. Without broadband access, our youth will continue to move away, our businesses will suffer, and communities will continue to struggle. There is no doubt that access to broadband is every bit as necessary as electricity and we must work to meet that need."

– Evelyn Wood
Town Of Thurman Supervisor



5.0 Broadband Adoption and Use in New York State

2011 marked the release of the State's first and only examination of the use of high-speed Internet which analyzes the availability and adoption of broadband Internet services in New York.¹ The study was conducted to explore the opportunities and benefits associated with broadband adoption that are currently available to citizens in New York State. The following questions were addressed:

1. How do the demographics of New York State (income, level of education, race, region, and age) affect access to, and uptake of, broadband Internet services by New York State residents?
2. What factors affect the access to, and uptake of, broadband Internet services by New York State residents?
3. What are the barriers to adoption of broadband services (e.g. cost, education, language, other cultural factors)?

The results indicated that the overall State broadband adoption rate is **70%**, slightly higher than the national average of 65 %, but problems such as affordability and digital literacy are significant obstacles to adoption for economically and socially disadvantaged New Yorkers.

"Low-income Americans, rural Americans, seniors, and minorities disproportionately find themselves on the wrong side of the digital divide and excluded from the \$8 trillion global Internet economy, and all of its benefits. In the 21st century, having one-third of Americans sitting on the sidelines is as unthinkable as having one-third of our country without electricity in the 20th century."

– FCC Chairman Julius Genachowski

¹ For data reported in the New York State Adoption Rate Study, margins of error depend on the sample size used. For the main sample, the margin of error is +/- 3%.

In an Internet Usage Report¹ published by the U.S. Department of Commerce, National Telecommunications and Information Administration (NTIA), adoption rates for New York State were slightly lower at 69%. New York is ranked in the middle of the pack when compared to other States, with Utah having the greatest penetration rate of nearly 80%. **Figure 5.1** shows percentage of U.S. households using broadband by State for 2010 as reported by the NTIA.

¹ EXPLORING THE DIGITAL NATION: Computer and Internet Use at Home, Prepared by Economics and Statistics Administration and National Telecommunications and Information Administration U.S. Department of Commerce November, 2011: http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_computer_and_internet_use_at_home_11092011.pdf

Figure 5.1: Households Using Broadband in the Home by State by the end of 2010

State	% with Broadband Internet	State	% with Broadband Internet
Utah	79.7	New York	69.0
New Hampshire	77.8	Illinois	68.7
Washington	76.7	Georgia	68.6
Massachusetts	75.9	Delaware	68.4
Connecticut	74.8	Iowa	67.5
Oregon	74.7	Maine	67.4
Kansas	74.6	Pennsylvania	67.4
Nevada	74.2	Texas	66.8
Arizona	74.2	Michigan	66.3
Maryland	74.1	South Dakota	65.5
Alaska	73.4	North Carolina	65.1
New Jersey	73.3	Missouri	64.3
California	73.1	Ohio	63.9
Wyoming	72.9	Oklahoma	62.5
Idaho	72.0	Montana	61.4
District of Columbia	71.7	Louisiana	60.5
Colorado	71.6	South Carolina	59.5
North Dakota	70.9	Tennessee	59.5
Rhode Island	70.7	West Virginia	59.1
Minnesota	70.6	Indiana	58.8
Wisconsin	70.5	Kentucky	57.8
Florida	70.2	New Mexico	57.7
Virginia	69.5	Alabama	55.5
Vermont	69.2	Arkansas	52.4
Hawaii	69.2	Mississippi	51.7

"This isn't just about faster Internet or fewer dropped calls. It's about connecting every part of America to the digital age. It's about a rural community in Iowa or Alabama where farmers and small business owners will be able to sell their products all over the world. It's about a firefighter who can download the design of a burning building onto a handheld device; a student who can take classes with a digital textbook; or a patient who can have face-to-face video chats with her doctor."

– President Obama, State of the Union Address,
January 25, 2011

On a global perspective, New York is slightly ahead of the U.S. in broadband penetration (the U.S. ranks 15th in the world), but falls behind many other leading nations. **Figure 5.2** shows New York rankings when compared to G7 countries.

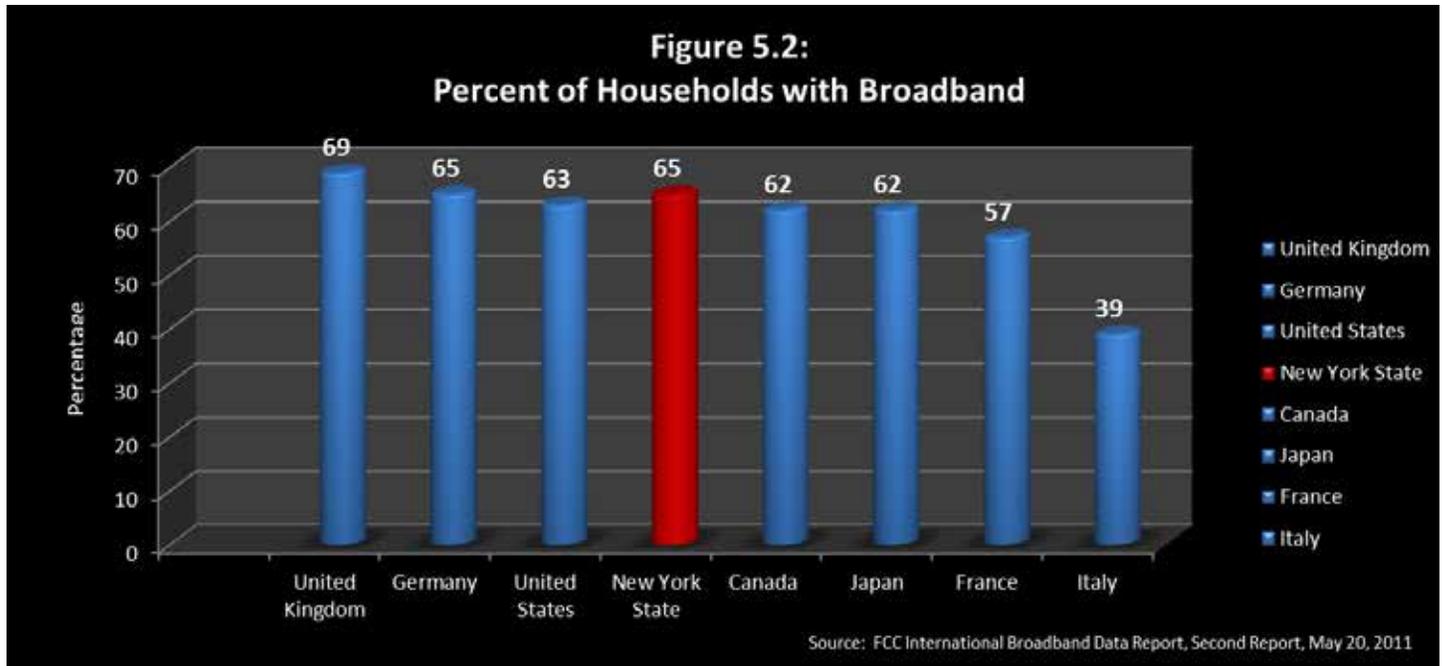


Figure 5.3 provides comparisons based on population density, gross domestic product and education levels.

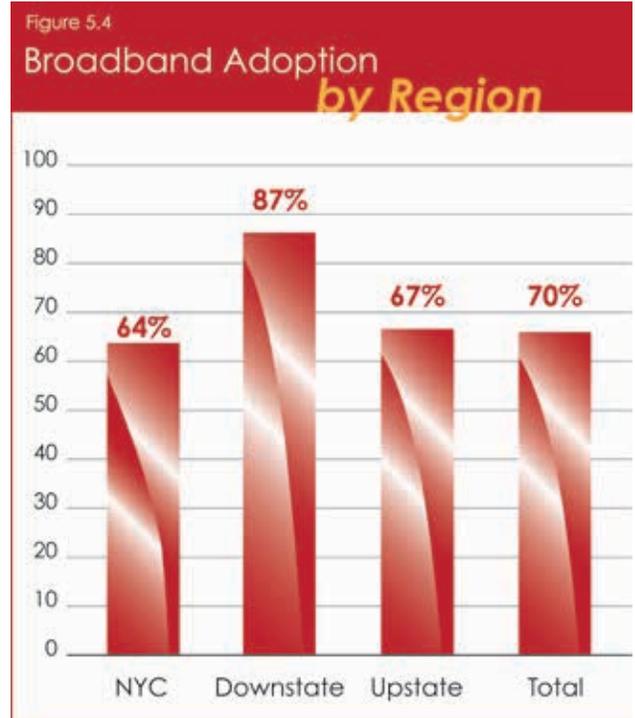
Community	% Households with Broadband	Population Total	Population Density (avg population)	GDP Total (U.S. \$M)	GDP per Cap	Education % of Labor Force with Tertiary Education
United Kingdom	69	61,179,300	250	2,131,507	34,954	36
Germany	65	82,002,356	230	2,853,157	34,748	28
United States	63	309,280,117	33	14,165,565	46,588	N/A
New York State	65	19,490,297	159	1,144,480	58,721	29
Canada	62	33,739,859	4	1,299,895	39,004	59
Japan	62	127,771,000	338	4,972,265	38,916	24
France	57	64,367,000	118	2,071,782	32,460	31
Italy	39	60,045,068	198	1,840,070	30,990	18

Source: FCC International Broadband Data Report, Second Report, May 20, 2011

While broadband is widely available in New York State, it is far from universally available. We must find ways to help New York's households take advantage of broadband when it is available to them and improve overall adoption rates. More than **30%** of households are not harnessing the social and economic opportunities of the digital age.

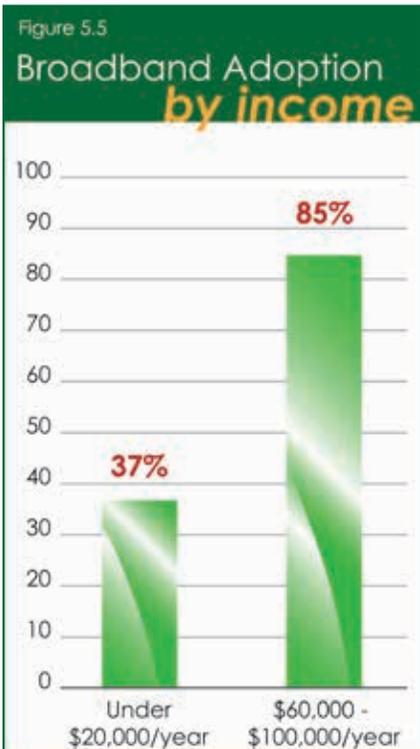
Broadband Adoption by Region

Despite higher availability rates in New York City, broadband adoption rates are slightly below the overall State adoption rate. However, when the multi-county downstate region is considered, the adoption rate jumps considerably to **87%**. This is likely due to the prevalence of higher incomes in that region of the State. **Figure 5.4** shows broadband adoption rates by region.



Broadband Adoption by Demographics

The main access divisions are along socioeconomic dimensions for income and education. However, other notable disparities between demographic groups such as age, race, non-family households, and the non-employed exist and these groups also tend to lag behind in home broadband use. **Figures 5.5 through 5.9** indicate the disparities by specific demographics.



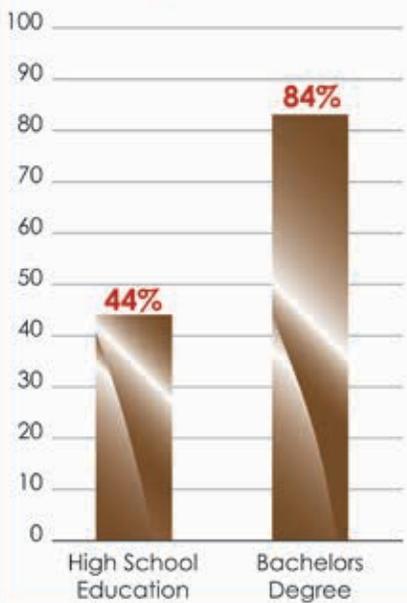
5.5: Broadband Adoption by Income

Thirty-seven (37)% of New York households with annual incomes \$20,000 or below have broadband at home, while 85% of New Yorkers with incomes from \$60,000 to \$100,000 have broadband at home. New Yorkers in the lowest income tier also have the highest number of households who do not want broadband services, even if it were available. This suggests the lack of affordability is a substantial barrier to broadband adoption among a large proportion of New Yorkers.



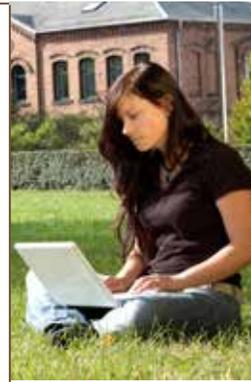
Figure 5.6

Broadband Adoption by Education



5.6: Broadband Adoption by Education

Since level of education directly affects income, it is no surprise that adoption rates are higher for New Yorkers with higher levels of education. Forty-four (44)% of adults whose highest level of education is a high school diploma are broadband users at home, while 84% of adults who graduated from college with a bachelor's degree are broadband users at home.

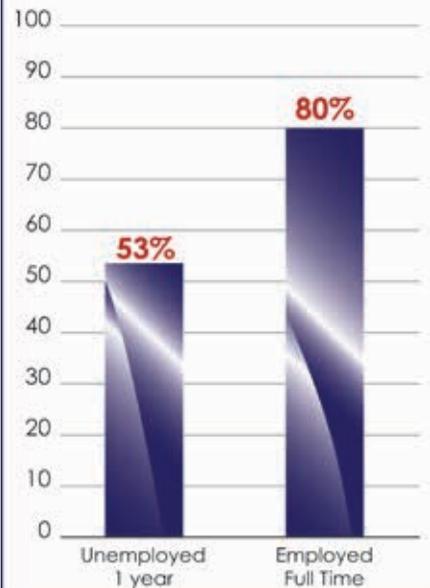


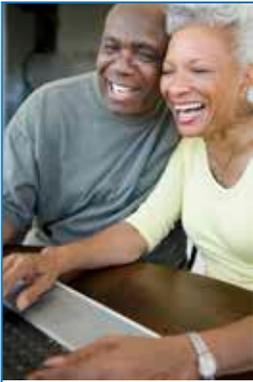
5.7: Broadband Adoption by Employment Status

Broadband adoption rates in relation to employment status reinforces the importance of addressing affordability as a barrier. The higher adoption rates in relation to employment are among those employed respondents who are most likely able to afford access. Those retired and unable to work have the lowest adoption rates, reflecting lower ability to pay and reduced need or desire.

Figure 5.7

Broadband Adoption by Employment Status





5.8: Broadband Adoption by Age

The highest adoption rates are in the lower age ranges, 18-24, and the lowest adoption rates are found in seniors 65 or older. Income is a factor in adoption for the over-65 age bracket, as seniors in that age bracket are typically on a fixed or lower income. In addition, computer technology and familiarity and online activities generally tend to be lower among older New Yorkers.

Figure 5.8
Broadband Adoption by age

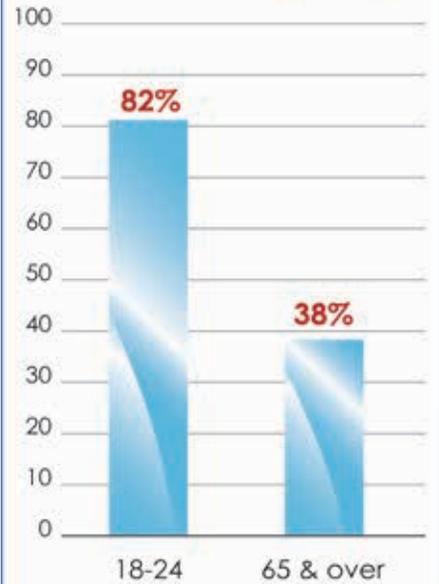
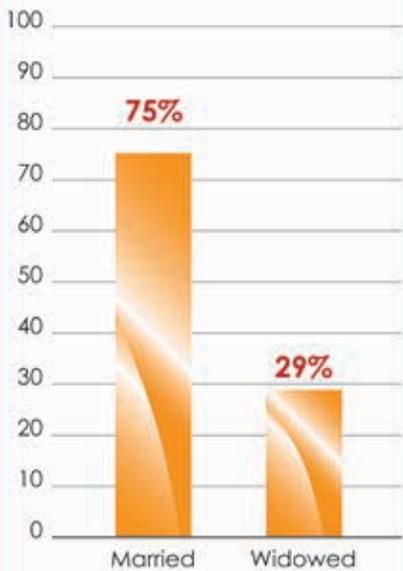


Figure 5.9
Broadband Adoption by Marital Status

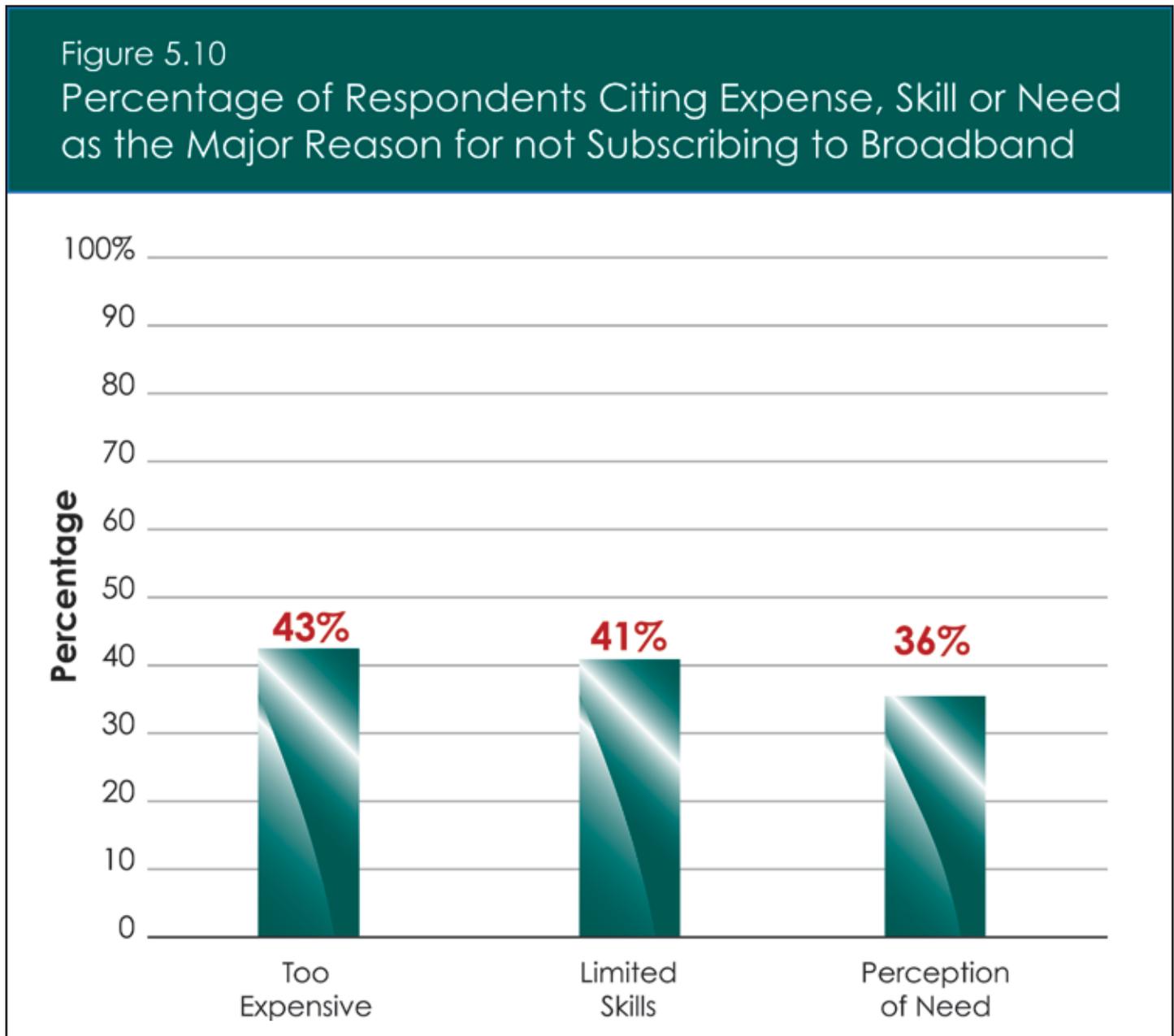


5.9: Broadband Adoption by Marital Status

The correlation of broadband adoption rates with marital status mirrors the patterns found with age, income and education. Respondents that are married, never married, or living with a partner have the highest adoption rates because these groups typically are younger with higher incomes and education levels. As a result, they are more likely to have a preference for, and are able to afford broadband.



Although New York State's adoption rate is slightly higher than the national average, **6.4 million** New Yorkers do not subscribe. Top reasons for low adoption rates include affordability, limited technical proficiency and low perception of need. These reasons were fairly consistent across all demographics. **Figure 5.10** illustrates the prevalence of each broadband adoption barrier.

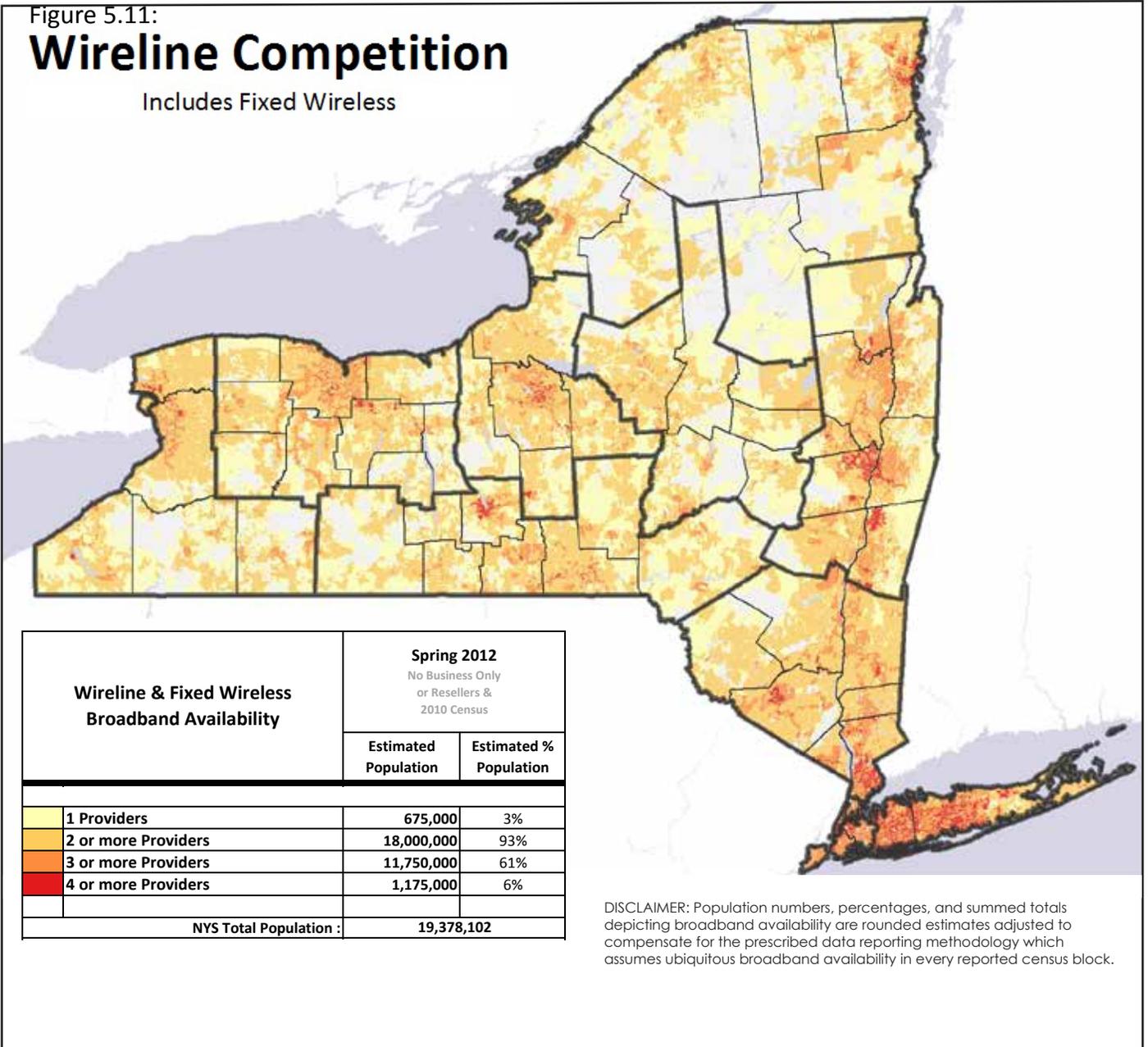


Promoting wireline competition is essential to position New York to increase our State's broadband adoption rates. Competition translates into lower prices, higher speeds, more innovation, and better customer service. With nearly **13 million** broadband users in New York State, many subscribers have limited choices in selecting a provider. **Figure 5.11** indicates broadband competition throughout New York State.

Figure 5.11:

Wireline Competition

Includes Fixed Wireless



The adoption rate data also complements New York State mapping efforts by tracking and measuring broadband availability by overlaying adoption rate statistics and other demographic information. This enables New York State to focus on areas that require more intense measures to raise adoption rates or address availability gaps.

The sample size used for the State Adoption Rate Study is larger than most national adoption rate studies, analyzing data collected through interviews of more than 3,000 households,

Visit www.broadbandmap.ny.gov/documents/adoption-study/NYS-Broadband-Adoption-Study-BW.pdf to view the full New York State Adoption Rate Study.

6.0 Sector Analysis

The Benefits of Broadband

With affordable broadband technology as an equalizer, distance is no longer an obstacle to information and economic opportunity across business sectors. With broadband Internet connectivity, citizens living in Schoharie County are no longer isolated from the larger economy of Manhattan; a private entrepreneur in Chemung County can pursue a global business opportunity to compete with a public company in London; through telemedicine, a family in Washington County can obtain medical advice as readily as someone living two blocks from a major medical facility; a farmer in rural upstate can access veterinary services and suppliers; and New York's students can have access to educational resources from across the globe.

Whether its education, healthcare, public safety, or government, high-speed Internet capabilities are necessary to connect citizens, businesses and communities. The following information shows how each sector can benefit from broadband.

Healthcare



An expansion of broadband could improve the health of New Yorkers through telemedicine, electronic prescriptions, electronic medical records and broader means of

communication. Broadband use in the healthcare industry can greatly enhance patient care; can improve doctor/patient relationships; and can assist physicians with treating patients. For example, doctors can write an online script or submit online prescription renewals on behalf of a patient and contact a patient with results of a test or appointment reminders. Opportunities for learning are also broader. Doctors can view surgeries in real time or share patient files with other physicians on the efficacy of a course of treatment.

New Yorkers living in rural areas face additional healthcare challenges. According to a report released by the United-Health Center for Health Reform and Modernization¹, rural residents tend to be in poorer health, and have limited access to primary-care physicians than people in urban areas. Studies also have shown that rural Americans experi-

¹ Modernizing Rural Health Care: Coverage, Quality and Innovation, UnitedHealth Center for Health Reform & Modernization
<http://www.unitedhealthgroup.com/newsroom/news.aspx?id=cbfb7c73-7b8-47c1-a679-d953d6596510>

ence more chronic conditions such as diabetes and heart disease than those living in larger metropolitan or urban areas. While there will be a universal shortage of tens of thousands of physicians within the next ten years, rural New Yorkers experience more difficulties accessing quality health care services.

Broadband enabled applications such as telemedicine, electronic health records, and even simpler technology solutions such as e-mail communications and health related information available on the Internet, have become an important solution to these challenges. Through telemedicine, opportunities to healthcare and resources can be greatly improved for patients in rural New York communities.

Education



Broadband permits a wide variety of online learning experiences. However, e-learning requires security, capacity, availability, world-wide connectivity,

and equipment which may not be available in many of New York's educational communities. Even when available at school, many disadvantaged students lack these capabilities and resources at home. These communities need expanded bandwidth, more computer workstations, and affordable access to the Internet in order to be full participants in the global education arena.

Students can use tools online to take courses from anywhere around the globe. They can watch videos or look at famous works of art; conduct online chats with teachers, counselors or students from around the world who may be studying the same information; and have expanded access to instructional resources, e-books or library-based information. With advanced broadband capacity educational opportunities become endless.

e-Government



As citizens become more proficient using emerging online applications in the private sector, they are demanding the same level of online services from

government. State, county and local governments are increasingly using the Internet as a way to bring vital government services to citizens and businesses in a way never previously envisioned.

Government agencies use online applications as portals to collect and share important information with other government agencies and citizens; provide access to citizens for public services or to apply for government services such as food stamps or student loans; and to process payments for services like obtaining a new driver's license or registering a car. To meet this growing demand, New York State agencies are moving more transactions to the Internet. The number of New York State government citizen self-service online applications grew by **46%** over a 3 year period from **392** applications in **2007**, to **574** online applications in **2010**.

Agriculture



Contrary to some popular misconceptions, agriculture is an industry which is increasingly relying on broadband enabled

applications to manage farming operations, monitor market conditions, perform crop analysis to determine seasonal yields, and communicate with customers, suppliers, and veterinary services. Broadband plays an important role in connecting farms to national and international markets. It is essential that we deliver broadband to our farmers in rural areas if we want to restore and sustain economic growth and opportunity for New Yorkers residing and working in those regions. Farmers and agriculture-related businesses will not be able to fully compete until they possess the ability to make full use of the vast array of broadband technologies.

Broadband also enables precision farming, which is a management technique that relies on global positioning through satellite imagery, geospatial tools, and applications designed to permit the farmer to monitor and track crops and land in ways that were not possible previously. This sophisticated analysis enables farmers to estimate crop yields, and apply the correct amount of water, fertilization, pesticides, and other elements to improve crop yields, while reducing time and supply expenses. In order to continue to thrive in an increasingly difficult economic environment, our farmers need a combination of physical access to affordable broadband, education and training to use technology to manage their businesses.

"As a State, we must address the challenges facing agriculture in order to guarantee the future success of the sector and ensure that agriculture plays a central role in our economic revitalization"

- Governor Andrew M. Cuomo
State of the State Address, 2012

Public Safety



First responder safety is New York's priority. However, today, first responders from different jurisdictions and agencies are often unable to communicate during

emergencies. First responders need broadband so they can seamlessly share information across public safety agencies, jurisdictions and counties; to support seamless disaster management between branches and levels of government; and to support homeland security networks. Broadband can also make emergency alert systems more capable by enhancing the way New Yorkers are notified about emergencies and disasters allowing for better protection of lives.

The number of innovative applications available for the consumer market continues to increase as device and application developers utilize technological advances to stretch our current limits and capabilities. While most people with a Smartphone can communicate real-time with friends and family, use GPS applications to navigate a vehicle, scan a barcode to quickly check a product review or best price, our public safety communities continue to rely on outdated radio communications with expensive devices with limited functionality.

A broadband interoperable public safety network would enable each segment of the public safety community to communicate with each other, across jurisdictions, and between agencies. Fire personnel could coordinate a rescue operation with police officials, EMS providers could summon law enforcement, and critical information can be relayed to all first responders simultaneously. In addition to the benefits broadband brings to communications, the potential broadband enabled applications bring to the public safety community is both transformative and lifesaving. Consider the following applications for law enforcement:

License Plate Reader - By taking a photo using a smart-phone or Tablet PC's camera, the investigator can auto-



Broadband Project Spotlight Osceola Library

According to Osceola Librarian Leona Cheresnoski, in the tiny town of Osceola where only 250 permanent residents



reside, "everything is just faster." This is due to the fact that the whole community is benefiting from

newly adopted broadband technology.

In 2008, the New York State Education Department was awarded \$235,500 from the State Universal Broadband Grant Program to provide broadband access and upgrade existing access in public libraries located in high-need communities. As part of the program, the Osceola Library was able to bring broadband access to the town through a partnership between the North Country Library System and a local, private Internet provider. The library, located in a repurposed church building, is the hub for the broadband access connection and serves as the town's anchor allowing residents at home to connect.

Since receiving broadband access, the library's number of computer stations has doubled to support the increased usage. The town's users are now reaping the benefits of high-speed Internet and use it for email, research, interlibrary loans, accessing e-government services and running home businesses more effectively.

mate the process to capture the license plate information to determine if the car is stolen and its registered owner. Not only can the photo be stored, but information such as location and date/time can be useful intelligence.

Fingerprint Identification - Through technologies tethered to the smartphone or tablet, the fingerprint of a subject can be collected and searched against Law Enforcement databases to quickly identify a person and quickly assess the level of threat.

Facial Recognition - By taking a picture with a smartphone or tablet, a subject's photograph can be matched against existing databases, such as the DMV or law enforcement databases to determine identity.

Source:

<http://www.whitehouse.gov/sites/default/files/uploads/publicsafetyreport.pdf>

These applications exist today, along with many other applications for fire, EMS, and other emergency services. Broadband can unleash the potential which exists across the entire spectrum of public safety and first responder services, while saving the lives of our first responders and the public.

"Broadband continues to be an important element of economic development efforts in counties across New York. Expanding broadband access in underserved communities is fundamental to ensuring sustainable and productive local economies. NYSAC remains committed to working with our federal and State partners to ensure county law enforcement has access to the newest and most innovative broadband technologies so they can better serve and protect the public. As technology evolves, broadband has become fundamental to creating interoperable public safety communications systems that connect first responders across local jurisdictions."

– Stephen J. Acquario, Executive Director
New York State Association of Counties (NYSAC)

"Presently, in almost any library, public computers are in use almost constantly, often by individuals searching for jobs, working on improving their computer skills, and looking for health and other types of information. It is grant programs like the one provided by New York State that have helped libraries continue to meet the technology requirements of library patrons and their communities."

- Jeffrey Cannell
Commissioner for Office of Cultural Education
and acting State Librarian



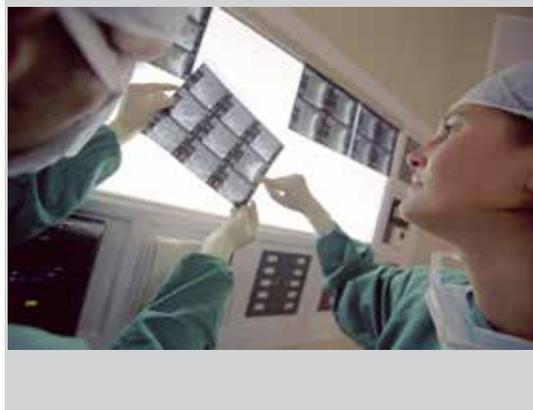
Broadband Project Spotlight

New York Digital Health Accelerator

Both public and private institutions are increasingly using the Internet to streamline the delivery of health information, and New York State is no exception. In a public/private partnership, the New York State Department of Health partnered with venture capital firms to launch the New York Digital Health Accelerator (NYDHA), a program that will make New York a hub for the emerging digital health technology industry. The initiative will help develop innovative approaches to improving patient outcomes at lower costs, while also helping to attract health care entrepreneurs to our State.

With the initial investment provided by a syndicate of investors, the NYDHA, is expected to create 1,500 jobs over five years and attract \$150-\$200 million in additional investment. The NYDHA will stimulate a new marketplace, creating the next generation of healthcare tools while positioning New York as the capital of the health IT entrepreneurial sector.

To learn more about the Digital Health Accelerator visit www.digitalhealthaccelerator.com.



Small Business



The Internet has transformed the way small businesses operate, communicate with employees, and interact with customers. As more and more New Yorkers conduct business online and are empowered with greater

choices, small businesses are becoming more dependent on broadband connections to stay competitive and take advantage of growth opportunities.

Small business owners with high-speed Internet are finding significant advantages with online tools and a web presence to help achieve business targets, improve competitiveness and efficiency, reach local, national and global customers, and locate and interact with suppliers. Broadband access can also reduce overhead costs through telecommuting, and extend the recruiting range for skilled employees.

With connectivity, an entrepreneur can launch a website or application from their living room; a small bike shop owner in Schoharie County can market and sell their merchandise nationally and globally just as easily as a big-box sporting goods store; a computer networking company in Rochester can recruit talent from larger metropolitan areas like New York City and Boston; and a candy store in Saratoga can find suppliers across the globe who offer discounts for buying in bulk.

In addition to a web presence, social networking sites such as Linked In, Twitter, Facebook, and Pinterest offer additional ways of networking for small businesses. Social networking sites expand the reach of business owners to market and sell their products and services, and generate buzz with little or no cost.

Broadband is a catalyst for small business growth and helps level the playing field. Whether your business is large, small, urban or rural, the benefits from broadband are limitless.

“Broadband can have a dramatic effect on small businesses -- a key engine for new job creation in our economy. Arming these businesses with cutting-edge technology and innovative tools doesn't just help local businesses reach local customers—it brings them a worldwide market for their goods and services.”

- FCC Chairman Genachowski





7.0 Investing in New York through State and Federal Broadband Funding

Even in challenging fiscal times, Governor Cuomo recognizes investments to expand broadband technologies in underserved and unserved, urban and rural communities, are necessary to position New York for future growth and prosperity. In December 2011, Governor Cuomo awarded more than **\$2 million** in funding for broadband projects during the first round of the Regional Economic Development Council Grants. The **\$2 million** will be distributed among four project sponsors, shown in **Figure 7.1**, to increase physical access to broadband services.

Figure 7.1: NYS Funding – Regional Economic Development Council (REDC) Broadband Projects

Region	County	Applicant	Description	Total Award
North Country	St. Lawrence	Development Authority of the North Country (DANC)	(DANC) will provide redundant broadband connectivity for Corning, Inc., a major employer in the county, and provide broadband to the Village of Rensselaer Falls.	\$250,000
Mohawk Valley	Oneida, Herkimer	Northland Networks Ltd	Northland Networks will build and maintain a fiber optic network spanning from Herkimer (Herkimer County) to Vernon (Oneida County).	\$703,500
North Country	Franklin, Hamilton	Slic Network Solutions	Slic Network Communications will construct 25 miles of fiber optic cable from Tupper Lake, Franklin County to Long Lake, Hamilton County.	\$596,000
North Country	Hamilton, Warren	Hamilton County/Frontier	Hamilton County will provide broadband access to communities throughout Hamilton County through a partnership with Frontier Communications. This project will install both middle mile and last mile fiber optic facilities to provide broadband service to several communities that currently have no existing broadband capacity.	\$472,000

Governor Cuomo also committed an additional **\$25 million**, from the \$75 million New York Works Economic Development Fund, to expand broadband Internet access to rural upstate and underserved urban areas of New York. The Governor's commitment amounts to the largest amount of State funding dedicated to broadband in New York State's history. The funding will extend high-speed Internet access in underserved urban and rural communities, enabling New York to create jobs and potentially provide more cellular telephone coverage in the Adirondacks. Broadband awards will be announced later this year.

Working to help New York State's first responders have the tools they need to protect New Yorkers in emergency situations, Governor Cuomo also committed **\$140 million** to improve the ability for first responders to communicate with each other by creating a communications network of regional partnerships and systems (including State agencies), fund new communications equipment and strengthen training for overall readiness. These awards are critical to improve first responder communications and help localities better respond to emergency situations. The Statewide Interoperability Communications Grant program, a multi-year, competitive reimbursement program, administered by the New York State Division of Homeland Security and Emergency Services is funded by state cellular surcharge revenue.

There has been a significant effort at the federal level to expand broadband use through federal stimulus money. Under the American Recovery and Reinvestment Act (ARRA) of 2009 more than **\$7 billion** was made available for broadband deployment. The Broadband Program Office facilitated the submission of **263** statewide grant applications that resulted in nearly **\$160 million** in ARRA funding to New York State project sponsors. This money is being used to expand broadband capacity in communities, improve public safety communications, expand online government services, provide new educational opportunities and leverage the state's university research and development capacity. **Figure 7.2** shows the New York State organization awarded federal broadband stimulus funds.

"As Governor, you have made opening New York State to business a top priority. The Regional Councils have been at the forefront of this effort, turning the tide and giving entrepreneurs and business leaders across the nation, and the globe, a reason to invest right here in the Empire State."

— Regional Economic Development Council Co-Chairs
from a letter sent to Governor Cuomo and Lieutenant Governor Duffy, May 3, 2012

Source: <http://www.governor.ny.gov/assets/050312REDCCoChairLaunch%20LetterFINAL.pdf>



Figure 7.2 New York State ARRA Broadband Funded Projects

APPLICANT	PROJECT DESCRIPTION	AWARD
ION Hold Company, LLC	ION Hold will build ten new segments of fiber optic, middle mile broadband infrastructure, serving 70 rural communities in upstate New York, parts of Pennsylvania and Vermont.	\$39,724,614
New York State Education Department	New York Computer Centers, Broadbandexpress@yourlibrary, will provide computers in 30 libraries and five mobile training centers across 41 economically distressed upstate New York counties.	\$10,521,150
NYC Department of Information Technology and Telecommunications	NYC Connected Learning will provide computer training, computers, educational software and free broadband access for one year to 18,000 low-income, New York City residents.	\$22,162,825
Wildwood Programs, Inc.	Wildwood Programs will upgrade broadband services and deploy videoconferencing and other technology tools to 75 facilities in upstate New York. The project will focus on human service organizations serving people with disabilities.	\$845,000
New York City Small Business Association	New York City will help at-risk students develop skills to graduate and successfully transition to college or a career by providing computer training, refurbished computer equipment, and expanded Internet access at home.	\$6,000,000
New York City Public Computer Center	New York City will deploy new workstations and upgrade nearly 550 more at 90 public computer centers throughout the city in high-poverty areas. The project also creates after-school programs and provides test preparation and workforce education for economically vulnerable communities.	\$13,900,000
St. Regis Mohawk Tribe	The St. Regis Mohawk Tribe will upgrade public computer centers and offer digital literacy training to economically vulnerable residents in Franklin County. In addition, the grant will bring last-mile fiber to the St. Regis Mohawk Tribe community, located in an isolated rural area in north central New York. Approximately 3,750 people, 200 businesses and 42 community institutions will benefit. This project is expected to create more than 780 jobs.	\$11,204,267
New York State	The State will improve the statewide map depicting the availability of high-speed broadband and support the activities of the New York State Broadband Program Office.	\$8,875,431
Port Byron Telephone Company, Inc.	Port Byron Telephone Company will bring high-speed DSL broadband service to unserved homes, businesses and community institutions within its rural service territory.	\$639,218
Deposit Telephone Company, Inc.	Deposit Telephone Company will bring highspeed DSL broadband service to unserved establishments in New York and Pennsylvania. More than 2,700 people and over 70 businesses will benefit from improved service.	\$3,143,839
Slic Network Solutions, Inc.	Slic Network Solutions will construct 136 miles of fiber optic cable and purchase equipment and electronics necessary to deliver advanced broadband services to 726 unserved households in remote western Franklin County. They will also construct 660 miles of fiber optic cable in St. Lawrence County, where more than 14,000 people, approximately 112 local business and 30 community institutions will benefit from improved service.	\$32,095,409
Castle Cable TV	Castle Cable will extend broadband and other advanced telecommunications services through communities in Jefferson and St. Lawrence Counties. More than 5,500 people, 217 local businesses and 12 community institutions will benefit from improved service.	\$7,168,559
Mid-Hudson Cablevision, Inc.	Mid-Hudson Cablevision will bring broadband to the 75 mile rural corridor between New York City and Albany. More than 20,000 people, 3,000 businesses and 100 community institutions will benefit from improved service.	\$3,473,919

With New York Federal and State grant funding flowing to New York Broadband project sponsors, these investments will help bridge the technological divide, drive economic growth and create jobs, and ultimately make a critical difference in the long-term success of our communities.



8.0 Broadband Program Office Outreach

The New York State Broadband Program Office believes it is important to take a proactive approach to inform and educate New Yorkers on statewide broadband activities and how broadband can improve their quality of life. This is accomplished through a variety of tools, programs and initiatives, including broadband workshops and symposiums, council meetings, newsletters and websites.

In 2011, New York State Senator Betty Little and New York State Congressman Chris Gibson confirmed their support of broadband adoption in rural communities that have low broadband adoption rates, by partnering with the State Broadband Program Office to hold broadband events. More than 100 stakeholders, community leaders, and citizens attended several events to discuss issues including State broadband initiatives and programs, the types and availability of services, and broadband funding opportunities at the federal level.

New York State has been researching ways to leverage existing public broadband assets and infrastructure to increase broadband penetration. To assist with this goal, the

Program Office conducted a series of meetings with representatives from public and private sectors involved in broadband activities, and neighboring states to discuss opportunities for increased partnerships.

Council meetings were also held throughout the year where members were briefed on Program Office activities. During the meetings, Council member workgroups provided input on the opportunities and challenges associated with broadband planning and deployment as it is related to specific

focus areas (planning and policy, e-government, digital literacy, and infrastructure). The Broadband Program Office used this information to develop strategies, initiatives and recommendations for each area of focus.

To disseminate information throughout the year, the Program Office distributed newsletters highlighting broadband topics, policy, funding and other relevant information.

In addition, a newly enhanced website was launched. Site visitors can learn about State efforts to ensure every New Yorker has access to affordable broad-

band services in urban and rural communities across the State.

Visit the newly enhanced broadband website at <http://www.nysbroadband.ny.gov/>.



"Connectivity is more than a quality of life issue. It's a way of life issue. It's the way we communicate, the way businesses function, the way hospitals save lives. It's entertainment and staying in touch with families and friends. It is the key to a better and prosperous future for the Adirondacks. I am pleased with the progress we are making. Through collaboration and creative thinking we are overcoming some of the unique challenges in this region. The support of public financing is making these projects achievable and it is very important that support continues in the years ahead."

- New York State Senator Betty Little
New York State 45th District

9.0 Looking Forward

We have made tremendous strides in the collection and analysis of the current state of broadband connectivity in New York. The Office of Cyber Security will continue collecting availability data to identify gaps and measure the results of policy and funding efforts.

As we continue to collect data, the availability and adoption of broadband in the State of New York continues to become more and more important and relevant in the lives of every New Yorker. Broadband facilitates our involvement in issues which promote social good; encourages active engagement in the operation of our government; and provides limitless opportunities for economic prosperity.

Bridging the digital divide not only connects our citizens to each other, it breaks down communication barriers, opens global markets to entrepreneurs, and transforms the way our society lives and works. For this reason, it is important to consider the prominent role broadband plays in both the national and international arena.

"Indeed, broadband can be the great equalizer – giving every American with an Internet connection access to a world of new opportunities that might previously have been beyond their reach, and expanding their opportunities to succeed and thrive in a digital economy."

- Julius Genachowski, January 20, 2011
FCC Chairman

Policy Considerations

Universal access to broadband has become one of the most important issues of the 21st century. We have seen world events dominated by the use of social media applications and other world events facilitated by high speed access to the Internet. In 2011, the United Nations even deemed access to the Internet "a basic human right."

Considering the potential benefits broadband access brings to individuals, it is not difficult to understand why broadband is described as the universal equalizer of many human rights.

"Given that the Internet has become an indispensable tool for realizing a range of human rights, combating inequality, and accelerating development and human progress, ensuring universal access to the Internet should be a priority for all states."

- Frank La Rue,
Special Rapporteur to the United Nations

In order to ensure all New Yorkers are able to fully utilize the benefits of broadband, we must build on efforts that have already begun, and complement policy goals and funding opportunities which are currently in place at the federal level. The future of New York's economic development depends on a robust broadband infrastructure that can sustain the bandwidth requirements of future applications.

Broadband Strategy Alignment at the International, National, and State Level

Broadband touches just about every part of life. In fact, the **National Broadband Plan**, released by the FCC in 2009, details how broadband will advance consumer welfare, civic participation, public safety and homeland security, community development, healthcare delivery, energy dependence and efficiency, education, worker training, private sector investment, entrepreneurial activity, job creation, and other national purposes. In 2012, building and enhancing our infrastructure means more than just constructing roads and bridges. We also need to close the digital divide and stimulate demand for broadband and Internet services.

Broadband has the ability to tear down walls to promote real-time communications; open local businesses to a global marketplace; and unite people on opposite sides of the planet with just a few keystrokes. As a result, broadband policies at the international and national level should align and complement State and local efforts to increase broadband adoption.

The United Nations Broadband Commission set **four** goals for making broadband policy universal and boosting affordability and broadband uptake, shown in **Figure 9.1**. The National Broadband Plan set **six** goals for the use of broadband in the United States, shown in **Figure 9.2**.

**Figure 9.1: United Nation Broadband Commission
International Broadband Goals To Be Achieved by 2015**

Goal	Objective
Adopt a Universal Broadband Policy	All countries should have a national broadband plan or strategy or include broadband in their Universal Access/Service Definitions
Make Broadband Affordable	Entry-level broadband services should be made affordable in developing countries through adequate regulation and market forces (amounting to less than 5% of average monthly income)
Connect Homes to Broadband	40% of households in developing countries should have Internet access
Get People Online	Internet user penetration should reach 60% worldwide, 50% in developing countries and 15% in LDCs

**Figure 9.2: National Broadband Plan
Goals To Be Achieved by 2020**

Goal	Objective	Recommendations
Lead the World in Broadband Access	100 million U.S. homes should have affordable access to broadband with minimum download speeds of 100 Mbps/sec and minimum upload speeds of 50 Mbps/sec.	<ul style="list-style-type: none"> • Foster competition to drive demand for increased network performance and lower costs of deploying infrastructure.
Lead the World in Mobile Innovation	Develop the fastest and most extensive wireless networks in the world in mobile innovation.	<ul style="list-style-type: none"> • Make 500 megahertz of spectrum available by 2020 for both licensed and unlicensed use. • Develop initiatives to ensure greater transparency and access in allocating spectrum for various uses.
Make Broadband Affordable and Provide Digital Literacy Training	Every American must have access to an affordable broadband network and have the opportunity to develop digital skills. Achieve the goal of a 90% broadband adoption rate.	<ul style="list-style-type: none"> • Reprioritize resources and strategic targeting of efforts to make broadband affordable and help users develop digital skills.
Connect Every U.S. Community to Broadband	Every community should have affordable access to at least 1 gigabit per second broadband service to anchor institutions such as schools, hospitals, and government buildings.	<ul style="list-style-type: none"> • Upgrade the E-rate and improve the Rural Health Care support programs. • Offer reforming incentive structures, licensing, and data interoperability. • Ensure public priorities take advantage of the benefits broadband networks offer.
Ensure the Safety of American Communities	Develop a nationwide, wireless, interoperable broadband public safety network so first responders from different jurisdictions can communicate effectively.	<ul style="list-style-type: none"> • Develop a nationwide broadband safety network that is robust enough to maintain performance in the aftermath of a disaster, and allows every first responder to communicate with each other and share real-time data over high-speed connections.
Lead the Clean Energy Economy	Every American should be able to use broadband to track and manage their real-time energy consumption. Real-time data can also inform automated thermostats and appliances, allowing consumers to save energy and money while reducing the need for expensive new power plants.	<ul style="list-style-type: none"> • Encourage renewable power, grid storage, and vehicle electrification. • Enable consumers to access real-time usage information from smart meters. • Offer historical billing information over the Internet.

With the backdrop of national broadband goals driving policy and funding opportunities at the federal level, and increased availability and adoption at the international level opening up global markets, State policies and broadband goals will enable New York State to lead the way in advancing the expansion of broadband. The support of federal and state governments will be a critical success factor in overcoming the diverse challenges of providing universal broadband access, sustaining adoption, and keeping pace with increasingly higher speed requirements.

The following policy recommendations would reduce many challenges which currently exist in New York state:

New York State Broadband Availability Recommendations

- Coordinate federal, state, and local infrastructure projects to maximize economies of scale by leveraging public investments.
- Consider “Dig Once” policies and legislation that would apply to Federal, State, and locally funded projects. The costs of installing broadband cables along existing roads is typically ten times the cost of installing the conduit at the same time roads are repaired or built.
- Establish Broadband Clusters in economically depressed regions of the State to encourage investment in new businesses and growth in others, by working with State, local, and private stakeholders.
- Establish a Broadband “Last Mile” Tax Credit Program and Broadband Infrastructure Grants for “unserved” areas of the State to encourage providers to install “last mile” infrastructure and/or provide matching grants to municipalities, libraries and schools to install their own infrastructure.
- Explore regulatory “streamlining” of local and State regulators to facilitate broadband build-out in areas most in need.
- Open State procurement contracts to local governments and consider developing master contracts to expedite the placement of wireless towers on State owned property and buildings. Standards for permits, pole access, establishing rights-of-way, and access to State-owned property would expedite broadband projects.
- Explore low-cost models for “make-ready” expenses by reviewing the methodology for determining pole access attachment charges and rights-of-way.
- Collaborate with federal agencies, such as the FCC and USDA, to explore implementing federal policies to address similar issues as they pertain to areas under federal jurisdiction.
- Develop a REDC “Race to the Top” broadband grant program, using the competitive grant process to encourage the most innovative broadband grant applications.
- Engage REDCs to develop customized broadband strategies demonstrating plans to increase sector utilization.
- Leverage mapping and adoption data for developing regional strategies.
- Promote public/private partnerships to build broadband networks – public sector should be considered provider of last resort.

“We must change the way we engage in economic development planning and execution. Those working at the local level know their area economies best...”

- Governor Andrew M. Cuomo
State of the State Address, 2011

New York State Broadband Adoption Recommendations

- Promote public/private partnerships at the REDC level to raise broadband awareness and encourage broadband adoption targeted to individuals, at-risk populations, and specific business sectors.
- Complement federal programs such as the FCC's "Connect to Compete" program¹ and USDA Grant and Loan programs with State supported programs. These include:
 - Programs to recycle State surplus computers for New Yorkers who cannot afford computer equipment to access the Internet.
 - Digital literacy training, online job search instruction and access to low-cost computers could be available in State offices open to the public, such as Local Workforce Investment Boards, One-Stop Employment Centers, county social services departments, and educational institutions including Community Colleges and Boards of Cooperative Education Services ("BOCES").
- Adopt Digital Literacy Standards and consider offering tax credits for New Yorkers who complete Digital Literacy training.
- Recognize digital literacy achievement through rewards programs. Broadband non-adopters may be motivated by discounted, subsidized or free computer equipment or broadband service plans. A "NYS Certified Internet Badge" indicating levels of accomplishment may motivate younger users. As courses are taken and skill levels mastered, participants could be awarded badges to display on resumes, websites or social media pages.
- Consider the creation of a New York Sustainable Broadband Services Fund – low-income broadband subsidies for Internet access, computer access, and training.
- Increasing security for online activity through technical improvements, law enforcement programs, and educational programs that reduce distorted risk perceptions, and adopt regulations for higher levels of security at the provider level.
- Provide improved educational programs, particularly in low income areas, to enhance the understanding of Internet use and the skills necessary to derive benefits from broadband adoption.

¹ The FCC's "Connect to Compete" program is a national public/private partnerships program designed to increase broadband adoption, elevate digital literacy and assist Americans in searching and training for jobs. To view the FCC "Connect to Compete" Fact Sheet visit: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-310924A1.pdf

New York State Broadband Recommendations to Support Regional Economic Development Councils

Governor Cuomo's new operating model for funding regional projects to stimulate economic development provides an ideal framework to develop a broadband strategy tailored to the unique requirements of each region. The Governor's launch of ten Regional Economic Development Councils (REDC) includes members who live and work in the region and know the opportunities that exist for job creation and growth. REDC membership reflects the unique interests of each community, including major industries, small business, higher education, community organizations and labor.

There are many variables which affect the broadband requirements of each region. These include current broadband availability, planning efforts already underway, demographics such as income and education level, and the predominant geographical terrain in each region. The Broadband Program Office will support the REDC's by collecting the most recent data on the availability and access to specific broadband speeds. In addition, the development of an economic index depicting sector utilization of broadband will help REDC's assess the current environment and future requirements. By aggregating demand for broadband and consolidating the requirements of each sector, the collective needs of the entire region are more easily met and integrated into a strategic State Broadband Plan.

An important element which should be considered while investing in broadband is ensuring local and regional authorities have proposed a strategy to maximize the use of broadband for economic and social development. Ensuring broadband is universally accessible by validating availability, and deciding to invest in broadband infrastructure is a necessary prerequisite for both regional and State broadband strategy. However, this only establishes the foundation for future success of the overall broadband strategy. Without State support, many New York communities will be challenged to fully leverage broadband services once they are made available. This is particularly relevant in the agriculture, healthcare, and entrepreneurial business sectors. The mere availability of broadband is only the initial step in ensuring that the full economic impact is realized.

New York State Broadband Recommendations to Expand Outreach

□ Partnerships to Increase Broadband Awareness

- The Broadband Program Office will work with broadband stakeholders to promote the use of broadband targeted to individuals and the business community. In order to be sustainable, programs to raise awareness and provide instruction on digital literacy collaboration between community anchor institutions and businesses, with support from the Broadband Program Office. Using broadband availability and adoption data, coupled with specific sector utilization measurements, will help define programs to maximize broadband adoption for individuals and business sectors.

□ Enhancing Broadband Availability Data

- The Broadband Program Office will continue partnering with the Office of Cyber Security to expand data collection efforts to establish availability baseline metrics, and measure and map progress made to increase broadband availability, including :
 - Broadband service availability
 - Broadband service affordability
 - Broadband service market penetration
 - Broadband service utilization for key sectors: e-commerce, e-government, telehealth, telework, and education

□ Broadband Provider Panel

- Access to the broadband networks we currently have in New York is due in large part to the significant investments New York broadband service providers have made in our State. The availability gaps which still pervade rural areas of the State, and the adoption challenges we face in our most disadvantaged populations, will require a strong partnership between providers and State and local governments. Engaging the provider community while developing solutions to bridge the gaps in broadband availability and adoption, will be critical to the State's success in reaching broadband goals.

The Broadband Program Office will organize an event to begin this critical dialogue and explore solutions which will address the challenges of broadband access and adoption.

□ Broadband Institutional Needs Survey

- The first New York State Adoption Rate Study provided valuable insight into the motivators for consumer broadband use, as well as the barriers to entry. The Broadband Program Office is undertaking a project to determine the adoption of broadband for commercial entities. As a primary driver of economic growth, broadband can help sustain the retention and growth of current business, as well as the attraction of new industries.

For this reason, an examination and analysis of institutional broadband requirements, and the business drivers for locating or expanding business operations can guide future investments, and transform economically depressed areas of the State into future technology centers, while employing New Yorkers and attracting new industries.

□ **Federal Collaboration Opportunities**

- There is no better partnership than those which share similar goals. The National Broadband Plan is the roadmap to universal broadband access for all Americans. With similar goals, but unique requirements, New York State should forge strong partnerships with the federal government to increase opportunities.
- The \$7.2 billion dollar investment in broadband made by the federal government helped close some of the gaps which exist in many areas of the country, including New York. In addition to ARRA funding, significant reform of the Universal Service Fund (USF) will modernize a funding model which was designed to subsidize telephone service long before broadband was available.
- The FCC implemented “Connect to Compete,” a program to unite private and government entities to provide low-cost computers and Internet service to low-income individuals.
- The USDA has provided a significant amount of grants and loans to New York broadband service providers in rural areas of the State. There are several active loan and grant programs available to New York applicants.
- Partnerships with federal agencies will facilitate broadband expansion by complementing funding opportunities, working collaboratively to resolve policy and regulatory impediments, and identifying priority areas of the state based on need and the greatest opportunity for economic growth.

Broadband is a cornerstone of New York’s economic recovery, underpinning our public safety, educational, social and healthcare systems. As the equalizer of financial opportunity, healthcare access, and occupational transformation, universal broadband access must continue to remain a state priority.

Our focus on gathering useful data to fully understand the state of broadband availability and adoption in New York has resulted in actionable information which can drive policy and funding decisions to close the gaps which still exist. While New York remains in the top tier of many international and national broadband rankings, we can do better. As the epicenter of many global sectors of the economy, including the financial, healthcare and entertainment industries, New York should raise the bar in order to compete with competitors around the globe. New York State should set goals for ubiquitous broadband access which is not just available, but affordable to every citizen, at a speed and quality which keeps pace with innovative application development.

New York should be at the forefront of debate about effective broadband policies, regulations, and barriers to adoption. In an era where innovations in technology can save and prolong lives, enable disabled citizens to break the barriers of their disabilities, and level the playing field between a global corporation on the other side of the world, and an entrepreneur in a small rural New York town – broadband should be available to every New Yorker.

Special Acknowledgements

The **2011-12 Broadband Annual Report** is published by the **New York State Broadband Program Office (NYSBPO)** as the culmination of data and analysis gathered since 2007 on the use of broadband by New Yorkers. Executive Order 22.1 requires the submission of an Annual Broadband Report which summarizes the state of broadband in New York State, presents the latest availability and adoption data, and provides recommendations which include:

- (a) an analysis of how best to foster a variety of high-speed Internet access alternatives for citizens and businesses;
- (b) an analysis of how best to increase the participation of stakeholders in such alternatives, including the public and private sector, not-for-profit organizations and other non-governmental organizations, and higher education institutions;
- (c) proposed strategies for continued broadband deployment and adoption efforts, as well as further development of advanced telecommunications applications.

The broadband availability data and maps were collected and created by the **Division of Homeland Security and Emergency Services (DHSES), Office of Cyber Security (OCS)**. The strong partnership between the DHSES OCS and the NYSBPO enables the OCS to independently collect and report broadband availability data received from broadband providers in New York, while the NYSBPO serves as the focal point for broadband outreach, strategy and policy recommendations to the Office of the Governor. The annual report builds on the work of the first Universal Broadband Council, as well as the **Broadband Development and Deployment Council** formed as a result of Executive Order 22.1.

In addition to garnering praise from our broadband strategy partners in the federal government, the OCS mapping team has been serving as a model for gathering broadband availability data well before the introduction of the National Broadband Map, and subsequent funding. Despite being one of the largest and geographically diverse states in the country, OCS reported early broadband availability data by forming strong partnerships with almost every New York broadband provider, and continues to build on best practices by validating current data, and by discovering new ways to report availability on even more granular levels than we currently have.

Federal broadband initiatives such as the National Interoperable Broadband Public Safety Network, federal and State funding opportunities, as well as State and regional broadband initiatives will continue to harness the rich amount of data already collected; drive future requests for information to develop policies; and measure the progress of current efforts and funded projects.



Appendices

Appendix A

Broadband Availability by County Sorted by Population Density

Estimated Population Percentages and Numbers Sorted by Population Density						
NYS DED Region	County Name	Area (sq miles)	Population 2010	Population Density 2010 (pop/sq mile)	Estimated Population No Wireline or Fixed Wireless Broadband	Estimated % Population No Wireline or Fixed Wireless Broadband
North Country Region	Hamilton	1,806	4,836	3	1,025	21%
North Country Region	Essex	1,915	39,370	21	4,725	12%
North Country Region	Lewis	1,290	27,087	21	3,800	14%
North Country Region	Franklin	1,696	51,599	30	8,775	17%
Southern Tier Region	Delaware	1,467	47,980	33	7,200	15%
North Country Region	St. Lawrence	2,819	111,944	40	11,250	10%
Mohawk Valley Region	Herkimer	1,456	64,519	44	5,150	8%
Western NY Region	Allegany	1,035	48,946	47	5,375	11%
Mohawk Valley Region	Schoharie	626	32,749	52	5,250	16%
Finger Lakes Region	Orleans	814	42,883	53	1,725	4%
Southern Tier Region	Schuyler	342	18,343	54	1,475	8%
Southern Tier Region	Chenango	898	50,477	56	2,025	4%
Western NY Region	Cattaraugus	1,324	80,317	61	13,750	17%
Mohawk Valley Region	Otsego	1,014	62,259	61	8,725	14%
North Country Region	Jefferson	1,756	116,229	66	10,500	9%
Finger Lakes Region	Wayne	1,396	93,772	67	5,625	6%
Finger Lakes Region	Yates	376	25,348	67	3,050	12%
Southern Tier Region	Steuben	1,404	98,990	71	11,000	11%
Capital Region	Warren	931	65,707	71	2,625	4%
Finger Lakes Region	Wyoming	597	42,155	71	4,625	11%
North Country Region	Clinton	1,117	82,128	74	4,100	5%
Capital Region	Washington	846	63,216	75	7,575	12%
Capital Region	Greene	658	49,221	75	2,950	6%
Mid-Hudson Region	Sullivan	996	77,547	78	3,875	5%
Central NY Region	Oswego	1,401	122,109	87	4,875	4%
Western NY Region	Chautauqua	1,508	134,905	89	6,750	5%
Finger Lakes Region	Seneca	390	35,251	90	4,575	13%
Central NY Region	Cayuga	882	80,026	91	8,000	10%
Capital Region	Columbia	648	63,096	97	2,525	4%
Southern Tier Region	Tioga	522	51,125	98	2,550	5%
Central NY Region	Cortland	501	49,336	98	1,975	4%
Finger Lakes Region	Livingston	641	65,393	102	3,275	5%
Mohawk Valley Region	Fulton	533	55,531	104	2,225	4%
Central NY Region	Madison	661	73,442	111	2,950	4%
Finger Lakes Region	Genesee	496	60,079	121	2,400	4%
Mohawk Valley Region	Montgomery	410	50,219	122	2,500	5%
Mid-Hudson Region	Ulster	1,161	182,493	157	7,300	4%
Finger Lakes Region	Ontario	663	107,931	163	4,325	4%
Mohawk Valley Region	Oneida	1,257	234,878	187	9,400	4%
Western NY Region	Niagara	1,144	216,469	189	6,500	3%
Southern Tier Region	Tompkins	491	101,564	207	5,075	5%
Southern Tier Region	Chemung	411	88,830	216	4,450	5%
Capital Region	Rensselaer	665	159,429	240	6,375	4%
Capital Region	Saratoga	844	219,607	260	6,600	3%
Southern Tier Region	Broome	715	200,600	280	6,025	3%
Mid-Hudson Region	Dutchess	825	297,488	361	8,925	3%
Mid-Hudson Region	Putnam	246	99,710	405	3,000	3%
Mid-Hudson Region	Orange	838	372,813	445	11,250	3%
Finger Lakes Region	Monroe	1,384	744,344	538	22,250	3%
Capital Region	Albany	533	304,204	571	12,250	4%
Central NY Region	Onondaga	805	467,026	580	14,000	3%
Long Island Region	Suffolk	2,373	1,493,350	629	44,750	3%
Capital Region	Schenectady	210	154,727	739	4,650	3%
Western NY Region	Erie	1,222	919,040	752	36,750	4%
Mid-Hudson Region	Rockland	199	311,687	1,564	9,350	3%
Mid-Hudson Region	Westchester	500	949,113	1,898	28,500	3%
Long Island Region	Nassau	447	1,339,532	2,999	40,250	3%
New York City	Richmond	102	468,730	4,582	14,000	3%
New York City	Queens	179	2,230,722	12,464	67,500	3%
New York City	Bronx	57	1,385,108	24,103	41,500	3%
New York City	Kings	97	2,504,700	25,783	75,000	3%
New York City	New York	34	1,585,873	46,984	47,500	3%

DISCLAIMER: Population numbers, percentages, and summed totals depicting broadband availability are rounded estimates adjusted to compensate for the prescribed data reporting methodology which assumes ubiquitous broadband availability in every reported census block.

Appendix B

Availability of Broadband Speeds 6 Mbps or greater
Sorted by REDC and County

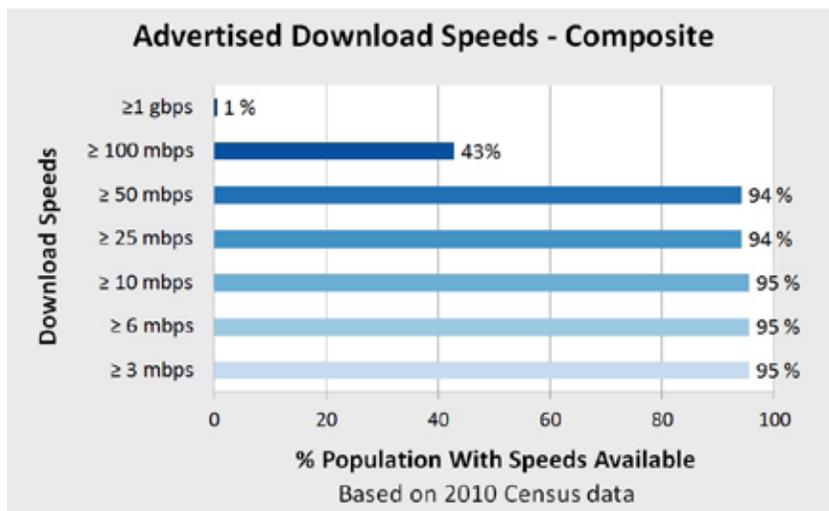
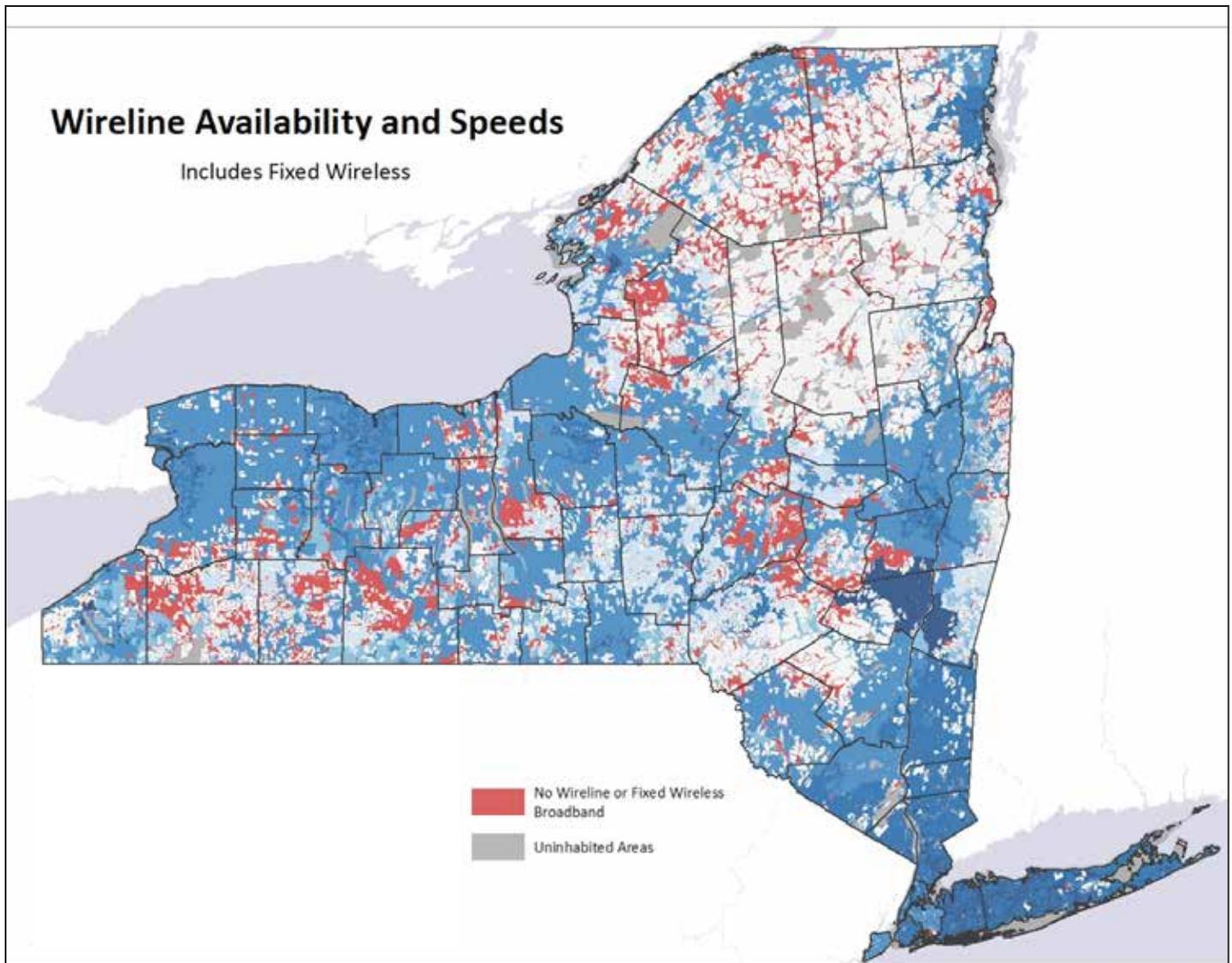
Availability of Wireline Broadband at Speeds 6 Mbps or Greater					
NYS REDC Region	County Name	Area (sq miles)	Population 2010	Estimated Population Speeds ≥ 6 mbps	Estimated % Population Speeds ≥ 6 mbps
Capital Region	Albany	533	304,204	292,500	96%
Capital Region	Columbia	648	63,096	48,000	76%
Capital Region	Greene	658	49,221	46,250	94%
Capital Region	Rensselaer	665	159,429	145,000	91%
Capital Region	Saratoga	844	219,607	212,500	97%
Capital Region	Schenectady	210	154,727	147,500	95%
Capital Region	Warren	931	65,707	58,750	89%
Capital Region	Washington	846	63,216	49,250	78%
Central NY Region	Cayuga	882	80,026	58,750	73%
Central NY Region	Cortland	501	49,336	42,000	85%
Central NY Region	Madison	661	73,442	66,250	90%
Central NY Region	Onondaga	805	467,026	452,500	97%
Central NY Region	Oswego	1,401	122,109	110,000	90%
Finger Lakes Region	Genesee	496	60,079	56,250	94%
Finger Lakes Region	Livingston	641	65,393	62,500	96%
Finger Lakes Region	Monroe	1,384	744,344	725,000	97%
Finger Lakes Region	Ontario	663	107,931	102,500	95%
Finger Lakes Region	Orleans	814	42,883	40,250	94%
Finger Lakes Region	Seneca	390	35,251	28,500	81%
Finger Lakes Region	Wayne	1,396	93,772	85,000	91%
Finger Lakes Region	Wyoming	597	42,155	36,750	87%
Finger Lakes Region	Yates	376	25,348	17,750	70%
Long Island Region	Nassau	447	1,339,532	1,300,000	97%
Long Island Region	Suffolk	2,373	1,493,350	1,450,000	97%
Mid-Hudson Region	Dutchess	825	297,488	287,500	97%
Mid-Hudson Region	Orange	838	372,813	362,500	97%
Mid-Hudson Region	Putnam	246	99,710	96,250	97%
Mid-Hudson Region	Rockland	199	311,687	302,500	97%
Mid-Hudson Region	Sullivan	996	77,547	72,500	93%
Mid-Hudson Region	Ulster	1,161	182,493	175,000	96%
Mid-Hudson Region	Westchester	500	949,113	925,000	97%
Mohawk Valley Region	Fulton	533	55,531	49,500	89%
Mohawk Valley Region	Herkimer	1,456	64,519	55,000	85%
Mohawk Valley Region	Montgomery	410	50,219	40,750	81%
Mohawk Valley Region	Oneida	1,257	234,878	215,000	92%
Mohawk Valley Region	Otsego	1,014	62,259	48,000	77%
Mohawk Valley Region	Schoharie	626	32,749	23,250	71%
New York City	Bronx	57	1,385,108	1,337,500	97%
New York City	Kings	97	2,504,700	2,425,000	97%
New York City	New York	34	1,585,873	1,537,500	97%
New York City	Queens	179	2,230,722	2,162,500	97%
New York City	Richmond	102	468,730	455,000	97%
North Country Region	Clinton	1,117	82,128	75,000	91%
North Country Region	Essex	1,915	39,370	30,750	78%
North Country Region	Franklin	1,696	51,599	38,750	75%
North Country Region	Hamilton	1,806	4,836	195	4%
North Country Region	Jefferson	1,756	116,229	97,500	84%
North Country Region	Lewis	1,290	27,087	19,250	71%
North Country Region	St. Lawrence	2,819	111,944	90,000	80%
Southern Tier Region	Broome	715	200,600	190,000	95%
Southern Tier Region	Chemung	411	88,830	81,250	91%
Southern Tier Region	Chenango	898	50,477	36,250	72%
Southern Tier Region	Delaware	1,467	47,980	32,250	67%
Southern Tier Region	Schuyler	342	18,343	14,750	80%
Southern Tier Region	Steuben	1,404	98,990	81,250	82%
Southern Tier Region	Tioga	522	51,125	45,000	88%
Southern Tier Region	Tompkins	491	101,564	93,750	92%
Western NY Region	Allegany	1,035	48,946	35,750	73%
Western NY Region	Cattaraugus	1,324	80,317	56,250	70%
Western NY Region	Chautauqua	1,508	134,905	125,000	93%
Western NY Region	Erie	1,222	919,040	887,500	97%
Western NY Region	Niagara	1,144	216,469	207,500	96%

DISCLAIMER: Population numbers, percentages, and summed totals depicting broadband availability are rounded estimates adjusted to compensate for the prescribed data reporting methodology which assumes ubiquitous broadband availability in every reported census block.

Appendix C

Wireline Availability and Speed Map

Includes uninhabited areas and areas of no wireline or fixed wireless broadband

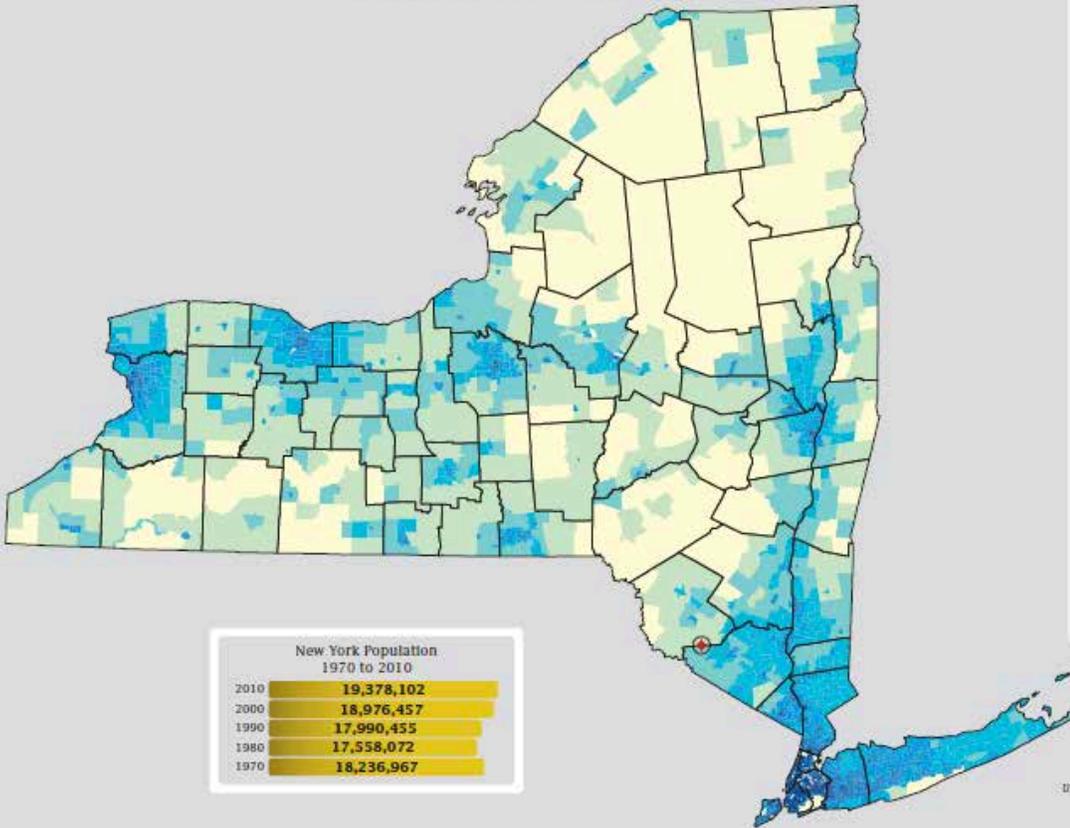


Appendix D

United States Census Bureau: 2010 Census
New York State Profile

2010 Census: New York State Profile

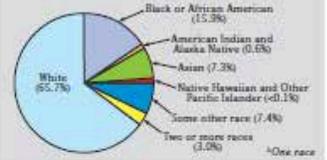
Population Density by Census Tract



New York Population 1970 to 2010	
2010	19,378,102
2000	18,976,457
1990	17,990,455
1980	17,558,072
1970	18,236,967

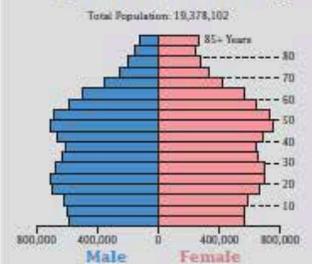


State Race* Breakdown



Hispanic or Latino (of any race) makes up **17.6%** of the state population.

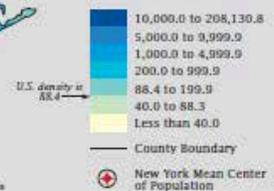
Population by Sex and Age



Housing Tenure



People per Square Mile by Census Tract



Appendix E

Resources

Broadband Links

New York State Broadband Websites

1. Governor Cuomo's Regional Economic Development Council Guidebook
<http://www.governor.ny.gov/regional-council-guidebook.pdf>
2. Governor Cuomo's Regional Economic Development Council Consolidated Funding Application (CFA)
<http://www.esd.ny.gov/ConsolidatedFundingApplication.html>
3. New York State Broadband Program Office – New York's signal point of contact for state broadband news, events, funding opportunities, and announcements
<http://www.nysbroadband.ny.gov/>
4. New York State Broadband Adoption Study
<http://www.nysbroadband.ny.gov/themes/broadband/images/BroadbandAdoption.pdf>
5. New York State Broadband Map -The State of New York has undertaken a massive effort to build a statewide broadband map showing usage and access to broadband technology to measure and assess the existing broadband landscape. <http://www.broadbandmap.ny.gov/map/>
6. New York State Broadband Speed Test - The faster the connection, the greater the opportunities. The State Office of Cyber Security is conducting the "New York State Speed Test" to collect actual broadband speeds consumers are experiencing and where they are located.
<http://www.nyspeedtest.org/>

Federal Broadband Websites

7. BroadbandUSA website: Monitors how American Reinvestment and Recovery Act broadband funds are being spent throughout the United States.
<http://broadbandusa.gov/>
8. The official website for the Federal Communication Commission's (FCC) National Broadband Plan – the broadband strategy for the United States.
<http://www.broadband.gov/>
9. Website dedicated to digital literacy resources and collaboration opportunities.
<http://www.digitalliteracy.gov/>
10. Official website of the Federal Communications Commission (FCC)
<http://www.fcc.gov/>
11. National Broadband Availability – Rural and Urban Areas
<http://www.broadbandmap.gov/download/Broadband%20Availability%20in%20Rural%20vs%20Urban%20Areas%20June%202011.pdf>
12. National Broadband Plan
<http://download.broadband.gov/plan/national-broadband-plan.pdf>
13. National Broadband Map
<http://www.broadbandmap.gov/>
14. National Broadband Availability – Rural and Urban Areas
<http://download.broadband.gov/plan/national-broadband-plan-chapter-8-availability.pdf>
15. The National Telecommunications and Information Administration (NTIA) – provided federal ARRA broadband funding for the BTOP and SBDD grant programs.
<http://www.ntia.doc.gov/>

16. NTIA Report: Exploring the Digital Nation: Home Broadband Internet Adoption in the U.S. -November 2011- prepared by the Economics and Statistics Administration and the National Telecommunications and Information Administration in the U.S. Department of Commerce on broadband adoption at home.
http://www.ntia.doc.gov/files/ntia/publications/esa_ntia_us_broadband_adoption_report_11082010_1.pdf
17. Universal Service Rural Health Care Pilot Program, FCC: Provides funds to cover 85% of the cost of constructing state wide or regional broadband telehealth networks and of connecting those projects to dedicated nationwide broadband telehealth networks and the public Internet.
www.usac.org/rhc-pilot-program/

International Broadband Strategy

18. The Broadband Commission for Digital Development aims to boost the importance of broadband on the international policy agenda and believes that expanding broadband access in every country is key to accelerating progress towards these goals by the target date of 2015.
<http://www.broadbandcommission.org/>
19. OECD Broadband Portal – Collection of comprehensive global broadband statistics
http://www.oecd.org/document/54/0,3343,en_2649_34225_38690102_1_1_1_100.html

Broadband Reports

20. The Economic Impact of Rural Telecommunications: The Greater Gains. This study presents evidence about the direct and indirect economic effects of the rural telecommunications industry.
<http://www.hudson.org/files/publications/RuralTelecomOct2011.pdf>
21. Pew Internet Report | August 2010 - This report is based on the findings of Americans' use of the Internet and provides information on the issues, attitudes and trends shaping America and the world. The report explores the impact of the internet on families, communities, work and home, daily life, education, health care, and civic and political life.
<http://pewinternet.org/~media/Files/Reports/2010/Home%20broadband%202010.pdf>

Federal Broadband Funding

22. This website is a central storehouse for information on more than 1,000 federal grant programs which provide access to approximately \$500 billion annually in federal awards.
<http://grants.gov/>
23. Broadband Technology Opportunities Program (BTOP), National Telecommunications and Information Administration, Dept. of Commerce:
www.ntia.doc.gov/broadbandgrants
24. Broadband Initiatives Program (BIP), Rural Utilities Service, U.S. Dept. of Agriculture:
www.usda.gov/rus/telecom/arra-broadband.htm
25. Rural Broadband Access Loan and Loan Guarantee Program, Rural Utilities Service, U.S. Dept. of Agriculture.
www.usda.gov/rus/telecom/broadband.htm
26. Community Connect Broadband Grants, Rural Utilities Service, U.S. Dept. of Agriculture: Grant funding to applicants proposing to provide broadband service on a "community-oriented connectivity" basis to rural communities of fewer than 20,000 inhabitants.
www.usda.gov/rus/telecom/index.htm
27. NTIA BTOP: Grant Awards Overview Report | December 2010
http://www.ntia.doc.gov/files/ntia/publications/ntia_report_on_btop_12142010_0.pdf
28. Rural Telephone Loans and Loan Guarantees, Rural Utilities Service, U.S. Dept. of Agriculture: Provides long-term direct and guaranteed loans to qualified organizations for the purpose of financing the improvement, expansion, construction, acquisition, and operation of telephone lines, facilities, or systems to furnish and improve telecommunications service in rural areas. www.usda.gov/rus/telecom/index.htm
29. Distance Learning and Telemedicine Loans and Grants, Rural Utilities Service, U.S. Dept. of Agriculture: Provides seed money to rural community facilities (e.g., schools, libraries, hospitals) for advanced telecommunications systems that can provide health care and educational benefits to rural areas.
http://www.rurdev.usda.gov/UTP_DLT.html

30. Universal Service High Cost Program, Federal Communications Commission (FCC): Provides funding to eligible telecommunications carriers to help pay for telecommunications services in high-cost, rural, and insular areas so that prices charged to customers are reasonably comparable across all regions of the nation. www.usac.org/hc/
31. Universal Service Schools and Libraries Program (i.e., E-rate), FCC: Provides discounts for affordable telecommunications and Internet access services to ensure that schools and libraries have access to affordable telecommunications and information services. www.universalservice.org/sl/
32. Appalachian Area Development Program, Appalachian Regional Commission: Project grants to support self-sustaining economic development in the region's most distressed counties and areas. Includes funds for a Telecommunications Initiative involving projects that enable communities to capitalize on broad band access. www.arc.gov/index.do?nodeId=21
33. Library Services and Technology Act Grants to States, Institute of Museum and Library Services, National Foundation on the Arts and the Humanities: Provides funds for a library services including installation of fiber and wireless networks that provide access to library resources and services. www.imls.gov/programs/programs.shtm
34. Native American and Native Hawaiian Library Services, Institute of Museum and Library Services, National Foundation on the Arts and the Humanities: Grants to support library services including electronically linking libraries to networks. www.imls.gov/applicants/grants/nativeAmerican.shtm
35. Education Technology State Grants, Office of Elementary and Secondary Education, Dept. of Education: Grants to State Education Agencies for development of information technology to improve teaching and learning in schools. www.ed.gov/about/contacts/state/technology.html
36. Ready to Teach, Office of Assistant Secretary for Educational Research and Improvement, Dept. of Education: Grants for a national telecommunication-based program to improve the teaching in core curriculum areas. www.ed.gov/programs/readyteach/index.html
37. Special Education—Technology and Media Services for Individuals with Disabilities, Office of Special Education and Rehabilitative Services, Dept. of Education: Supports development and application of technology and education media activities for disabled children and adults. www.ed.gov/about/offices/list/osers/index.html?src=mr/
38. Telehealth Network Grants, Health Resources and Services Administration, Department of Health and Human Services: Grants to develop sustainable telehealth programs and networks in rural and frontier areas, and in medically underserved areas and populations. www.hrsa.gov/telehealth/
39. Telehealth Resource Center Grant Program, Health Resources and Services Administration, Department of Health and Human Services: www.hrsa.gov/telehealth/
40. Licensure Portability Grant Program, Health Resources and Services Administration, Department of Health and Human Services: Provides support for state professional licensing boards to develop and implement state policies that will reduce statutory and regulatory barriers to telemedicine. www.hrsa.gov/telehealth/
41. National Environmental Information Exchange Network Grant Program, Environmental Protection Agency: Provides funding to states, territories, and federally recognized Indian Tribes to support the development of an Environmental Information Exchange Network, including broadband infrastructure. www.epa.gov/exchangenetwork/grants/

Appendix F

Broadband Glossary

3G	Third generation mobile wireless broadband technology.
4G	Fourth generation wireless broadband, the stage of broadband mobile communications that will supersede the third generation (3G). Specifies a mobile broadband standard offering both mobility and very high bandwidth. Usually refers to LTE and WiMax technologies.
Asymmetric Digital Subscriber Line (ADSL)	Type of digital subscriber line broadband technology which transmits data over copper telephone lines.
Bandwidth	The amount of data transmitted in a given amount of time; usually measured in bits per second, kilobits per second, or megabits per second.
Bit	A single unit of data, either a one or a zero. In the world of broadband, bits are used to refer to the amount of transmitted data. A kilobit (Kb) is approximately 1,000 bits. A megabit (Mb) is approximately 1,000,000 bits.
BPL	Broadband Over Powerline enables broadband access using a combination of existing electrical power lines and fiber.
Broadband	High speed Internet access, currently defined by the FCC as having data transmission speeds of at least 4 Mbps actual download and 1 Mbps actual upload.
Broadband Coverage	In wireless communications, refers to the geographic area in which one can obtain service.
Brownfield	A network in which a carrier already has infrastructure in the area that can be used to deliver service going forward.
Burst Rate	The maximum rate or "speed" which a network is capable of delivering within a short timeframe, typically seconds or minutes. This is usually expressed as a rate in Mbps.
Capacity	Ability of telecommunications infrastructure to carry information. The measurement unit depends on the facility. A data line's capacity might be measured in bits per second, while the capacity of a piece of equipment might be measured in numbers of ports.
Carrier of last resort	The carrier that commits (or is required by law) to provide service to any customer in a service area that requests it, even if serving that customer would not be economically viable at prevailing rates.
Census Block	The smallest level of geography designated by the U.S. Census Bureau, which may approximate actual city street blocks in urban areas. In rural districts, census blocks may span larger geographical areas to cover a more dispersed population.
Census tract	A small, relatively permanent statistical subdivision of a county, designed to contain roughly 1,000 to 8,000 people who are relatively homogeneous with respect to their demographics, economic status and living conditions.
Central Office (CO)	A telephone company facility in a locality to which subscriber home and business lines are connected on what is called a local loop. The central office has switching equipment that can switch calls locally or to long
Common carrier	A telecommunications provider, such as a telephone company, that offers its services for a fee to the public.
Community Anchor Institution	Defined by the NTIA as schools, libraries, medical and healthcare providers, community colleges and other institutions of higher education, and other community support organizations and entities.
Competitive Local Exchange Carrier (CLEC)	The term and concept coined by the Telecommunications Act of 1996 for any new local phone company that was formed to compete with the ILEC (Incumbent Local Exchange Carrier). A company that offers local telephone service in competition with the legacy telephone company.

Customer Premises Equipment (CPE)	Equipment which resides on the customer's premise. Examples include set top boxes, cable modems, wireless routers, optical network terminals, integrated access devices, etc.
Dark fiber	A fiber optic cable that is laid and ready for use, but for which the service provider has not provided modulating electronics; usually contrasted to lit fiber, which is fiber optic cable in use to provide wired communications.
Digital Subscriber Line (DSL)	Digital Subscriber Line: The use of a copper telephone line to deliver "always on" broadband Internet service.
Emergency Alert System (EAS)	A national public warning system that requires broadcasters, cable television systems, wireless cable systems, satellite digital audio radio service (SDARS) providers, and direct broadcast satellite (DBS) providers to provide the communications capability to the President to address the American public during a national emergency. The system also may be used by state and local authorities to deliver important emergency information, such as AMBER alerts and weather information targeted to specific areas.
FCC	Federal Communications Commission: A Federal regulatory agency that is responsible, among other things, of regulating VoIP.
Fiber to the Premise (FTTH)	A fiber optic deployment architecture in which optical fiber extends all the way to the customer's premise. Also known as Fiber to the Home (FTTH) or Fiber to the Building (FTTB). Typically using PON for residential deployments.
Fixed Wireless (FW)	Wireless service that uses fixed CPE and mobile portable devices to deliver data services.
Gateway device	A network device that acts as an entrance to another network and often is used to connect two otherwise incompatible networks.
Gigabit Ethernet (Gbps)	A network transmission standard that provides a data rate of 1,000 megabits per second. (The National Broadband Plan recommends a speed of 1 Gbps for all community anchor institutions.)
Housing Units (HU)	Includes a house, an apartment, a mobile home, a group of rooms or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters.
Incumbent Local Exchange Carrier (ILEC)	The dominant local phone carrier within a geographical area. Section 252 of the Telecommunications Act of 1996 defines Incumbent Local Exchange Carrier as a carrier that, as of the date of enactment of the Act, provided local exchange service to a specific area; for example, Verizon, Windstream and Frontier. In contrast, Competitive Access Providers (CAPs) and competitive local exchange carriers (CLECs) are companies that compete against the ILECs in local service areas.
Internet gateway	The closest peering point between a broadband provider and the public Internet for a given consumer connection.
ISDN	Integrated Services Digital Network: An alternative method to simultaneously carry voice, data and other traffic, using the switched telephone network.
ISP (Internet Service Provider)	A company providing Internet access to consumers and businesses.
Kbps	Kilobits per second: 1,000 bits per second. A measure of how fast data can be transmitted.
Last Mile	Refers generally to the transport and transmission of data communications from the demarcation point between the end user's internal network and the carrier's network at the customer premise to the first point of aggregation in the carrier's network (such as a remote terminal, wireless tower location, or HFC node).
Long Term Evolution (LTE)	A high performance air interface for cellular mobile communication systems. LTE technology increases the capacity and speed of wireless networks relative to current 3G deployments.
Loop	Connection from the network central office to the customers' premises.
Mbps	Megabits per second: 1,000,000 bits per second. A measure of how fast data can be transmitted.

Microcell	Cell sites with extremely limited, but targeted, coverage. Microcells may provide indoor coverage in skyscrapers or may be placed in fire trucks, police cars and ambulances.
Microwave	Microwave transmission refers to the technique of transmitting information over microwave frequencies, using various integrated wireless technologies.
Middle Mile	Refers generally to the transport and transmission of data communications from the central office, cable headend or wireless switching station to an Internet point of presence.
National Broadband Availability Target	The level of service set in the National Broadband Plan that should be available to every household and business location in the U.S. The initial target is an actual download speed of at least 4 Mbps and an upload speed of at least 1 Mbps, with a proposed review and update every four years by the FCC.
Next Generation 911 (NG911)	An emergency response system that integrates the core functionalities of the E911 system and also supports multimedia communications (such as texting, email, video and voice).
Offload	Shifting telecommunications traffic from one network to another to relieve network congestion.
Overbuild	Building excess capacity. In this context, it involves investment in additional infrastructure projects to provide competition.
Point of Presence (POP)	An access point to the Internet. A point of presence is a physical location that houses servers, routers, switches and aggregation equipment. A location where a communications carrier allows other carriers to access its network.
Point to point (P2P)	A type of fiber to the premise network in which each endpoint is connected to its serving office via a dedicated fiber optic strand.
Public Safety Answering Point (PSAP)	A call center responsible for answering emergency calls and dispatching emergency services.
Right of Way	The right to pass over or occupy a particular piece of land.
RUS (Rural Utility Service)	A division of the United States Department of Agriculture, promoting universal service in unserved and underserved areas of the country with grants and loans.
Set Top Box	A standalone device that receives and decodes programming so that it may be displayed on a television. Set top boxes may be used to receive broadcast, cable, and satellite programming.
Smart Grid	The electric delivery network, from electrical generation to the premise.
Smart meter	A digital meter (typically electric) located on the customer premises that records energy usage.
Spectrum Allocation	The amount of spectrum dedicated (or allocated) to a specific use; in wireless, spectrum allocation is typically made in paired bands, with one band for upstream and the other for downstream.
Spectrum Band	The frequency of the carrier wave in wireless communications. Radios can transmit on different frequencies in the same area at the same time without interfering; frequency marks the division of different parts of spectrum for different uses. Frequency is measured in Hertz (Hz); the range of frequency typically used for radio communications is between 10,000 (10 kHz) and 30,000,000,000 Hz (30 GHz). Different frequencies have different natural properties: lower frequencies travel farther and penetrate solids better, while higher frequencies can carry more information (faster data rates, etc.) The best balance of these properties for the purpose of cell phones is in the range of roughly 700.
Subscribership	Subscribership is how many customers have subscribed for a particular telecommunications service or provider. (The subscribership rate for broadband services is also called the broadband adoption rate.)
Switched Network	A domestic telecommunications network usually accessed by telephones, key telephone systems, private branch exchange trunks, and data arrangements.

T1	A digital transmission link with a total signaling speed of 1.544 Mbps. It is a standard for digital transmission in North America.
Take rate	The ratio of the number of premises that elect to take a service divided by the total number of premises in a market area; effectively a penetration rate of homes passed. (Also referred to as the Broadband Adoption Rate.)
Universal Service	The idea of providing every home in the United States with basic telephone service.
Unserved	Those housing units or individuals without access to a broadband network capable of offering service that meets the National Broadband Availability Target.
Upstream	Data flowing from your computer to the Internet (sending Email, uploading a file).
VDSL - Very High Bit Rate Digital Subscriber Line	A form of DSL similar to ADSL but providing higher speeds at shorter loop lengths.
Video On Demand (VOD)	A service that allows users to remotely choose a movie from a digital library and be able to pause, fast forward, or even rewind their selection.
VoIP - Voice Over Internet Protocol	A voice enabling technology that employs a data network (such as a broadband connection) to transmit voice conversations.
WiMax	Worldwide Interoperability for Microwave Access (WiMAX) is a telecommunications technology that uses radio spectrum to transmit bandwidth between digital devices. Similar to WiFi, WiMAX brings with it the ability to transmit over far greater distances and to handle much more data.
Wireless ISP (WISP)	An Internet service provider that provides fixed or mobile wireless services to its customers.

Appendix G

Common Broadband Abbreviations

3G	Third generation	IXC	Interexchange Carrier
4G	Fourth generation	kbps	Kilobits per second
ADSL	Asymmetric Digital Subscriber Line	Kft	Kilo-feet (1,000 feet)
AMPS	Advanced Mobile Phone Service	kHz	Kilohertz (1 thousand Hertz)
BDIA	Broadband Data Improvement Act	kWh	Kilowatt-hour
BIP	Broadband Infrastructure Program	LATA	(Local Access and Transport Area)
BPON	Broadband Passive Optical Network	LEC	Local exchange carrier
BTOP	Broadband Technology Opportunities Program	LTE	Long-Term Evolution
CAP	Competitive Access Provider	Mbps	Megabits per second (1 million bits per second)
CDMA	Code-Division Multiple Access	MHz	Megahertz (1 million Hertz)
CLEC	Competitive Local Exchange Carrier	MSA	Metropolitan service area
CO	Central Office	MS-ISAC	Multi-State Information Sharing and Analysis Center
CPE	Customer Premises Equipment	NBP	National Broadband Plan
DOCSIS	Data Over Cable Service Interface Specification	NG911	Next Generation 911
DS1	Digital Signal 1	NIST	National Institute of Standards and Technology
DS3	Digital Signal 3	NTIA	National Telecommunications and Information Administration
DSL	Digital Subscriber Line	PBS	Public Broadcasting Service
DSLAM	Digital Subscriber Line Access Multiplexer	PC	Personal computer
DTV	Digital television	PDF	Portable Document Format
E911	Enhanced 911	POP	Point of Presence
EAS	Emergency Alert System	PON	Passive Optical Network
EPON	Ethernet Passive Optical Network	POTS	Plain Old Telephone Service
ERIC	Emergency Response Interoperability Center	PSAP	Public safety answering point
EV-DO	Evolution-Data Optimized	PSBL	Public Safety Broadband Licensee
FCC	Federal Communications Commission	PSTN	Public Switched Telephone Network
FS-ISAC	Financial Services Information Sharing and Analysis Center	QOS	Quality of Service
FTTN	Fiber to the Node or Fiber to the Neighborhood	R&D	Research and development
FTTP	Fiber-to-the-Premise	RBOC	Regional Bell Operation Company
FW	Fixed Wireless	RSA	Rural service area
Gbps	Gigabits per second	RUS	Rural Utilities Service
GHz	Gigahertz (1 billion Hertz)	SIM	Subscriber Identity Module
GPS	Global Positioning System	SLC	Subscriber line charge
GSM	Global System for Mobile communication	SMS	Short Message Service
HD	High definition	TDMA	Time Division Multiple Access
HFC	Hybrid Fiber Coaxial	Telco	Telecommunications
HFM	Hybrid Fiber Microwave	TOP	Technology Opportunity Program
HU	Housing Units	TV	Television
Hz	Hertz	UHF	Ultra high frequency
ILEC	Incumbent local exchange carrier	USF	Universal Service Fund
IP	Internet Protocol	VDSL	Very high bit rate Digital Subscriber Line
IPAWS	Integrated Public Alert and Warning System	VHF	Very high frequency
ISAC	Information Sharing and Analysis Center	VOIP	Voice Over Internet Protocol
ISO	Independent System Operator	WCS	Wireless Communications Service
ISP	Internet service provider	WiMAX	Worldwide Interoperability for Microwave Access
IT	Information technology	WISP	Wireless Internet Service Provider
IT-ISAC	Information Technology Information Sharing and Analysis Center	WPS	Wireless Priority Service



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