

Congress of the United States
U.S. House of Representatives
Committee on Small Business
2361 Rayburn House Office Building
Washington, DC 20515-0515

Memorandum

To: Members, House Committee on Small Business
From: Committee Staff
Date: July 16, 2012
Re: Hearing: Digital Divide: Expanding Broadband Access to Small Businesses

On July 18, 2012 at 1:00 p.m., the Committee on Small Business will meet in Room 2360 of the Rayburn House Office Building to receive testimony on the role of the federal government in expanding broadband access to small businesses in the United States. Specifically, the Committee will hear from the Federal Communications Commission (FCC), the National Telecommunications and Information Administration (NTIA) of the Department of Commerce, and the Rural Utilities Service (RUS) of the United States Department of Agriculture on the status of current broadband programs and the overall strategy to expand broadband capabilities to small businesses.

I. Background

Broadband has the potential to transform the way small businesses operate and compete in the 21st Century. Along with basic email services, the Internet provides a number of tools to help small firms increase their productivity, efficiency, and overall success. Social media, teleworking, cloud data storage, and global video conferencing are a few examples of opportunities provided by the Internet. The FCC estimates that 97 percent of small businesses use some form of broadband applications to strengthen their operations.¹

One of the most important tools the Internet offers to businesses is the ability to access the global electronic marketplace. From 1998 to 2009, electronic commerce in the United States, also known as online sales, grew from \$4.9 billion to \$145.2 billion, or by 35.9 percent annually.² Moreover, broadband generated an entrepreneurship boom in new Internet technologies, such as websites and applications; the expectation is that these enterprises will grow into medium and large businesses.

¹ FCC, NATIONAL BROADBAND PLAN 16 (2010), available at <http://download.broadband.gov/plan/national-broadband-plan.pdf> (hereinafter "Broadband Plan").

² BUREAU OF THE CENSUS, UNITED STATES DEPARTMENT OF COMMERCE, RETAIL SALES AND E-COMMERCE-TABLE 1055, available at http://www.census.gov/compendia/statab/cats/wholesale_retail_trade/online_retail_sales.html.

Once they understand the benefits of broadband, small businesses are concerned with the speed, price and choice of Internet provider.³ A recent survey by the Office of the Chief Counsel for Advocacy at the United States Small Business Administration (Advocacy), showed almost half (48 percent) of rural businesses and more than one-third (37 percent) of urban businesses are not satisfied with their current Internet speed.⁴

The development and adoption of Internet technology continues to grow at a rapid pace. To keep up with the demand, private sector carriers have been aggressively building out their broadband infrastructure to provide more coverage at faster speeds. Due to the cost, this build-out has tended to occur in high-density urban and suburban areas where costs for constructing broadband networks can be spread over a larger customer base.

Thus, a new issue is how to economically provide coverage to rural, including unserved areas. The federal government has a number of programs in place that provide incentives for the development of broadband in these areas. However, it is important to enact regulatory policies that do not diminish the incentive for private sector investment, because this will ultimately harm small businesses and the economy that rely on investments for the growth needed to create jobs.

Developments in Broadband

Initial forays into providing access to the Internet relied on modems attached to the wireline telephone network. Although these networks could transmit at high speeds between telephone company central offices and nodes on the Internet, users, including most small businesses, had to rely on slow (56 Kpbs) wire line telephone connections. This represented a bottleneck in adoption of Internet and services that utilized the Internet.

Congress attempted to jumpstart deployment of high speed access with the enactment of the Telecommunications Act of 1996, which set the goal of removing regulatory barriers and encouraging market participation.⁵ In that Act, Congress defined advanced telecommunications capability as “high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology.”⁶ Even that definition was superseded by consumer demand,⁷ application development, and technological improvements to the infrastructure.

Internet service providers have adopted technologies, such as coaxial or fiber optic cable for broadband service, which generally has sufficient capacity to transmit all the data needed by small businesses. As already noted, the cost of wiring communities, particularly remote locations, with advanced technologies, especially fiber optics, is expensive. To reduce costs, some providers utilize wireless transmission. Wireless technologies are provided by cellular carriers directly to consumer smart phones, tablets, or other devices through licensed or unlicensed frequencies.⁸ Wireless Internet delivery (either from satellites or terrestrial services)

³ ADVOCACY, THE IMPACT OF BROADBAND SPEED AND PRICE ON SMALL BUSINESS 32 (2010), *available at* http://www.sba.gov/sites/default/files/rs373tot_0.pdf. (hereinafter “Broadband Speed Report”).

⁴ *Id.* at 41.

⁵ Pub. L. No. 104-104, 110 Stat. 56 (1996).

⁶ *Id.* at § 706, 110 Stat. 153.

⁷ Broadband Speed Report, *supra* note 3, at 42.

⁸ Broadband Speed Report, *supra* note 3, at 13.

continues to grow at a rapid pace: Cisco projects that wireless data traffic will grow 20 times from 2010 to 2015.⁹

The speed and capabilities of broadband can vary greatly depending upon the type of service. According to the NTIA, 98.3 percent of the United States population has access to broadband speeds of at least 768 kbps download/200 kbps upload; and 95.5 percent has access to at least 3 megabits per second (mbps) download/768 kbps upload.¹⁰ Although the Telecommunications Act of 1996 established a baseline, Congress authorized the FCC to revise that definition as new technologies are developed under their authority. The FCC has established a benchmark minimum speed for broadband as 4 mbps download and 1 mbps upload.¹¹ The chart below provides an example of download speeds for business applications.¹²

Typical Applications and Their Performance for Various Download/Upload Broadband Speeds (Single User)

Applications	56 Kbps/ 56 Kbps (Dial-up, maximum speed)	256 Kbps/ 256 Kbps (DSL; Cable)	768 Kbps/ 384 Kbps (DSL; Cable; Satellite)	1 Mbps/ 384 Kbps (DSL; Cable; Satellite)	3 Mbps/ 768 Kbps (DSL; Cable; Satellite)	7 Mbps/ 768 Kbps (DSL; Cable; Fiber)	10 Mbps/ 1 Mbps (DSL; Cable; Fiber)	15 Mbps/ 2 Mbps (Cable; Fiber)	20 Mbps/ 2 Mbps (Cable; Fiber)	25 Mbps/ 5 Mbps (Cable; Fiber)	50 Mbps/ 10 Mbps (Cable; Fiber)	100 Mbps/ 10 Mbps (Fiber)
Simple text e-mail without attachments (50 KB)	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Web browsing	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
E-mail with large attachments or graphics (500 KB)	Bad	OK	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Download small files (e.g., a 50-page text document with limited graphics) (1 MB) ¹	Bad	Bad	OK (11 sec.)	Good (8 sec.)	Good (3 sec.)	Good (2 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)
Download large files (e.g., a 100-page text document with graphics) (2 MB) ²	Bad	Bad	OK (21 sec.)	Good (16 sec.)	Good (6 sec.)	Good (3 sec.)	Good (2 sec.)	Good (2 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)	Good (1 sec.)
Online trading, e-business	Bad	Bad	OK	Good	Good	Good	Good	Good	Good	Good	Good	Good
Online meeting presentation and document sharing	Bad	Bad	OK	Good	Good	Good	Good	Good	Good	Good	Good	Good
Videoconferencing streaming at 384 Kbps (desktop/single user) ³	Bad	Bad	OK	OK	Good	Good	Good	Good	Good	Good	Good	Good

II. Federal Role in Expanding Broadband

Federal involvement in the management and deployment of communication services dates back to the Great Depression. In the 1930s, many rural areas lacked the infrastructure to support communications services, or even electrical service, due to the high-costs. The gap in coverage of communication services was one factor that led to the 1934 Communications Act, which

⁹ http://www.cisco.com/en/US/netsol/ns827/networking_solutions_sub_solution.html#%7Eforecast.

¹⁰ <http://www.broadbandmap.gov/summarize/nationwide>.

¹¹ Connect America Fund: A National Broadband Plan for Our Future; Establishing Just and Reasonable Rates for Local Exchange Carriers; High Cost Universal Service Support, WC Docket Nos. 10-90, 07-135, 05-337, 03-109; GN Docket No. 09-51; CC Docket Nos. 01-92, 96-45; WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, slip op. at ¶¶ 1-4 (FCC 11-161) (Nov. 18, 2011), summarized at 76 Fed. Reg. 73,830 (Nov. 29, 2011) (hereinafter “USF/ICC Transformation Order”). The slip opinion is available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0206/FCC-11-161A1.pdf.

Technically, the FCC did not adopt a new definition of broadband under its authority pursuant to the Telecommunications Act of 1996. Rather, the Commission determined that carriers would not be eligible for assistance from the Connect America Fund unless they provided 4 Mbps downstream and 1 Mbps upstream. Downstream refers to the speed at which someone can download something to a computer or other web-enabled device (such as a smart phone) and upstream refers to speeds at a computer or other web-enabled device can transmit data to the Internet.

¹² Broadband Speed Report, *supra* note 3, at 17.

established the FCC and the concept of providing ‘universal service’ to all Americans.¹³ The goal of universal service, described in greater detail later in the memorandum, is to provide telecommunication services to all individuals in the United States at a reasonable and adequate rate.¹⁴ In addition, the Rural Electrification Act of 1936 established the Rural Electric Administration (REA) and developed a subsidized loan process to rural electric cooperatives to provide electrical services in rural and high-cost areas.¹⁵ This program was then expanded in 1949 to allow telecommunication cooperatives and increase the build-out of communication services to needed areas.¹⁶ The REA later became known as the Rural Utilities Service (RUS).¹⁷

Currently, the FCC is the independent agency tasked with regulating interstate and international communications by wire, wireless,¹⁸ satellite, and cable.¹⁹ The RUS is the primary agency for financing rural broadband development. RUS regularly²⁰ administers two funding programs to expand broadband: the Rural Broadband Access Loan and Loan Guarantee program; and the Community Connect Broadband grants.²¹ Moreover, the NTIA is the primary agency responsible for developing telecommunications and information policy aimed at expanding broadband access and adoption in the United States.²² These agencies play a key role in developing the policy and financing available to modernize the current telecommunication infrastructure and expand broadband deployment.

In describing the expansion of broadband, it is important to note how the rapid growth of the Internet has led to the ‘technological convergence’ of different technologies and infrastructure that provide similar communication services.²³ For example, at the beginning of the 1990s, many small businesses accessed the Internet as part of their telephone line, in the form of dial-up service or a digital subscriber line (DSL). Then, as the Internet infrastructure and technology developed, many small firms switched to a higher-capacity broadband line, instead of the telephone line, to utilize voice services, also known as voice over Internet protocol (VoIP) and other communication services (such video and Internet access). The technological convergence and the rise in demand of Internet capabilities have led policy makers to consider ways to expand broadband access to rural areas of the United States.

Policymakers identified reforming the Universal Service Fund (USF) as one way to expand broadband by allocating subsidies to carriers for the deployment of broadband. The USF, generally, is the money collected²⁴ from telecommunications companies and then allocated to

¹³ 47 U.S.C. § 151.

¹⁴ *Id.*

¹⁵ 7 U.S.C. § 901 et seq.

¹⁶ Pub. L. No. 81-423, 63 Stat. 948, codified at 7 U.S.C. §§ 921-924.

¹⁷ Pub. L. 103-354, 108 Stat. 3219.

¹⁸ Wireless spectrum is managed by the FCC for commercial use and by the NTIA for government use.

¹⁹ <http://transition.fcc.gov/aboutus.html>.

²⁰ This does not include the one-time appropriation from the American Recovery and Reinvestment Act (ARRA) to administer the Broadband Initiatives Program (BIP), which is described in greater detail in a later section of the memorandum.

²¹ <http://www.rurdev.usda.gov/AboutRD.html>.

²² <http://www.ntia.doc.gov/about>.

²³ JONATHAN E. NUECHTERLEIN AND PHILIP J. WEISER, DIGITAL CROSSROADS: AMERICAN TELECOMMUNICATIONS POLICY IN THE INTERNET AGE 24 (2005).

²⁴ The USF is administered through four programs: High Cost, Low Income, Rural Health Care, and Schools and Libraries. From 1998 to 2010, the USF provided over \$43 billion to the High Cost program; over \$9.8 billion for

carriers with the mission of providing universal telecommunication service to American citizens, including small businesses, at an affordable rate. However, broadband was not included in the FCC's original definition of telecommunication services from the 1996 Telecommunications Act. Then in 2007, the FCC Federal-State Joint Board²⁵ recommended that broadband and Internet services should receive support from the USF to meet the nation's communication goals.²⁶ The FCC has adopted that recommendation and started making changes to its policies in order to enable firms to increase deployment of broadband under USF and the Telecommunications Act of 1996.

The role of these three agencies to promote deployment of broadband was enhanced with the enactment of the American Recovery and Reinvestment Act (ARRA), the development of the NBP, the proposed reform to the USF, and the growth of wireless broadband. Strong oversight of these programs is essential to ensure that small businesses have access to fast and affordable broadband.

*American Recovery and Reinvestment Act*²⁷

The federal government became even more involved in the deployment of broadband with the enactment of ARRA. ARRA provided one-time appropriations to the RUS²⁸ and NTIA²⁹ totaling \$7.2 billion in federal grants and loans to expand broadband deployment. Of the \$7.2 billion, the RUS received \$2.5 billion to administer grants and loans through the Broadband Initiatives Program (BIP). The remaining \$4.7 billion was appropriated for the NTIA to issue federal grants through the Broadband Technology Opportunity Program (BTOP).³⁰ The purpose of the programs is to support the deployment of broadband infrastructure, enhance and expand public computer centers, encourage sustainable adoption of broadband services, and to develop a national broadband map.

The RUS BIP program provided financing for 320 projects, totaling \$3.53 billion.³¹ The list of projects included: 285 last mile projects, 12 middle mile projects, 4 satellite awards, and 19 technical assistance grants.³² RUS estimated the infrastructure projects funded will provide

the Low Income program; over \$426 million for the Rural Health Care program; and over \$29 billion for the Schools and Libraries program.

²⁵ The Federal-State Joint Board on Universal Service is comprised of the FCC Commissioners, State Utility Commissioners, and a consumer advocate representative. The Joint Board is tasked with providing recommendations to implement the universal provisions of the 1996 Telecommunications Act, including the separation of property and expenses between interstate and intrastate operations.

²⁶ In the Matter of High-Cost Universal Service Support; Federal-State Joint Board on Universal Service, WC Docket No. 05-337, 22 FCC Rcd 20477 (November 20, 2007).

²⁷ Pub. L. No. 111-5, 123 Stat. 115 (2009).

²⁸ ARRA, Div. A., Title I, 123 Stat. 118.

²⁹ ARRA, Div. B., Tit. VI, § 6001, 123 Stat. at 512 (codified, as amended, at 47 U.S.C. § 1305).

³⁰ *Id.* The BTOP program was created in ARRA.

³¹ RUS, QUARTERLY REPORT ON BROADBAND INITIATIVES PROGRAM 2 (DEC. 2010), available at http://www.rurdev.usda.gov/supportdocuments/BIPQuarterlyReport_12-10.pdf.

³² *Id.* at 2. Last mile is commonly referred to as the last segment of connecting the Internet service provider to the customer. Middle mile is referred to as the segment that does not predominantly provide broadband service to end users, and may include interoffice transport, backhaul, or special access services. A detailed explication of middle mile telecommunications services is beyond the scope of this memorandum. As the statistics from RUS demonstrate, most middle mile telecommunications services already are capable of providing broadband services; if not, there would have been more than 12 middle mile projects funded by the RUS.

broadband service to 2.8 million households, reaching nearly 7 million people, 364,000 businesses, and 32,000 anchor institutions across more than 300,000 square miles.³³ In addition, RUS asserts the projects will create more than 25,000 immediate and direct jobs.³⁴

The NTIA BTOP program provided financing for 233 projects, totaling \$3.94 billion.³⁵ NTIA states the funding will go towards the construction or upgrade of approximately 120,000 miles of broadband networks on multiple networks, including fiber wire and wireless.³⁶ NTIA estimates that the BTOP investment will add approximately 70,000 miles of new broadband facilities,³⁷ and will serve as a catalyst for “millions of dollars in additional private sector investment.”³⁸

With the administration of the grants and loans completed, both agencies have increased their focus on oversight of the projects. Many of the projects were awarded without a full assessment of the current network capabilities and needs or whether they would benefit small businesses.

National Broadband Plan

Along with \$7.2 billion for broadband deployment, ARRA mandated the FCC to develop a comprehensive plan, known as the NBP, to “ensure that all people in the United States have access to broadband capability and shall establish benchmarks for meeting this goal.”³⁹ On March 17, 2010, the FCC released its 360-page NBP that provides policy recommendations and outlines long-term general goals including: supplying the nation with broadband access; ensuring affordable access to robust Internet service; and making the United State the leader in mobile innovation, with the fastest and most extensive network.⁴⁰ These general goals are supported by 208 specific recommendations, including reforming the USF to include broadband, increasing the amount of spectrum for wireless devices, and strengthening digital literacy and Internet adoption rates.⁴¹

USF Reform

As stated, the concept of providing universal service of communication to all of the people of the United States was first outlined in the 1934 Communications Act.⁴² The Act tasked the FCC with making “wire and radio so as to make available, so far as possible, to all the people of the United States...a rapid, efficient, nationwide, and world-wide wire and radio communications services with adequate facilities at reasonable charges.”⁴³ In response, the FCC developed the

³³ *Id.* at 6-9.

³⁴ RUS, ADVANCING BROADBAND: A FOUNDATION OR STRONG RURAL COMMUNITIES – BIP PROGRAM AWARDS REPORT 3 (JAN 2011), available at http://www.rurdev.usda.gov/supportdocuments/RBBreport_V5forweb.pdf.

³⁵ NTIA, THE BROADBAND TECHNOLOGY OPPORTUNITIES PROGRAM: EXPANDING BROADBAND ACCESS AND ADOPTION IN COMMUNITIES ACROSS AMERICA 3 (2010), available at http://www.ntia.doc.gov/files/ntia/publications/ntia_report_on_btop_12142010_0.pdf.

³⁶ *Id.*

³⁷ *Id.*

³⁸ NTIA, CONNECTING AMERICA’S COMMUNITIES at 4, available at http://www.ntia.doc.gov/files/ntia/publications/ntia_report_on_btop_12142010_0.pdf.

³⁹ ARRA, Div. B., Tit. VI, § 6001, 123 Stat. at 516.

⁴⁰ *Id.* at Exec. Summary at xiv-xv.

⁴¹ Broadband Plan, *supra* note 1.

⁴² 47 U.S.C. § 151.

⁴³ *Id.*

USF as a mechanism to subsidize telephone service to low-income households and high-cost areas.

The funding mechanism for the USF was not explicitly delineated in statute. The subsidies, mainly higher rates for long-distance calls by subscribers in low-cost areas, were not explicit. As Congress considered the overhaul to the 1934 Communications Act in 1995 and 1996, a decision was made to statutorily recognize the concept of universal service and require the FCC to make the subsidies for universal service explicit and transparent.

In the Telecommunications Act of 1996, Congress defined universal service as “an evolving level of telecommunications services that the Commission shall establish periodically ... taking into account advances in telecommunications and information technologies and services.”⁴⁷ U.S.C. § 254(c)(1). In response to that mandate, the FCC did not originally include broadband services within the parameters of evolving levels of telecommunications services.⁴⁴ The FCC’s decision made sense in 1997. Internet usage was in an embryonic stage at the time. To demonstrate the growth of the Internet, consider that one of the largest companies in the United States, Google, did not even exist at the dawn of the 21st Century. Furthermore, no Internet services were delivered to wireless devices when the FCC excluded broadband from universal. It took less than a half-decade for Internet usage to go from something for tech geeks to widespread mainstream adaptation.

As stated, the FCC Federal-State Joint Board recommended that broadband and Internet services should receive subsidies from the USF to expand broadband deployment and meet the nation’s communication goals.⁴⁵ Further details of the USF reform were then outlined in the NBP. On November 18, 2011, the FCC announced the comprehensive reform of the USF and the intercarrier compensation system⁴⁶ to “ensure that robust, affordable voice and broadband service, both fixed and mobile, are available to Americans throughout the nation.”⁴⁷ The 751-page order contains many of the same recommendations stated in the NBP. The principal goals of the comprehensive reform are to: 1) preserve and advance universal availability of voice services; 2) ensure universal availability of modern networks capable of providing voice and broadband services to homes, businesses, and community anchor institutions; 3) ensure universal availability of modern networks capable of providing advanced mobile voice and broadband service; 4) ensure that rates for broadband services and rates for voice services are reasonably comparable in all regional of the nation; and 5) minimize the universal service contribution on consumers and businesses.⁴⁸

The USF/ICC Transformation Order states that provisions will be implemented over a multi-year period to “adopt a gradual, measured transition that will facilitate predictability and stability.”⁴⁹ One of the most important provisions for communication carriers is the restructuring and

⁴⁴ Federal-State Joint Board on Universal Service, CC Docket No. 96-45, Report and Order, 12 FCC Rcd 8776 at ¶¶ 56-64 (1997).

⁴⁵ In the Matter of High-Cost Universal Service Support; Federal-State Joint Board on Universal Service, WC Docket No. 05-337, 22 FCC Rcd 20477 (November 20, 2007).

⁴⁶ Intercarrier compensation is referred to as the monetary compensation that is transferred between carriers while connecting calls through multiple networks.

⁴⁷ USF/ICC Transformation Order, *supra* note 11, slip op. at ¶ 4.

⁴⁸ *Id.* at ¶ 17.

⁴⁹ *Id.* at ¶ 35.

transition of the High-Cost Program,⁵⁰ which has been the largest beneficiary of USF disbursements⁵¹, to the Connect America Fund.⁵² The order adopted a framework to impose limits on reimbursable funds and costs for certain wireline carriers serving high-cost areas.⁵³ In addition, the Commission will continue to introduce other specific provisions of the USF/ICC Transformation Order that will affect the deployment of both wireline and wireless broadband access to small businesses

Spectrum

Electromagnetic spectrum is the infrastructure for wireless broadband to transmit data on mobile devices, such as smart phones and tablets. The rapid growth in mobile wireless technology and capabilities has enhanced the need for more spectrum. The NBP outlines a number of proposals to increase spectrum, including making available 500 megahertz for mobile broadband.⁵⁴ Increasing the amount of spectrum available will allow mobile wireless providers to continue to expand their network capabilities to keep up with the rapid growth in demand. In February 2012, Congress provided the FCC with the authority to auction unused spectrum for new wireless providers.⁵⁵ The Congressional Budget Office estimates the new spectrum could provide over \$27 billion in federal receipts.⁵⁶

III. Conclusion

Broadband is an essential tool for small businesses and their ability to compete in the global economy. This hearing will provide an opportunity for members of the Committee to examine the effectiveness of current federal programs aimed at expanding broadband to small business in rural America.

⁵⁰ The High Cost Program is one the four USF programs designed to ensure that consumers in rural and high-cost areas have access to telecommunication services that are affordable and reasonable compared to urban areas. The program allows carriers who serve those areas to obtain funds to help offset the high costs of providing service.

⁵¹ <http://www.usac.org/about/about/universal-service/fast-facts.aspx>.

⁵² The Connect America Fund (CAF) is a new program that will ultimately replace the High-Cost program within the USF.

⁵³ In the Matter of Connect America Fund High-Cost Universal Service Support, WC Docket Nos. 10-90 and 05-337 (April 25, 2012).

⁵⁴ Broadband Plan, *supra* note 1, at 75.

⁵⁵ Pub. L. No. 112-96, § 6402, 126 Stat. 158 (2012).

⁵⁶ THE CONGRESSIONAL BUDGET OFFICE, COST ESTIMATE FOR AMERICAN JOBS ACT OF 2011, *available at* http://www.cbo.gov/sites/default/files/cbofiles/attachments/s1549_0.pdf.