



## The National Broadband Plan

**-name redacted-**

Specialist in Science and Technology Policy

**-name redacted-**

Specialist in Telecommunications Policy

**-name redacted-**

Specialist in Telecommunications Policy

**-name redacted-**

Specialist in Telecommunications Policy

**-name redacted-**

Legislative Attorney

July 9, 2010

Congressional Research Service

7-....

[www.crs.gov](http://www.crs.gov)

R41324

## Summary

On March 16, 2010, the Federal Communications Commission (FCC) released *Connecting America: The National Broadband Plan*. Mandated by the American Recovery and Reinvestment Act of 2009 (ARRA, P.L. 111-5), the FCC's National Broadband Plan (NBP) is a 360-page document composed of 17 chapters containing 208 specific recommendations directed to the FCC, to the Executive Branch (both to individual agencies and to Administration as a whole), to Congress, and to nonfederal and nongovernmental entities. The ARRA specified that the NBP should "seek to ensure that all people of the United States have access to broadband capability."

The NBP identified significant gaps in broadband availability and adoption in the United States. In order to address these gaps and other challenges, the NBP set six specific goals to be achieved by the year 2020. These six goals are discussed further in this report, and an outline of the NBP is provided at the end of this report.

It is important to note that many aspects of telecommunications policies, regulations, and legal issues would be affected by the NBP. For example:

- The Universal Service Fund (USF) is a fund that was created to provide universal availability and affordability of communications throughout the United States; the issue is whether or how the universal service concept should embrace access to broadband as one of its policy objectives.
- Because wireless broadband can play a key role in the deployment of broadband services, the NBP extensively addresses spectrum policy and the issue of how to make more spectrum available and usable for mobile broadband applications.
- Issues such as intercarrier compensation and set-top boxes are identified by the NBP as having potential significant impact on broadband availability and adoption.
- Broadband will likely play a role in addressing critical national challenges in areas such as health care, education, energy, environment, and public safety; the issue is how, for each national purpose, the existing legislative and regulatory framework and trends in the field might best benefit from better broadband access and services.
- Finally, one potential issue the FCC may face in its attempts to achieve NBP goals is the scope of the agency's authority to regulate broadband Internet access and management.

A major issue for Congress will be how to shape the Plan's various initiatives when and if they go forward, either through oversight, through consideration of specific legislation, or in the context of comprehensive telecommunications reform. A key challenge for Congressional policymakers will be to assess whether an appropriate balance is maintained between the public and private sectors, and the extent to which government intervention in the broadband marketplace would help or hinder private sector investment and competition.

## Contents

Background.....	1
Overview of Plan .....	2
Goals to Create a “High-Performance America” .....	2
Recommendations .....	4
Implementation.....	5
Broadband Adoption and Availability and the Federal Universal Service Fund .....	6
The Evolution of the Universal Service Concept .....	6
Universal Service and Broadband .....	7
The National Broadband Plan and the USF.....	8
The Connect America and Mobility Funds .....	8
Low Income Program.....	9
Schools and Libraries and Rural Health Programs .....	9
Funding .....	9
Reform of Intercarrier Compensation.....	10
Fostering a Market for Set-Top Boxes.....	11
Spectrum Policies for Wireless Broadband.....	14
Spectrum Assignment .....	15
Television Broadcast Spectrum .....	16
D Block .....	17
Wireless Backhaul .....	18
Technology and Spectrum Management .....	18
New Technologies .....	19
New Policies.....	19
National Purposes .....	21
Meeting Policy Goals .....	22
The FCC’s Authority to Implement the National Broadband Plan .....	23
Towards a National Broadband Policy?.....	28

## Tables

Table 1. Outline of National Broadband Plan.....	30
Table 2. Recommendations of the National Broadband Plan to Congress .....	32

## Contacts

Author Contact Information.....	34
---------------------------------	----

## Background

Signed into law on February 17, 2009, Section 6001(k) of the American Recovery and Reinvestment Act of 2009 (ARRA, P.L. 111-5) mandated the Federal Communications Commission (FCC) to prepare a report containing a national broadband plan. The impetus behind mandating a national broadband plan was derived from the widely accepted view in Congress of broadband as a critical public infrastructure, increasingly important to the nation's economic development. Broadband was also viewed as playing an increasingly critical role in addressing specific challenges facing the nation in areas such as health care, energy, education, public safety, and others.

In the United States, broadband infrastructure is constructed, operated, and maintained primarily by the private sector, including telephone, cable, satellite, wireless, and other information technology companies. Although broadband is primarily deployed by private sector providers, federal and state regulation of the telecommunications industry, as well as government financial assistance programs, can have a significant impact on private sector decisions to invest in and deploy broadband infrastructure, particularly in underserved and unserved areas of the nation. When considering broadband policy, the ongoing challenge for Congressional policymakers is how to strike a balance between providing federal assistance for unserved and underserved areas where the private sector may not be providing acceptable levels of broadband service, while at the same time minimizing any deleterious effects that government intervention in the marketplace may have on competition and private sector investment.

The ARRA specified that the national broadband plan “shall seek to ensure that all people of the United States have access to broadband capability and shall establish benchmarks for meeting that goal,” and that the plan should include:

- an analysis of the most effective and efficient mechanisms for ensuring broadband access by all people of the United States;
- a detailed strategy for achieving affordability of such service and maximum utilization of broadband infrastructure and service by the public;
- an evaluation of the status of deployment of broadband service, including progress of projects supported by the grants made pursuant to this section; and
- a plan for use of broadband infrastructure and services in advancing consumer welfare, civic participation, public safety and homeland security, community development, health care delivery, energy independence and efficiency, education, worker training, private sector investment, entrepreneurial activity, job creation and economic growth, and other national purposes.

Starting in the summer of 2009, an FCC task force embarked on a massive information gathering effort consisting of 36 public workshops, 9 field hearings, 31 public notices producing 75,000 pages of public comments, and 131 online blog postings triggering almost 1,500 comments.<sup>1</sup>

---

<sup>1</sup> Federal Communications Commission, *News Release*, “FCC Sends National Broadband Plan to Congress,” March 16, 2010, p. 2, available at [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-296880A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296880A1.pdf).

On March 16, 2010, the FCC publically released its report, *Connecting America: The National Broadband Plan*.<sup>2</sup> As mandated by the ARRA, the report was formally submitted to the House Committee on Energy and Commerce and the Senate Committee on Commerce, Science, and Transportation. At the March 16, 2010 Open Commission Meeting, the FCC Commissioners voted to approve a Broadband Mission Statement containing goals for a U.S. broadband policy. However, the FCC Commissioners did not vote on whether to approve the plan itself.

## Overview of Plan<sup>3</sup>

The FCC's National Broadband Plan (NBP) is a 360-page document composed of 17 chapters containing 208 specific recommendations. **Table 1**, at the end of this report, is an outline of the National Broadband Plan. *Connecting America: The National Broadband Plan* begins with an introduction, a statement of goals, and a discussion of the current state of the broadband "ecosystem." This is followed by three parts containing the bulk of the plan's recommendations: Part I, "Innovation and Investment," Part II, "Inclusion," and Part III, "National Purposes." The NBP concludes with a chapter on implementation and benchmarks.

## Goals to Create a "High-Performance America"

The NBP seeks to "create a high-performance America" which the FCC defines as "a more productive, creative, efficient America in which affordable broadband is available everywhere and everyone has the means and skills to use valuable broadband applications."<sup>4</sup> In order to achieve this mission, the NBP recommends that the country set six goals for 2020:

- **Goal No. 1: At least 100 million U.S. homes should have affordable access to actual download speeds of at least 100 megabits per second and actual upload speeds of at least 50 megabits per second.** Speeds of 100 Mbps in 100 million homes (popularly referred to as "100 squared") would constitute next-generation broadband<sup>5</sup> in most U.S. households. As a milestone, the FCC has set an interim goal of 100 million homes with actual download speeds of 50 Mbps and actual upload speeds of 20 Mbps by 2015. The FCC notes that existing providers are in the process of upgrading their networks, and it is likely that 90% of the country will have access to advertised peak download speeds of more than 50 Mbps by 2013.<sup>6</sup>
- **Goal No. 2: The United States should lead the world in mobile innovation, with the fastest and most extensive wireless networks of any nation.** According to November 2009 data from American Roamer, 3G wireless service

<sup>2</sup> Available at <http://www.broadband.gov/plan/>.

<sup>3</sup> Prepared by (name redacted), Specialist in Science and Technology Policy.

<sup>4</sup> Federal Communications Commission, *Connecting America: The National Broadband Plan*, March 17, 2010, p. 9.

<sup>5</sup> A distinction is often made between "current generation" and "next generation" broadband (commonly referred to as next generation networks or NGN). "Current generation" typically refers to currently deployed cable, DSL, and many wireless systems, while "next generation" refers to dramatically faster download and upload speeds offered by fiber technologies and also potentially by future generations of cable, DSL, and wireless technologies.

<sup>6</sup> According to the FCC, "the affordability and actual performance of these networks will depend on many factors such as usage patterns, investment in infrastructure, and service take-up rates." See *Connecting America*, p. 21.

covers roughly 60% of U.S. land mass.<sup>7</sup> Approximately 77% of the U.S. population live in an area served by three or more 3G service providers, 12% live in an area served by two, 9% live in an area served by one, and about 2% live in an area with no provider.<sup>8</sup> The FCC currently has 50 MHz of spectrum that it can assign for broadband use. The NBP recommends making 500 MHz of spectrum available for broadband by 2020, with an interim benchmark of 300 MHz by 2015.

- **Goal No. 3: Every American should have affordable access to robust broadband service, and the means and skills to subscribe if they so choose.** There are two aspects to the goal of universal broadband: availability and adoption. Regarding *broadband availability*, 290 million Americans—95% of the U.S. population—currently live in housing units with access to terrestrial, fixed broadband infrastructure capable of supporting actual download speeds of at least 4 Mbps. This leaves a “gap” of 14 million people in the United States living in 7 million housing units that do not have access to terrestrial broadband infrastructure capable of this speed.<sup>9</sup> The FCC has estimated that \$24 billion in additional funding would be necessary to fill what it refers to as the “broadband availability gap.”<sup>10</sup> Regarding *broadband adoption*, the NBP sets an adoption goal of “higher than 90%” by 2020. Currently, broadband adoption stands at 67%, about two-thirds of the adult population. Certain demographic groups exhibit significantly lower rates of broadband adoption, for example: 40% of adults making less than \$20,000 per year have adopted terrestrial broadband at home, 50% of adults in rural areas, 24% of those with less than a high school degree, 35% of those older than 65, 59% of African Americans, 49% of Hispanics, 42% of people with disabilities, and fewer than 10% of residents on Tribal lands.<sup>11</sup>
- **Goal No. 4: Every American community should have affordable access to at least 1 gigabit per second broadband service to anchor institutions such as schools, hospitals and government buildings.** The NBP notes that while 99% of all health care locations with physicians have access to an actual download speed of at least 4 Mbps, and while 97% of schools are connected to the Internet (many supported by the federal E-rate program), more than 50% of teachers say slow or unreliable Internet access presents obstacles to their use of technology in classrooms, and only 71% of rural health clinics have access to mass-market broadband solutions. Further, many business locations, schools and hospitals often have connectivity requirements that cannot be met by mass-market DSL, cable modems, satellite or wireless providers, and must buy dedicated high-

<sup>7</sup> *Connecting America: The National Broadband Plan*, p. 22.

<sup>8</sup> According to the FCC, “these measures likely overstate the coverage actually experienced by consumers, since American Roamer reports advertised coverage as reported by many carriers who all use different definitions of coverage. In addition, these measures do not take into account other factors such as signal strength, bitrate or in-building coverage, and may convey a false sense of consistency across geographic areas and service providers.” See *Connecting America: The National Broadband Plan*, p. 22.

<sup>9</sup> *Connecting America: The National Broadband Plan*, p. 20.

<sup>10</sup> *Ibid.*, p. 136.

<sup>11</sup> *Ibid.*, p. 23.

capacity circuits such as T-1 or Gigabit Ethernet service. The availability and price of such circuits vary greatly across different geographies.<sup>12</sup>

- **Goal No. 5: To ensure the safety of the American people, every first responder should have access to a nationwide, wireless, interoperable broadband public safety network.** Nearly nine years after 9/11, first responders from different jurisdictions and agencies still often cannot communicate with each other during emergencies and continue to operate outdated communications systems, most of which do not have broadband capability.<sup>13</sup>
- **Goal No. 6: To ensure that America leads in the clean energy economy, every American should be able to use broadband to track and manage their real-time energy consumption.** According to the FCC, “broadband and advanced communications infrastructure will play an important role in achieving national goals of energy independence and efficiency.”<sup>14</sup>

## Recommendations

Chapters 4 through 17 constitute the heart of the National Broadband Plan and contain 208 specific recommendations intended to help achieve the Plan’s goals. The NBP’s recommendations are directed to the FCC, to the Executive Branch (both to individual agencies and to Administration as a whole), to Congress, and to nonfederal and nongovernmental entities. **Table 2** (at the end of this report) provides a listing of recommendations specifically directed to Congress.

The NBP is categorized into three parts:

- **Part I (Innovation and Investment)** which “discusses recommendations to maximize innovation, investment and consumer welfare, primarily through competition. It then recommends more efficient allocation and management of assets government controls or influences.”<sup>15</sup> The recommendations address a number of issues, including: spectrum policy, improved broadband data collection, broadband performance standards and disclosure, special access rates, interconnection, privacy and cybersecurity, child online safety, poles and rights-of-way, research and experimentation (R&E) tax credits, R&D funding.
- **Part II (Inclusion)** which “makes recommendations to promote inclusion—to ensure that all Americans have access to the opportunities broadband can provide.”<sup>16</sup> Issues include: reforming the Universal Service Fund, intercarrier compensation, federal assistance for broadband in Tribal lands, expanding existing broadband grant and loan programs at the Rural Utilities Service, enable greater broadband connectivity in anchor institutions, and improved broadband adoption and utilization especially among disadvantaged and vulnerable populations.

---

<sup>12</sup> Ibid., p. 20.

<sup>13</sup> Ibid., p. 313.

<sup>14</sup> Ibid., p. 265.

<sup>15</sup> Ibid., p. 11.

<sup>16</sup> Ibid.

- **Part III (National Purposes)** which “makes recommendations to maximize the use of broadband to address national priorities. This includes reforming laws, policies and incentives to maximize the benefits of broadband in areas where government plays a significant role.”<sup>17</sup> National purposes include: health care, education, energy and the environment, government performance, civic engagement, and public safety. Issues include: telehealth and health information technology, online learning and modernizing educational broadband infrastructure, digital literacy and job training, smart grid and smart buildings, federal support for broadband in small businesses, telework within the federal government, cybersecurity and protection of critical broadband infrastructure, copyright of public digital media, interoperable public safety communications, next generation 911 networks and emergency alert systems.

## Implementation

The NBP discusses an implementation strategy intended to carry out the recommendations. First, because many of the recommendations are directed towards the Executive Branch, the NBP recommends the creation of an interagency Broadband Strategy Council to coordinate implementation of the NBP. Second, given that approximately half the recommendations are directed to the FCC, the NBP calls on the FCC to quickly publish a timetable or proceedings to implement those NBP recommendations that fall under FCC authority. On April 8, 2010, the FCC released a Broadband Action Agenda explaining the purpose and timing of more than 60 rulemakings and other notice-and-comment proceedings.<sup>18</sup>

Additionally, Congress is seen as playing a major role in implementing the National Broadband Plan, both by considering legislation to implement NBP recommendations, and by overseeing (and possibly funding) broadband activities conducted by the FCC and Executive Branch agencies.

As telecommunications technologies increasingly converge onto a broadband platform, many of the issues traditionally regarded as part of “telecommunications policy” are becoming viewed as part of “broadband policy.” Accordingly, the NBP addresses many of the ongoing major telecommunications policy issues, such as the reform and reorientation of the Universal Service Fund, reform of intercarrier compensation, the possible mandating of “gateway” set-top boxes, spectrum and wireless policy, and the appropriate regulatory framework for an evolving information infrastructure. Some of these issues will likely be addressed in subsequent FCC proceedings, and all may be debated and considered by Congress.

---

<sup>17</sup> Ibid.

<sup>18</sup> FCC, *Broadband Action Agenda*, available at <http://www.broadband.gov/plan/broadband-action-agenda.html>.



## **Broadband Adoption and Availability and the Federal Universal Service Fund<sup>19</sup>**

The NBP states that “Everyone in the United States today should have access to broadband services supporting a basic set of applications that include sending and receiving e-mail, downloading web pages, photos and video, and using simple video conferencing.”<sup>20</sup> A universalization target of 4 Mbps of actual download speed and 1 Mbps of actual upload speed has been set as the initial target rate for public investment to ensure that these expectations will be met. The NBP calls upon the Federal Universal Service Fund (USF) to undertake a major role to ensure that this goal is achieved.

### **The Evolution of the Universal Service Concept**

Since its creation in 1934 the Federal Communications Commission has been tasked with “... mak[ing] available, so far as possible, to all the people of the United States,... a rapid, efficient, Nation-wide, and world-wide wire and radio communications service with adequate facilities at reasonable charges....”<sup>21</sup> This mandate led to the development of what has become known as the universal service concept. The universal service concept, as originally designed, called for the establishment of policies to ensure that telecommunications services are available to all Americans, including those in rural, insular, and high cost areas, by ensuring that rates remain affordable.

The term universal service, when applied to telecommunications, refers to the ability to make available a basket of telecommunications services to the public, across the nation, at a reasonable price. Over time, access to the public switched network through a single wireline connection, enabling voice service, became the standard of communications. Currently the basic universal service package, which was established in 1997, is comprised of:

- voice grade access to and some usage of the public switched network;
- single line service;
- dual tone signaling;
- access to directory assistance;
- emergency service such as 911;
- operator services;
- access and interexchange (long distance) service.

Since the U.S. household telephone connection rate is 95.6% of homes, an all-time high, some might say that the program has been a success and nothing more needs to be done.<sup>22</sup> The

---

<sup>19</sup> Prepared by (name redacted), Specialist in Telecommunications Policy.

<sup>20</sup> *Connecting America: The National Broadband Plan*, Chapter 8, p.135.

<sup>21</sup> Communications Act of 1934, as amended, title I sec.1 [47 U.S.C. 151].

<sup>22</sup> *Telephone Subscribership in the United States*, Federal Communications Commission. Released February 2010. Table 1, p. 7. Data as of November 2009.

universal service concept, however, is an evolving one, and consequently so are universal service policies and goals. The initial focus of universal service support targeted eligible telecommunications carriers usually serving rural, insular, or other high cost areas by providing funds to help offset higher than average costs of providing telephone service (e.g., the High-Cost Program). Changes in expectations by policymakers and consumers have led to an expansion of universal service programs as well as to the establishment of a Federal USF to administer them.<sup>23</sup> For example, the passage of the Telecommunications Act of 1996 (P.L. 104-104) codified the universal service concept and expanded the concept to include, among other principles, that elementary and secondary schools and classrooms, libraries, and rural health care providers have access to telecommunications services for specific purposes at discounted rates as well as access to advanced telecommunications and information services.<sup>24</sup> This led to the establishment by the FCC of the Schools and Libraries and the Rural Health Care Programs. Earlier policy decisions by the FCC led to the development, in the mid-1980s, of a needs based Low-Income Program to assist economically needy individuals to join and remain on the telecommunications network.<sup>25</sup>

## **Universal Service and Broadband**

Over the past decade the telecommunications sector has undergone a vast transformation fueled in particular by the deployment of and access to broadband infrastructure and applications. One of the challenges facing this transition is the desire to ensure that all consumers have access to an affordable and advanced broadband infrastructure so that all members of society may derive its social and economic benefits. Broadband adoption rates are estimated at 67%, representing about two-thirds of the adult population, but these rates are uneven and significant gaps exist.<sup>26</sup> For example, those who: live in rural areas, have low education and income levels, have disabilities, are elderly, are African Americans, are Hispanics, and are living on Tribal lands all have significantly lower broadband adoption rates than the national average. Furthermore, approximately 5% of the U.S. population, equivalent to 14 million people living in 7 million housing units, do not have access to terrestrial broadband infrastructure capable of supporting the NBP's recommended 4 Mbps actual download speed.<sup>27</sup>

One of the major policy debates surrounding universal service policy is whether the universal service concept should embrace access to broadband as one of its policy objectives. The 1934 Communications Act, as amended, does take into consideration the changing nature of the telecommunications sector and allows for the mix of services eligible for universal service support to be modified. In particular, provisions in the universal service section state that “universal service is an evolving level of telecommunications services” and the FCC is tasked with “periodically” reevaluating this definition “taking into account advances in telecommunications and information technologies and services.”<sup>28</sup>

---

<sup>23</sup> The Federal USF provides support and discounts for providers and subscribers through four programs: the High-Cost Program, the Low-Income Program, the Schools and Libraries Program; and the Rural Health Care Program.

<sup>24</sup> See sections 254(b)(6) and 254(h) of the 1996 Telecommunications Act, incorporated in to the Communications Act of 1934, 47 U.S.C. 254.

<sup>25</sup> For a further discussion of the programs, funding, and policy issues relating to universal service see CRS Report RL33979, *Universal Service Fund: Background and Options for Reform*, by (name redacted).

<sup>26</sup> *Connecting America: The National Broadband Plan*, p. 23.

<sup>27</sup> *Ibid.*, p. 20.

<sup>28</sup> Section 254(c) of the 1996 Telecommunications Act, incorporated into the Communications Act of 1934, 47 U.S.C. (continued...)

There is a growing consensus among policymakers that the FCC should change the mix of services eligible for universal service support to include the universal availability of broadband services and use federal universal service funds to help eliminate broadband adoption and availability gaps.<sup>29</sup> The FCC's NBP recommends that access to and adoption of broadband be a national goal and has proposed that the USF be restructured to become a vehicle to help reach this goal.

## The National Broadband Plan and the USF

The USF will be a key component in this transition as the NBP would reorient its programs to address the deployment, affordability, and connectivity of broadband. To enable the USF to take on this role the NBP calls for the USF to be transformed, in three stages over a ten-year period, from a mechanism that largely supports voice telephone service to one that supports the deployment, adoption, and utilization of broadband.<sup>30</sup>

## The Connect America and Mobility Funds

The NBP calls on the existing High Cost program to transition from one that supports voice communications to one that supports a broadband platform that enables multiple applications, including voice. The NBP recommends that the High Cost program be phased out and replaced in stages, over the next ten years, to directly support high-capacity broadband networks through newly created Connect America and Mobility Funds.<sup>31</sup>

The Connect America Fund (CAF) would be the major vehicle to ensure the universal availability of affordable broadband by addressing the gaps in broadband deployment and adoption. The NBP adopts a new expanded USF definition embracing affordable broadband with at least 4 Mbps actual download speed and 1 Mbps of actual upload speed. Examples of the applications that could be supported by such a download speed include: advanced Web-browsing; e-mail; Voice over the Internet Protocol (VOIP); multimedia; streamed audio; streamed video lectures; and lower definition telemedicine.<sup>32</sup>

The NBP also calls for the USF to move from a largely fixed model to incorporate a mobile model. A Mobility Fund (MF) would be created to target funding to ensure that all states achieve the national average for 3G wireless coverage for both voice and data. The MF would provide one-time support for deployment of 3G networks.

---

(...continued)

254.

<sup>29</sup> Some, however, have cautioned that a more modest approach is appropriate given the “universal mandate” associated with this definition, the uncertainty and costs associated with mandating nationwide deployment, and the stress currently facing the USF.

<sup>30</sup> For a more detailed analysis of the transition of the USF to accommodate the inclusion of broadband and the implementation and funding of the USF provisions contained in the NBP see CRS Report RL33979, *Universal Service Fund: Background and Options for Reform*, by (name redacted).

<sup>31</sup> Much of this transition is detailed in Chapter 8, *Availability*, of the NBP.

<sup>32</sup> It would not support high definition video or high definition video conferencing.

## Low Income Program

According to an FCC conducted broadband consumer survey, 36% of non-adopters of broadband cite a financial reason as the main reason they do not have broadband at home.<sup>33</sup> To address this barrier the NBP recommends that the existing Low Income Program (Lifeline and Link Up) be expanded to address low broadband access levels in low-income households.<sup>34</sup> The NBP also calls for the integration of Federal Low Income programs with state and local efforts as well as the establishment of pilot programs to gain information to help develop a future full-scale low income program for broadband.

## Schools and Libraries and Rural Health Programs

Included in the national purposes stated in the NBP are those that address the role of broadband in the delivery of education and health care. The USF has two programs: the Schools and Libraries Program (also known as the E-rate program); and the Rural Health Care Program, which address the telecommunications needs of eligible schools, libraries, and rural health care providers respectively. The NBP contains almost a dozen recommendations to modernize and improve the Schools and Libraries program.<sup>35</sup> These recommendations focus on three goals: improve flexibility, deployment, and use of infrastructure; improve program efficiency; and foster innovation. Included among the recommendations are those that: raise the yearly funding cap to account for inflation; set minimum broadband connectivity rates; and expand support for internal connections.

Citing the importance of health care to the lives of consumers and its importance to the national economy the NBP also calls for the reform of the USF's Rural Health Care program. The major focus of the reform calls for the restructuring and expansion of its program components.<sup>36</sup> Included among the recommendations to modify the program are those that: expand eligibility to include urban as well as rural providers based on need; increase subsidy support beyond the current 25%; expand the definition for eligibility to include certain for-profit entities; replace the existing Internet Access Fund with a Health Care Broadband Access Fund; simplify the application process; and establish a Health Care Broadband Infrastructure Fund.

## Funding

While the NBP calls for a major restructuring of the USF, it recommends that the funding level be maintained close to its current size (in 2010 dollars). The NBP recommends that \$15.5 billion be shifted, through selected reforms, over the next decade from the existing USF High Cost program to support the transition to broadband.<sup>37</sup> However, the NBP also recommends that if Congress wishes to accelerate this transition it could allocate to the CAF additional general funds of "... a few billion dollars a year over a two or three year period."<sup>38</sup> Additional comments regarding funding include a recommendation that the USF contribution base be broadened, that the

---

<sup>33</sup> *Connecting America: The National Broadband Plan*, Chapter 9, p. 165.

<sup>34</sup> See *ibid.*, Chapter 9, *Adoption and Utilization*, for details on this expansion.

<sup>35</sup> See *ibid.*, Chapter 11, *Education*, for a detailed discussion of these recommendations.

<sup>36</sup> See *ibid.*, Chapter 10, *Health Care*, for a detailed discussion of these recommendations.

<sup>37</sup> *Ibid.*, Chapter 8, Recommendation 8.6.

<sup>38</sup> *Ibid.*, Chapter 8, Recommendation 8.15.

contribution methodology rules be revised to ensure sustainability, and acknowledgement of the potential negative impact that increasing USF funding rates may have on consumers.<sup>39</sup>

## Reform of Intercarrier Compensation<sup>40</sup>

Most telephone calls and other electronic communications travel over more than one carrier's network to get from the originating (or calling) party to the terminating (or receiving) party, thus requiring the facilities of an originating network, a terminating network, and perhaps one or more intermediate networks. Intercarrier compensation (ICC) is the system of rates that service providers are charged for the use of these networks to provide service to their subscribers.

There is a monopoly element to terminating a communication. Once the receiving party has chosen her local carrier (say Verizon or Comcast or, in a rural area, the local rural telephone company), the originating party's carrier has no choice but to pay the rate charged by the terminating carrier to complete the communication. Therefore these rates are subject to price regulation—the FCC regulates interstate rates and state public utility commissions regulate intrastate rates.

Intercarrier compensation rates have developed over time in an *ad hoc* fashion, and often were set to help foster a particular policy objective. For example, both the FCC and state regulatory commissions purposely set the rates for terminating long distance calls to subscribers of rural telephone companies significantly above cost in order to provide those rural carriers with a large revenue source that would allow them to keep local rates low. As a result, the revenues generated from intercarrier compensation charges imposed on long distance carriers represent approximately 25% of total rural telephone carrier revenues, but only approximately 10% of the revenues of other local telephone companies.<sup>41</sup> As another example of regulators setting intercarrier compensation rates to help meet a public policy objective, the FCC purposely has treated Internet Service Provider (ISP)-bound traffic differently from other traffic, not imposing termination charges on ISP-bound traffic or setting lower rates for terminating ISP-bound traffic than other traffic, in order to foster the development of Internet services.

Although the use of a terminating network's facilities is similar for each type of communication, the rate charged for terminating a communication ranges from zero to 35.9 cents a minute<sup>42</sup> depending on the jurisdiction of the communication,<sup>43</sup> the type of traffic carried,<sup>44</sup> and the regulatory status of the terminating carrier.<sup>45</sup>

---

<sup>39</sup> Ibid., Chapter 8, Recommendations 8.10 and 8.12.

<sup>40</sup> Prepared by (name redacted), Specialist in Telecommunications Policy. For a detailed discussion of issues relating to intercarrier compensation, including how it has developed historically and the market incentives created under alternative intercarrier compensation schemes, see CRS Report RL32889, *Intercarrier Compensation: One Component of Telecom Reform*, by (name redacted).

<sup>41</sup> These figures were cited by the FCC in *In the Matter of Developing a Unified Intercarrier Compensation Regime*, Further Notice of Proposed Rulemaking, adopted February 10, 2005, and released March 3, 2005, at para. 107. These percentages probably have fallen since then as the minutes of long distance traffic have fallen substantially in the past six years, but access charges still represent a far larger portion of rural telephone company revenues than urban telephone company revenues.

<sup>42</sup> *Connecting America: The National Broadband Plan*, p. 142 and footnote 42, citing a letter submitted by AT&T.

<sup>43</sup> For example, whether a wireline call is interstate or intrastate, or whether a wireless call crosses Metropolitan Trading Area (MTA) boundaries.

These regulatory-mandated distinctions create inefficient market signals that, in addition to imposing artificial advantages or disadvantages on certain categories of services or providers,<sup>46</sup> are skewing investment decisions, in some cases perhaps retarding the migration from legacy circuit-switched voice networks to Internet protocol (IP) broadband networks.

At the same time, these artificially high termination charges generate revenues that may be needed for rural companies to be able to offer basic telephone service at affordable rates comparable to those for urban subscribers. These high charges represent an implicit universal service subsidy imposed on long distance users. Intercarrier compensation reform that eliminates this implicit subsidy by moving terminating access rates toward cost may have to be accompanied by the creation of new sources of explicit universal service funding.

The Broadband Plan proposes that “the FCC should adopt a framework for long-term intercarrier compensation reform that creates a glide path to eliminate per-minute charges while providing carriers an opportunity for adequate cost recovery.”<sup>47</sup> Changes would be transitioned in over ten years, starting with reductions in the highest intercarrier compensation rates, which generally are intrastate rates.

Since the federal courts have ruled that the FCC does not have authority over intrastate rates, however, legislation may be needed to give the FCC *explicit* authority to reform intrastate intercarrier rates as well as interstate rates.

## Fostering a Market for Set-Top Boxes

Universal access to broadband networks is not an end in itself; it is a means to give consumers access to the applications that are provided over those networks. Consumers need devices—computers, smart phones, set-top boxes—to reach both their broadband network and the applications riding over the network. Those devices help consumers navigate to the many applications. Today, consumers can turn to many different manufacturers and retailers of computers and smart phones, but they generally have few options for set-top boxes (or, more broadly, for smart video devices). Virtually all such devices are provided by the consumer’s multichannel video programming distributor (MVPD—cable or satellite video service provider).

Section 629(a) of the Communications Act<sup>48</sup> directs the Federal Communications Commission (FCC),

---

(...continued)

<sup>44</sup> For example, whether it is interexchange (long distance) traffic, local exchange (local) traffic, or ISP-bound traffic.

<sup>45</sup> For example, whether the terminating carrier is an incumbent wireline carrier subject to rate of return regulation, an incumbent wireline carrier subject to price cap regulation, a competitive wireline carrier, or a wireless carrier.

<sup>46</sup> For example, some service providers have created “free” teleconference services by having end users call in to a telephone number in the service area of a rural telephone company that has very high terminating access charges. The caller’s long distance carrier must pay the high per minute terminating access charges to the rural telephone company and that rural telephone company in turn shares those revenues with the service provider. The terminating access charges are so high that both the rural telephone company and the teleconference service provider can profit. But the end users’ long distance carriers end up bearing the costs for the “free” teleconference service.

<sup>47</sup> *Connecting America: The National Broadband Plan*, p. 148.

<sup>48</sup> 47 U.S.C. § 549(a).

in consultation with appropriate industry standard-setting organizations, [to] adopt regulations to assure the commercial availability ... of converter boxes, interactive communications equipment, and other equipment used by consumers to access multichannel video programming [cable or satellite video service].

There is a consensus that FCC and industry efforts to date have not achieved this goal. There are few devices available in the retail market; these devices cannot work with all MVPDs and, even where compatible, cannot be used to identify many video signals, particularly those of high-definition cable offerings.

In its NBP, the FCC concluded that access to video services drives broadband usage and thus actions that would foster a market for smart video devices that make it easier for consumers to access broadband-enabled video would increase consumer adoption of broadband.<sup>49</sup> The FCC therefore adopted a Notice of Inquiry on April 21, 2010,<sup>50</sup> to explore the feasibility of:

- developing a nationally supported standard interface that is common across all MVPDs, thus allowing independent equipment manufacturers to produce smart video devices that could be used by end users without regard to their choice of MVPD, *and*
- requiring each MVPD to develop a complying adapter or gateway that would allow end users to purchase in a retail market smart video devices capable of searching for all available video options—from their MVPD, from the Internet, etc.—in one place.

As envisioned by the FCC:

- The smart video devices could be used with the services of any MVPD and without the need to coordinate or negotiate with MVPDs.
- The adapter or gateway would communicate with the MVPD service, performing the tuning and security decryption functions specific to a particular MVPD.
- The smart video devices would perform navigation functions, including presentation of programming guides and search functionality.

The envisioned “AllVid” solution would employ a nationwide interoperability standard analogous to how Ethernet and the IEEE industry standards have led to nationwide interoperability for customer data networks despite broadband service providers deploying differing proprietary network technologies.

Critics of this gateway concept argue that the cable industry already has spent almost \$1 billion attempting to implement the FCC’s earlier, unsuccessful efforts to create a market for video devices and that there is no demonstrated consumer demand for these set-top boxes. They claim that most consumers would prefer to lease set-top boxes that might become obsolete in an environment characterized by rapid product and service innovation. The additional expenditures

---

<sup>49</sup> *Connecting America: The National Broadband Plan*, pp. 49-52.

<sup>50</sup> Federal Communications Commission, *In the Matter of Video Device Competition; Implementation of Section 304 of the Telecommunications Act of 1996; Commercial Availability of Navigation Devices; Compatibility Between Cable Systems and Consumer Electronics Equipment*, MB Docket No. 10-91, CS Docket No. 97-80, and PP Docket No. 00-67, Notice of Inquiry, adopted and released on April 21, 2010.

to construct the adapter, they claim, would be passed through to consumers in higher MVPD rates. The critics further contend that technological change inherently outpaces any government rule or one-size-fits-all requirement. They also question whether households that do not currently subscribe to broadband service would be motivated to do so simply because they had access to smart video devices that provide them with greater, but perhaps more complicated, access to video services. The critics suggest that the AllVid mandate would primarily serve tech-savvy individuals who already subscribe to broadband service.

Proponents of the AllVid solution respond that, in the absence of standards and an interoperability requirement, there have been no incentives for MVPDs, manufacturers, and consumers to cooperate. They claim that consumer demand for smart video devices and manufacturer incentives to produce such devices have been constrained by the lack of a universal standard that would allow a single device to serve all MVPDs and by MVPD resistance to a device that would make it easier for consumers to access non-MVPD sources of video. They claim simple to use smart video devices would appeal particularly to non-tech savvy households. They dispute that the AllVid solution would constrain MVPD innovation or consumer choice by prescribing a single technical solution. Rather, they claim, it would foster innovation and choice by developing an industry-wide interoperability standard open to independent equipment manufacturers and applications providers without placing restrictions on MVPD networks.

The FCC recognizes that it may be especially challenging to develop an adapter for satellite video providers because, unlike in cable networks where the intelligence resides deep in the network at the head-end, in satellite networks the intelligence resides in the set-top box at the customer premise. It therefore might be more difficult for the satellite company to troubleshoot whether the source of a customer complaint lies in equipment under the control of the satellite operator or in the smart video device.

One NBP recommendation is that the FCC initiate a proceeding to ensure that all MVPDs install a gateway device or equivalent functionality in all new subscriber homes and in all homes requiring replacement set-top boxes by December 31, 2012.<sup>51</sup> Many observers question whether the technical and market challenges to accomplish this can be performed in that period of time.

An AllVid solution will not be available for several years. Currently, CableCARD technology—which only works for cable, not for satellite—is available to separate the system that customers use to gain access to video programming (called the conditional element) from the device customers use to navigate the programming. This allows independent smart video device manufacturers, such as TiVo, to serve end users, but there are problems with the technology, notably, it does not allow customers to receive certain high-definition cable channels. The FCC therefore has adopted a Notice of Proposed Rulemaking to expeditiously address some of the current problems with cableCARDs.<sup>52</sup>

---

<sup>51</sup> *Connecting America: The National Broadband Plan*, Recommendation 4.12.

<sup>52</sup> Federal Communications Commission, *In the Matter of Implementation of Section 304 of the Telecommunications Act of 1996; Commercial Availability of Navigation Devices; Compatibility Between Cable Systems and Consumer Electronics Equipment*, CS Docket No. 97-80 and PP Docket No. 00-67, Fourth Further Notice of Proposed Rulemaking, adopted and released on April 21, 2010.



## Spectrum Policies for Wireless Broadband<sup>53</sup>

Wireless broadband<sup>54</sup> plays a key role in the deployment of broadband services. Because of the importance of wireless connectivity, radio frequency spectrum policy is deemed by the NBP to be a critical factor in successful planning for a national policy. Mobile broadband provides high-speed Internet connectivity on the move. Other wireless technologies complement needed infrastructure for a host of national broadband goals for education, health, energy efficiency, public safety, and other social benefits. Mobile and fixed wireless broadband communications, with their rich array of services and content, require new spectrum capacity to accommodate growth. Although radio frequency spectrum is abundant, usable spectrum is limited by the constraints of technology and the cost of investment.<sup>55</sup>

The NBP proposes to increase spectrum capacity by:

- Making more spectrum licenses available for mobile broadband.
- Increasing the amount of spectrum available for shared use.
- Encouraging and supporting the development of spectrum-efficient technologies, particularly those that facilitate sharing spectrum bands.
- Instituting new policies for spectrum management, such as assessing fees on some spectrum licenses.

To facilitate the deployment of broadband in rural areas, the NBP also proposes:

- Improving the environment for providing fixed wireless services.

Many of the NBP proposals for wireless broadband may be achieved through changes in FCC regulations governing spectrum allocation and assignment. Other actions may require changes by federal agencies, state authorities, and commercial owners of spectrum licenses. To assist the implementation of the NBP there are also a number of areas where congressional action might be required to change existing statutes or to give the FCC new powers. The NBP includes the announcement of plans for the FCC to create what it refers to as a Spectrum Dashboard.<sup>56</sup> The initial release of the FCC's Spectrum Dashboard provided an interactive tool to search for information about how some non-federal frequency assignments are being used.<sup>57</sup> The dashboard could be used to meet requirements set by Congress for a spectrum inventory. In addition to the dashboard, the NBP proposes that the FCC and the National Telecommunications and Information Administration (NTIA) should create methods for recovering spectrum<sup>58</sup> and that the

---

<sup>53</sup> Prepared by (name redacted), Specialist in Telecommunications Policy.

<sup>54</sup> Broadband refers here to the capacity of the radio frequency channel. A broadband channel can quickly transmit live video, complex graphics, and other data-rich information as well as voice and text messages, whereas a narrowband wireless channel might be limited to handling voice, text, and some graphics.

<sup>55</sup> Many of the spectrum policies and proposals discussed in this section are covered in CRS Report R40674, *Spectrum Policy in the Age of Broadband: Issues for Congress*, by (name redacted)

<sup>56</sup> *Connecting America: The National Broadband Plan*, Recommendation 5.1.

<sup>57</sup> For more information on the Spectrum Dashboard, go to <http://reboot.fcc.gov/reform/systems/spectrum-dashboard/about>.

<sup>58</sup> *Connecting America: The National Broadband Plan*, Recommendation 5.2.

FCC maintain an ongoing spectrum strategy plan.<sup>59</sup> The NTIA manages federal use of spectrum, among other responsibilities. All of these steps will facilitate decisions about spectrum management by providing detailed information about the current and potential use of spectrum resources.

From a policy perspective, the NBP recommendations that would speed the arrival of new, spectrally efficient technologies might have the most impact over the long term. In particular, support for exploring ways to use technologies that enable sharing could pave the way for dramatically different ways of managing the nation's spectrum resources.

The need for a robust plan to accelerate the adoption of new technologies has, however, been eclipsed by public debate over the plan's proposed steps to add 300 MHz<sup>60</sup> of licensed spectrum for broadband within five years. All of the spectrum assignment proposals put forth in the NBP are contentious in that the various parties affected by the decisions have diverging views on how technology should be used to provide access to these frequencies. The disagreements may be in part over the cost of implementing different technological solutions, or about a shift in who controls access, but these are associated with the technical fixes the FCC has proposed to facilitate the spectrum assignment.

The NBP has laid out several opportunities for the FCC, the NTIA, and other government agencies to contribute to and encourage the development of new technologies for more efficient spectrum access.<sup>61</sup> For example, Congress might choose to require performance goals for improved spectrum efficiency, not unlike the way federal goals have been set for energy conservation or transportation safety. Congress might also evaluate how a detailed plan to encourage new technologies might assist in resolving current disagreements about spectrum assignment and use. The impact of evolving technologies on spectrum management is discussed in the section "Technology and Spectrum Management."

## **Spectrum Assignment**

One of the management tools available to the FCC is its power to assign spectrum licenses through auctions. Auctions are regarded as a market-based mechanism for assigning spectrum. Before auctions became the primary method for distributing spectrum licenses the FCC used a number of different approaches, primarily based on perceived merit, to select license-holders. The FCC was authorized to organize auctions to award spectrum licenses for certain wireless communications services in the Omnibus Budget Reconciliation Act of 1993 (P.L. 103-66). Following passage of the act, subsequent laws that dealt with spectrum policy and auctions included the Balanced Budget Act of 1997 (P.L. 105-33), the Auction Reform Act of 2002 (P.L. 107-195), the Commercial Spectrum Enhancement Act of 2004 (P.L. 108-494, Title II), and the Deficit Reduction Act of 2005 (P.L. 109-171). The Balanced Budget Act of 1997 (1997 Act) gave

---

<sup>59</sup> Ibid., Recommendation 5.3.

<sup>60</sup> Spectrum is segmented into bands of radio frequencies and typically measured in cycles per second, or hertz. Standard abbreviations for measuring frequencies include kHz—kilohertz or thousands of hertz; MHz—megahertz, or millions of hertz; and GHz—gigahertz, or billions of hertz.

<sup>61</sup> *Connecting America: The National Broadband Plan*, Recommendations 5.13 and 5.14. The NBP proposed that the National Science Foundation "should fund wireless research and development that will advance the science of spectrum access." p. 96.

the FCC auction authority until September 30, 2007. This authority was extended to September 30, 2011, by the Deficit Reduction Act of 2005 and to 2012 by the DTV Delay Act (P.L. 111-4).

In the NBP, the FCC has proposed taking steps to add 300 MHz of licensed spectrum for broadband within five years and a total of 500 MHz of new frequencies in ten years.<sup>62</sup> Approximately 50 MHz would be released in the immediate future by the completion of existing auction plans. An additional 40 MHz would be made available for auction, of which 20 MHz would be reassigned from federal to commercial use. Reallocating some spectrum from over-the-air broadcasting to commercial spectrum might provide an additional 120 MHz of spectrum. Final rulings on existing proceedings would release 110 MHz, of which 90 MHz would be for Mobile Satellite Services (MSS). Resolution of interference issues between Wireless Communications Services (WCS) and satellite radio would free up 20 MHz of new capacity.

Although Congress has shown interest in all of these debates, two proposals that are the most likely to generate interest in congressional action are repurposing and auctioning an estimated 120 MHz of airwaves assigned to over-the-air digital television broadcasting and the plans for auctioning the D Block (10 MHz in the 700 MHz band). These proposals are discussed below.

### **Television Broadcast Spectrum**

The Balanced Budget Act of 1997 represented the legislative culmination of over a decade of policy debates and negotiations between the FCC and the television broadcast industry on how to move the industry from analog to digital broadcasting technologies. To facilitate the transition, the FCC provided each qualified broadcaster with 6 MHz of spectrum for digital broadcasting to replace licenses of 6 MHz that were needed for analog broadcasting. The analog licenses would be yielded back when the transition to digital television was concluded. The completed transition freed up the 700 MHz band for mobile communications and public safety in 2009.

The FCC has revisited the assumptions reflected in the 1997 Act and has made new proposals, and decisions based on, among other factors, changes in technology and consumer habits. The NBP announced that a new proceeding would be initiated to recapture up to 120 MHz of spectrum from broadcast TV allocations for re-assignment to broadband communications. This proceeding would propose four sets of actions to achieve the goal; a fifth set of actions to increase efficiency would be pursued separately.<sup>63</sup> The FCC stipulated in the NBP that its recommendations “seek to preserve [over-the-air television] as a healthy, viable medium going forward, in a way that would not harm consumers overall, while establishing mechanisms to make available additional spectrum for flexible broadband uses.”<sup>64</sup>

Many of the proposals for redirecting TV broadcast capacity are based on refinements in the way frequencies are managed and are procedural in nature. Because over-the-air digital broadcasting does not necessarily require 6 MHz of spectrum, the NBP has proposed that some stations could share a single 6 MHz band without significantly reducing service to over-the-air TV viewers. The NBP also has proposed that broadcasters might form partnerships to provide other communications services using licenses assigned to TV. Among the proposals for how

---

<sup>62</sup> Ibid., Recommendation 5.8.

<sup>63</sup> Ibid., Recommendation 5.8.5.

<sup>64</sup> Ibid., p 89.

broadcasters might make better use of their TV licenses, the NBP has raised the possibility of auctioning unneeded spectrum and sharing the proceeds between the TV license-holder and the U.S. Treasury. The FCC has called on Congress to provide new legislation that would allow these “incentive auctions.” Although most spectrum license auction revenues are deposited as general funds, Congress has passed laws that permit the proceeds to be used for other purposes. The plan suggests the Commercial Spectrum Enhancement Act could provide a model for sharing auction proceeds. The act created the Spectrum Relocation Fund to provide a mechanism whereby federal agencies could recover the costs of moving from one spectrum band to another.

## **D Block**

The D Block refers to a set of frequencies within the 700 MHz band that were among the frequencies made available after the transition from analog to digital television in 2009. In compliance with instructions from Congress to auction all unallocated spectrum in this band, the FCC conducted an auction, which concluded on March 18, 2008. As part of its preparation for the auction (Auction 73), the FCC sought to increase the amount of spectrum available to public safety users in the 700 MHz band. Congress had previously designated 24 MHz of radio frequencies in the 700 MHz band for public safety channels. In 2007, the FCC proposed to allocate 10 MHz of the public safety frequencies specifically for broadband communications and to match the allocation with 10 MHz of commercial spectrum. This commercial license, known as the D Block, was to be auctioned under rules that would require the creation of a public-private partnership to develop the two 10-MHz assignments as a single broadband network, available to both public safety users and commercial customers. The D Block license was offered for sale in Auction 73 but did not find a buyer. The FCC then set about the task of writing new service rules for a re-auction of the D Block.<sup>65</sup>

In the NBP, the FCC announced its decision to auction the D Block under rules that would not require a partnership with public safety but would establish a framework for priority access to the D Block network by public safety users.<sup>66</sup> Generally, public safety officials had anticipated that the D Block would be an integral part of a public safety broadband network. Since the failed D Block auction of 2008, there has also been growing pressure on the FCC and on Congress to take the steps necessary to reallocate the D Block from commercial to public safety use. The NBP announcement regarding the D Block has increased that pressure. Although funding and control are critical elements of the debate, the controversy is rooted in contradictory assumptions about the level of service and reliability that new, largely untried, and in some cases undeveloped technology will be able to deliver for public safety broadband communications.

The FCC would address public safety needs such as developing standards and establishing procedures through the newly established Emergency Response Interoperability Center (ERIC).<sup>67</sup> ERIC would work closely with the Public Safety Communications Research program, jointly

---

<sup>65</sup> Background information regarding the D Block is provided in CRS Report R40859, *Public Safety Communications and Spectrum Resources: Policy Issues for Congress*, by (name redacted).

<sup>66</sup> *Connecting America: The National Broadband Plan*, Recommendation 5.8.2.

<sup>67</sup> FCC News, “The Federal Communications Commission Establishes New Emergency Response Interoperability Center,” April 23, 2010, at [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-297707A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-297707A1.pdf).

managed by the National Institute of Standards and Technology (NIST) and the NTIA, to develop and test the technological solutions needed for public safety broadband communications.<sup>68</sup>

## **Wireless Backhaul**

Most mobile communications depend on fixed infrastructure to relay calls to and from wireless networks. The infrastructure that links wireless communications to the wired world is commonly referred to as backhaul. In situations where installing communications cables is impractical, fixed wireless infrastructure may be used to provide the needed backhaul. Microwave technologies, for example, are used in a number of applications to extend coverage to areas not served by fiber-optic or other wire links.

The NBP has predicted that the importance of backhaul will increase with the implementation of 4G technologies, as mobile access to the Internet and other wired networks becomes increasingly prevalent.<sup>69</sup> The FCC therefore has proposed to take a number of procedural steps to increase the capacity of point-to-point wireless technologies.<sup>70</sup>

## **Technology and Spectrum Management**

The NBP spectrum assignment proposals are based on managing radio channels as the way to maximize spectral efficiency while meeting common goals such as minimizing interference among devices operating on the same or nearby frequencies. Today, channel management is a significant part of spectrum management; many of the FCC dockets deal with assigning channels and resolving the issues raised by these decisions. In the future, channel management is likely to be replaced by technologies that operate without the need for designated channels. The primary benefit from these new technologies will be the significant increase in available spectrum but new efficiencies in operational and regulatory costs will also be realized. The question for policy makers might be: has the time come to take actions so that future technologies—many of which are viewed as being within reach—become an integral part of planning for mobile broadband?

The concept of channel management dates to the development of the radio telegraph by Guglielmo Marconi and his contemporaries. In the age of the Internet, however, channel management is an inefficient way to provide spectrum capacity for mobile broadband. Innovation points to network-centric spectrum management as an effective way to provide spectrum capacity to meet the bandwidth needs of fourth-generation wireless devices.<sup>71</sup> Network-centric technologies organize the transmission of radio signals along the same principle as the Internet. A transmission moves from origination to destination not along a fixed path but by passing from one available node to the next. Pooling resources, one of the concepts that powers the Internet now, is likely to become the dominant principle for spectrum management in the future.

---

<sup>68</sup> NIST, “Demonstration Network Planned for Public Safety 700 MHz Broadband,” December 15, 2009 at [http://www.nist.gov/eel/oles/network\\_121509.cfm](http://www.nist.gov/eel/oles/network_121509.cfm).

<sup>69</sup> *Connecting America: The National Broadband Plan*, p. 93.

<sup>70</sup> *Ibid.*, Recommendations 5.9 and 5.10.

<sup>71</sup> A leading advocate for replacing channel management of radio frequency with network-centric management is Preston Marshall, the source for much of the information about network-centric technologies in this report. Mr. Marshall is Director, Information Sciences Institute, University of Southern California, Viterbi School of Engineering, Arlington, Virginia.

## **New Technologies**

The iPhone 3G and 3GS provide early examples of how the Internet is likely to change wireless communications as more and more of the underlying network infrastructure is converted to IP-based standards. The iPhone uses the Internet Protocol to perform many of its functions; these require time and space—spectrum capacity—to operate. The next generation of wireless networks, 4G, for Fourth Generation, will be supported by technologies structured and managed to emulate the Internet. The wireless devices that operate on these new, IP-powered networks will be able to share spectrum capacity in ways not currently used on commercial networks, greatly increasing network availability on licensed bandwidths. Another technological boost will come from improved ways to use unlicensed spectrum. Unlicensed spectrum refers to bands of spectrum designated for multiple providers, multiple uses, and multiple types of devices that have met operational requirements set by the FCC. Wi-Fi is an example of a current use of unlicensed spectrum.

The FCC refers to the new technologies for licensed and unlicensed spectrum as “opportunistic.” Identifying an opportunity to move to an open radio frequency is more flexible—and therefore more productive—than operating on a set of pre-determined frequencies.

New technologies that can use unlicensed spectrum without causing interference are being developed for vacant spectrum designated to provide space between the broadcasting signals of digital television, known as white spaces. On September 11, 2006, the FCC announced a timetable for allowing access to the spectrum so that devices could be developed.<sup>72</sup> One of the recommendations of the NBP is that the FCC complete the proceeding that would allow use of the white spaces for unlicensed devices.

More efficient spectrum use can be realized by integrating adaptive networking technologies, such as dynamic spectrum access (DSA),<sup>73</sup> with IP-based, 4G commercial network technologies such as Long Term Evolution (LTE). Adaptive networking has the potential to organize wireless communications to achieve the same kinds of benefits that have been seen to accrue with the transition from proprietary data networks to the Internet. These enabling technologies allow communications to switch instantly among network frequencies that are not in use and therefore available to any wireless device equipped with cognitive technology. Adaptive technologies are designed to use pooled spectrum resources. Pooling spectrum licenses goes beyond sharing. Licenses are aggregated and specific ownership of channels becomes secondary to the common goal of maximizing network performance.

## **New Policies**

The NBP has laid out several opportunities for the FCC, the NTIA, and other government agencies to contribute to and encourage the development of new technologies for more efficient spectrum access.<sup>74</sup> Among the technologies that facilitate spectrum sharing are cognitive radio

---

<sup>72</sup> FCC, *First Report and Order and Further Notice of Proposed Rule Making*, ET Docket No. 04-186, released October 18, 2006.

<sup>73</sup> Dynamic Spectrum Access, Content-Based Networking, and Delay and Disruption Technology Networking, along with cognitive radio, and decision-making software, are examples of technologies that can enable Internet-like management of spectrum resources.

<sup>74</sup> *Connecting America*, Recommendations 5.13 and 5.14. The NBP proposed that the National Science Foundation (continued...)

and Dynamic Spectrum Access (DSA).<sup>75</sup> Enabling technologies such as these allow communications to switch instantly among network frequencies that are not in use and therefore available to any radio device equipped with cognitive technology. Among the steps that might be taken to encourage spectrum-efficient technologies, the NBP has recommended that the FCC identify and free up a “new, contiguous nationwide band for unlicensed use” by 2020<sup>76</sup> and provide spectrum and take other steps to “further development and deployment” of new technologies that facilitate sharing.<sup>77</sup> Unlike its recommendations for auctioning spectrum licenses in the near future, the FCC’s plans for bringing new technologies into play provide few details. The NBP provides a glimpse through the keyhole of the horizons beyond, but not the key that might open the door.

The NTIA has recommended exploring “ways to create incentives for more efficient use of limited spectrum resources, such as dynamic or opportunistic frequency sharing arrangements in both licensed and unlicensed uses.”<sup>78</sup> This suggestion was incorporated into the FY2011 Federal Budget prepared by the Office of Management and Budget. The budget document directed the NTIA to collaborate with the FCC “to develop a plan to make available significant spectrum suitable for both mobile and fixed wireless broadband use over the next ten years. The plan is to focus on making spectrum available for exclusive use by commercial broadband providers or technologies, or for dynamic, shared access by commercial and government users.”<sup>79</sup>

A Presidential Memorandum<sup>80</sup> has directed the NTIA to take a number of actions in support of NBP goals, including taking the lead in creating and implementing a plan that will facilitate the exploration of “innovative spectrum-sharing technologies.”

The NTIA’s Commercial Spectrum Management Advisory Committee is actively looking at policy and technology issues in a series of subcommittee reports. The reports are addressing spectrum inventory, transparency, dynamic spectrum access, incentives, unlicensed spectrum, and sharing.<sup>81</sup>

The widespread adoption of opportunistic technologies would likely require a re-thinking of spectrum management policies and tools. Policies for channel management to control interference

---

(...continued)

“should fund wireless research and development that will advance the science of spectrum access.” p. 96.

<sup>75</sup> Dynamic Spectrum Access, Content-Based Networking, and Delay and Disruption Technology Networking, along with cognitive radio, and decision-making software, are examples of technologies that can enable Internet-like management of spectrum resources. DSA is part of the neXt Generation program, or XG, a technology development project sponsored by the Strategic Technology Office of the Defense Advanced Research Projects Agency (DARPA). The main goals of the program include developing both the enabling technologies and system concepts that dynamically redistribute allocated spectrum.

<sup>76</sup> *Connecting America*, Recommendation 5.11.

<sup>77</sup> *Connecting America*, Recommendation 5.13.

<sup>78</sup> Letter to the FCC, Re: National Broadband Plan, GN Doc. No. 09-51, January 4, 2010 at [http://www.ntia.doc.gov/filings/2009/FCCLetter\\_Docket09-51\\_20100104.pdf](http://www.ntia.doc.gov/filings/2009/FCCLetter_Docket09-51_20100104.pdf).

<sup>79</sup> Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2011, Appendix*, “Other Independent Agencies,” p. 1263. See also, FCC, *Fiscal Year 2011 Budget Estimates Submitted to Congress*, February 2010 at [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-296111A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296111A1.pdf).

<sup>80</sup> The White House, *Presidential Memorandum: Unleashing the Wireless Broadband Revolution*, June 28, 2010 at <http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution>.

<sup>81</sup> See Spectrum Management Advisory Committee website at <http://www.ntia.doc.gov/advisory/spectrum/>.

could give way to standards for preventing interference by managing networks and devices. The assignment and supervision of licenses would be replaced by policies and procedures for managing pooled resources. If opportunistic technologies are adopted, auctioning licenses might be replaced by auctioning access; the static event of selling a license replaced by the dynamic auctioning of spectrum access on a moment-by-moment basis.

The testing of new technologies that increase spectrum capacity, and the policy changes they are likely to bring, has been designated by the NBP as a future event. Its immediate plans for spectrum policy are to fine-tune existing spectrum assignments to increase the availability of licensed capacity. The level of opposition to most of these spectrum assignment plans might suggest that current spectrum management practices have reached the point of diminishing returns.

## National Purposes<sup>82</sup>

Among the requirements for the NBP, Congress specified that it should include

a plan for use of broadband infrastructure and services in advancing consumer welfare, civic participation, public safety and homeland security, community development, health care delivery, energy independence and efficiency, education, worker training, private sector investment, entrepreneurial activity, job creation and economic growth, and other national purposes.<sup>83</sup>

In the plan, the FCC has made recommendations that might fulfill both social and economic goals. In the section of the plan titled “National Purposes,” it has focused on social goals with an agenda of actions for federal, state, and local agencies. The areas covered in this section are

- Health care. The NBP identifies stated goals of the Department of Health and Human Services that might be effectively supported with technologies that are enhanced by access to broadband communications.
- Education. The NBP proposes that broadband can provide an effective tool for meeting the educational needs and ambitions of educators, students, and parents of young children as well as support the Department of Education’s strategies to improve educational achievement.
- Energy and the Environment. According to the NBP, broadband has multiple applications in the field of energy, conservation, and environmental protection. For example, SmartGrid goals set by Congress<sup>84</sup> might not be achievable without broadband communications.
- Economic Opportunity. Actions proposed in the NBP to further economic opportunity are centered on increasing access to Information Technology for small and medium-sized businesses. The role of broadband in providing job training and employment services and supporting telework are also addressed in recommendations.

---

<sup>82</sup> Prepared by (name redacted), Specialist in Telecommunications Policy.

<sup>83</sup> P.L. 111-5, § 6001 (k) (2) (D); 123 STAT. 516.

<sup>84</sup> P.L. 110-140, Sec. 1301; 123 STAT. 1783.



- **Government Performance.** The NBP recommendations for federal government actions encompass both ways that broadband might improve the effectiveness of government and also steps the federal government might take to increase the availability of broadband networks. The latter included federal actions to improve cybersecurity and ways that federal agencies might assist communities and state and local governments in building broadband infrastructure.
- **Civic Engagement.** The NBP describes concepts such as government transparency that can lead to greater participation by all in the democratic process. Broadband access has been described in the plan as a useful tool for encouraging civic engagement because of the part it plays in interactive communication and providing information.
- **Public Safety.** The NBP recommendations primarily address delivering wireless broadband to the radios of first responders. It also considered the role of broadband in upgrading the nation's 911 services and emergency alert systems.

## **Meeting Policy Goals**

Each of the sections on national purposes has mentioned the existing legislative and regulatory framework and trends in the field that might benefit from better broadband access and services. Although each sector serves different needs and goals, the NBP recommendations are fairly similar for each. In general, stakeholders have been encouraged to

- Create incentives to achieve broadband goals.
- Leverage broadband technology, including wireless broadband.
- Encourage innovation and improved productivity.
- Provide or increase funding for programs that support broadband policy goals.
- Modify regulations.

Each policy slice addresses aspects of the needs and services for the national purposes identified in the NBP. Considering all these slices as a single policy pie may be difficult. However, there are some common ingredients that each slice shares that could be addressed as a single policy. Connectivity through broadband networks represents an area of convergence that might benefit from a shared technology policy. The NBP observes that "... in many cases today's connectivity levels are insufficient for current use, let alone the needs of potential future applications."<sup>85</sup>

The NBP discusses some of the ways that federal investment in broadband infrastructure might be leveraged for community and state broadband services.<sup>86</sup> The plan has recognized many of the common elements of broadband use in the federal government but it has not explicitly addressed the possibility of unifying them as a common infrastructure project with many applications riding on a shared grid.

Development of the grid concept reflects recent trends in the expansion of the capabilities of the Internet and its feeder networks. The grid supports applications of any type, at any endpoint. Its

---

<sup>85</sup> *Connecting America: The National Broadband Plan*, p. 193.

<sup>86</sup> *Ibid.*, Recommendation 14.1.

strength derives in good measure from the imposition of the Internet Protocol. Not only can the grid accommodate any IP-based plug-in device but also it can route communications along any link within the grid operations. Some technologies can operate within the grid network without necessarily depending on terminals or switches. Software can reside anywhere and move around inside the grid as needed.

The Internet is typically described as comprised of three main parts: the Internet backbone, backbone access networks, and retail access networks—the services that link consumers and small businesses to the Internet. In business theory, the components of Internet service might be described as a distribution channel; the product—Internet access—is delivered to the end user through wholesalers and retailers. Increasingly, the backbone access networks—the wholesalers—are diversifying to accommodate new services that may never travel over the Internet backbone. The more technologically sophisticated wholesalers are expanding through internetworking to create powerful grids that run many applications to meet specific markets. These advanced communications grids might provide the technology needed to coordinate federal efforts to meet the goals laid out in “National Purposes.” An IP-enabled communications grid could, for example, support next-generation 911 call centers and public safety radios, enable parts of utility company smart grids, and deliver telehealth services.

The NBP recommends that the Executive Branch create a Broadband Strategy Council.<sup>87</sup> This council would coordinate efforts by the many agencies that the FCC has identified as having a role in the plan’s implementation. The NBP has suggested that the President could require that federal departments and agencies submit broadband implementation plans to the council. The council could also act as an intermediary between the agencies and Congress regarding legislation that might facilitate meeting the NBP’s goals. Another recommendation of the NBP would require the FCC to track progress in meeting the plan’s goals.<sup>88</sup>

## The FCC’s Authority to Implement the National Broadband Plan<sup>89</sup>

One potential issue the FCC may face in its attempts to implement the NBP is the scope of the agency’s authority to regulate broadband Internet access and management. The decision of the D.C. Circuit earlier this year in *Comcast v. FCC*<sup>90</sup> has thrown the agency’s current authority to regulate these practices into doubt. Broadband Internet services are currently classified as information services, to which Title I of the Communications Act applies.<sup>91</sup> The FCC does not possess direct authority to regulate services classified under Title I.<sup>92</sup> The FCC has announced the possibility of reclassifying the transmission component of broadband Internet services as a

---

<sup>87</sup> Ibid., Recommendation 17.1.

<sup>88</sup> Ibid., Recommendation 17.2.

<sup>89</sup> Prepared by (name redacted), Legislative Attorney.

<sup>90</sup> *Comcast v. Federal Communications Commission*, 600 F.3d 642 (D.C. Cir. 2010). (*Comcast*) CRS Report R40234, *The FCC’s Authority to Regulate Net Neutrality after Comcast v. FCC*, by (name redacted).

<sup>91</sup> See, Inquiry Concerning High-Speed Access to the Internet Over Cable & Other Facilities; Internet Over Cable Declaratory Ruling; Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities, 17 FCC Rcd 4798 (2002) (Cable Modem Declaratory Ruling).

<sup>92</sup> *Id.*

telecommunications service under Title II of the Communications Act.<sup>93</sup> The FCC hopes this potential reclassification would ground the FCC's authority to regulate broadband Internet services more firmly in the governing law.

In order to understand the current uncertainty surrounding the FCC's authority over broadband Internet services, some background is needed. After the passage of the Telecommunications Act of 1996, the FCC found it necessary to determine what kind of service broadband Internet service was.<sup>94</sup> The agency's choices were to classify broadband Internet access as an information service,<sup>95</sup> over which it would have no direct authority to regulate under Title I, or as a telecommunications service,<sup>96</sup> over which it would have extensive authority to regulate under Title II. There was also an intermediate option. The FCC contemplated classifying the transmission component of a broadband Internet service as a telecommunications service, while classifying the processing component as an information service.<sup>97</sup> The FCC ultimately chose to classify broadband Internet services as information services only.<sup>98</sup>

At the time (2002), the provision of broadband Internet services arguably was still a nascent industry, and the FCC expressed a desire to avoid introducing into the developing market what it thought at the time could be too many regulations.<sup>99</sup> However, this was a contentious question. The Supreme Court, in *NCTA v. Brand X*, made the final decision.<sup>100</sup> The question before the court was whether the FCC could define cable-modem services (i.e., cable broadband services) as information services. Opponents of that classification argued that the FCC did not have discretion to define cable modem services as an information service. The Court, however, sided with the FCC. What is important for the purposes of this discussion is that the Court did not say that cable modem services are clearly and unambiguously information services. Instead, the court said that the definitions of telecommunications services and of information services were ambiguous as they related to cable modem services, and that the FCC, as the agency with jurisdiction under the

---

<sup>93</sup> Press Release, Chairman Julius Genachowski, FCC, *The Third Way: A Narrowly Tailored Broadband Framework* (May 6, 2010). [“Genachowski Statement”]. Press Release, Austin Schlick, FCC, *A Third-Way Legal Framework for Addressing the Comcast Dilemma* (May 6, 2010). [“Schlick Statement”].

<sup>94</sup> It is worth noting that the Ninth Circuit Court of Appeals had issued a ruling declaring that cable modem Internet service was a telecommunications service, prior to the FCC's decision to implement a rulemaking on this issue. *AT&T Corp. v. City of Portland*, 216 F.3d 871, 877-79 (9<sup>th</sup> Cir. 2002). However, as discussed *infra*, despite the FCC reaching the opposite conclusion, the Supreme Court upheld the FCC's interpretation of the Communications Act.

<sup>95</sup> Information services are defined as:

the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control or operation of a telecommunications system or the management of a telecommunications service.

47 U.S.C. § 153(20).

<sup>96</sup> Telecommunications services are defined as:

the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used.

47 U.S.C. § 153(46).

<sup>97</sup> The agency identified a portion of cable modem Internet services as “Internet connectivity,” which is the portion the agency would seek to redefine as a telecommunications service today. See *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4809-11.

<sup>98</sup> *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4819.

<sup>99</sup> *Ibid.* at 14856.

<sup>100</sup> *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967 (2005) (*Brand X*).

Communications Act, had the authority to interpret those definitions.<sup>101</sup> The Court gave deference to the FCC's determination that cable modem services should be defined as information services and determined that the FCC's classification of cable modem services in this way was reasonable.<sup>102</sup>

However, three Justices dissented. Justice Scalia authored the dissent, concluding that cable modem services were actually two separate services: the computing service which was an information service, and the transmission service, which was a telecommunications service.<sup>103</sup> The classification that these Justices believe the Communications Act clearly mandates is the classification that the FCC now proposes to apply to broadband Internet services.<sup>104</sup>

Chairman Genachowski has announced his intention to pursue what he has termed "light touch" Title II regulation of broadband services.<sup>105</sup> As explained in the statement of the FCC's General Counsel, it is the intention of the FCC to commence a rulemaking to reclassify only the transmission component of broadband access services ("Internet connectivity") as a telecommunications service, while the data processing portion of the service would remain an information service.<sup>106</sup> The Chairman argues that, in choosing only to reclassify the transmission component of broadband access services, the reach of the FCC's jurisdiction will be sufficiently narrowed so as to avoid giving the agency the authority to regulate Internet content. This plan would also avoid the imposition of regulation so pervasive as to become burdensome.<sup>107</sup>

In keeping with this announcement, on June 17, 2010, the FCC released a notice of inquiry (NOI) into the framework of broadband Internet services.<sup>108</sup> In the NOI, the agency asked for comment on a number of questions. The FCC made clear that its ultimate goal in issuing the NOI was to determine the best avenue for restoring the agency's previous understanding of its authority to regulate broadband Internet services.<sup>109</sup> In other words, the FCC is seeking firmer ground for its authority to continue rulemakings along the lines of the broadband network management rulemakings<sup>110</sup> and the order it issued in 2007 finding Comcast to be in violation of the FCC's network management policies.<sup>111</sup> In doing so, the FCC recognizes that the D.C. Circuit's decision in *Comcast v. FCC* has thrown the agency's assertions of ancillary authority over broadband network management into considerable doubt.<sup>112</sup>

---

<sup>101</sup> *Ibid.* at 987.

<sup>102</sup> *Ibid.* at 991, 1002-03.

<sup>103</sup> *Ibid.* at 1005 (Scalia, J., dissenting).

<sup>104</sup> See Genachowski Statement, *supra* note 4; Schlick Statement, *supra* note 4.

<sup>105</sup> Genachowski Statement, *supra* note 4.

<sup>106</sup> Schlick Statement, *supra* note 4.

<sup>107</sup> Genachowski Statement, *supra* note 4.

<sup>108</sup> In the Matter of Framework for Broadband Internet Service, Notice of Inquiry, GN Docket No. 10-127 (2010) available at [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-10-114A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-10-114A1.pdf). ["NOI"]

<sup>109</sup> *Ibid.* at ¶¶ 1-2.

<sup>110</sup> See Preserving the Open Internet: Broadband Industry Practices, GN Docket no. 09-191, WC Docket No. 07-52, Notice of Proposed Rulemaking, 24 FCC Rcd 13064 (2009).

<sup>111</sup> See Formal Complaint of Free Press and Public Knowledge Against Comcast Corporation for Secretly Degrading Peer-to-Peer Applications; Broadband Industry Practices et al., WC Docket No. 07-52, Memorandum Opinion and Order, 23 FCC Rcd 13028 (2008).

<sup>112</sup> NOI, at ¶ 1.

The NOI lists three main potential paths forward and seeks comment on the feasibility of each. The first question the NOI asks is whether the FCC may find a better way to assert ancillary authority over broadband Internet services.<sup>113</sup> The D.C. Circuit did not foreclose on the possibility of the FCC asserting ancillary authority in other ways. It merely rejected the FCC's argument in that particular case.<sup>114</sup> Therefore, the FCC asks whether broadband Internet services may continue to be classified as information services while the agency asserts a different statutory basis for exercising ancillary jurisdiction. There are a number of potential theories for ancillary jurisdiction for which the FCC seeks comment.<sup>115</sup>

The other two potential paths towards firmer authority to regulate would involve direct regulation under Title II of the Communications Act. Therefore, it would be necessary to reclassify at least the Internet connectivity portion of broadband Internet services as a telecommunications service, because only telecommunications services are governed by Title II. The FCC asks for comment on how to define Internet connectivity for reclassification.<sup>116</sup> Assuming the FCC chooses one of these two paths, this reclassification would likely be reviewed by the courts, in light of the fact that the Supreme Court upheld the agency's previous classification of broadband Internet services as a unified information service. However, as discussed earlier, *Brand X* gave deference to the FCC's interpretation of the Communications Act in this area.<sup>117</sup> Furthermore, in the recent case *FCC v. Fox Television*, the Supreme Court held that when an agency issues a new (and different from its previous) interpretation of a statute it has the authority to implement, the agency "need not demonstrate to a court's satisfaction that the reasons for the new policy are better than the reasons for the old one."<sup>118</sup> The agency must show only that its current interpretation is reasonable, though in some circumstances a more detailed justification for the change must be made than would otherwise be necessary if the agency was rulemaking on a blank slate.<sup>119</sup>

Assuming that such a reclassification is upheld by the courts, the second potential path forward would be to apply the full force of Title II regulation to broadband Internet connectivity (as the FCC would define it). The FCC seeks comment on the potential effects of such a decision.<sup>120</sup> However, the Chairman and General Counsel have expressed that this is not the approach the agency is likely to take.<sup>121</sup> Rather, they have announced that their intention is to forbear from applying the portions of Title II to broadband access services that the FCC deems contrary to the public interest. Section 401 of the Telecommunications Act of 1996 requires the FCC to forbear from applying any regulation or provision under Title II to a provider of telecommunications services if the Commission determines that:

- (1) enforcement of such regulation or provision is not necessary to ensure that the charges, practices, classifications, or regulations by, for, or in connection with that telecommunications carrier or telecommunications service are just and reasonable and are

---

<sup>113</sup> *Ibid.* at ¶ 30.

<sup>114</sup> See CRS Report R40234, *The FCC's Authority to Regulate Net Neutrality after Comcast v. FCC*, by (name redacted).

<sup>115</sup> NOI, at ¶¶ 32-51.

<sup>116</sup> *Ibid.* at ¶¶ 52-66.

<sup>117</sup> *Brand X*, 545 U.S. at 991.

<sup>118</sup> *FCC v. Fox Television Stations, Inc.* 129 S. Ct. 1800, 1811 (2009).

<sup>119</sup> *Ibid.*

<sup>120</sup> NOI, at ¶ 52.

<sup>121</sup> See Genachowski Statement, *supra* note 4; Schlick Statement, *supra* note 4.

not unjustly or unreasonably discriminatory; (2) enforcement of such regulation or provision is not necessary for the protection of consumers; and (3) forbearance from applying such provision or regulation is consistent with the public interest.<sup>122</sup>

The Chairman and General Counsel argued, in their statements, that this provision would require forbearance from many of Title II's more onerous provisions, such as the rate regulation and tariff provisions, because applying those provisions would not be consistent with the public interest.<sup>123</sup>

The NOI asks for comment on this potential action.<sup>124</sup> It further asks for comment on the provisions on Title II from which the agency should not forbear. In particular, the NOI asks for comment on applying the provisions of Title II that the FCC had identified as likely to be needed to have adequate enforcement authority in its earlier press releases on this issue.<sup>125</sup> These provisions are Sections 201 (requiring service upon request and reasonable rates),<sup>126</sup> 202 (prohibiting unreasonable discrimination),<sup>127</sup> 208 (granting the FCC authority to act upon complaints),<sup>128</sup> 222 (protecting privacy),<sup>129</sup> 254 (universal service),<sup>130</sup> and 255<sup>131</sup> (access for disabled persons).<sup>132</sup> In the FCC's announcements, the General Counsel identified these provisions as potentially sufficient to "do the job" of providing enough authority to accomplish the FCC's goals.<sup>133</sup> However, the NOI asks for comment on other provisions that may be necessary to assert jurisdiction.<sup>134</sup>

The NOI also asks for comment on a number of other issues, including the method of forbearing. Currently, companies seeking forbearance from a provision of Title II (which had heretofore presumably applied to such companies) apply to the FCC seeking such forbearance. Under the FCC's proposal, the FCC would forbear under its own motion to maintain what is currently the status quo.<sup>135</sup> The FCC seeks comment on the process the agency should adopt for accomplishing this plan. The agency also seeks comment on how to treat wireless broadband services (terrestrial and satellite). The agency notes that "there are technological, structural, consumer usage, and historical differences between mobile wireless and wireline/cable networks" that may require different statutory and regulatory treatment.<sup>136</sup> Furthermore, the agency seeks comment on other

---

<sup>122</sup> Codified at 47 U.S.C. § 160.

<sup>123</sup> See Genachowski Statement, *supra* note 4; Schlick Statement, *supra* note 4.

<sup>124</sup> NOI, at ¶ 74. The Chairman and General Counsel analogized this approach to its regulation of wireless voice communications. In 1993, Congress specified that Title II applies to wireless communications, such as cellular phone service. 47 U.S.C. § 332(c). Section 332(c) gave the FCC the discretion to determine which regulations under Title II should be inapplicable to wireless voice services; however, the FCC could not forbear from applying Sections 201, 202, or 208 to wireless voice services. *Id.* Similarly, the statement of the Chairman has pledged to apply Sections 201, 202, and 208 to broadband access services

<sup>125</sup> NOI, at ¶¶ 74-85.

<sup>126</sup> 47 U.S.C. § 201

<sup>127</sup> 47 U.S.C. § 202.

<sup>128</sup> 47 U.S.C. § 208.

<sup>129</sup> 47 U.S.C. § 222.

<sup>130</sup> 47 U.S.C. § 254.

<sup>131</sup> 47 U.S.C. § 255.

<sup>132</sup> Genachowski Statement, *supra* note 4.

<sup>133</sup> Schlick Statement, *supra* note 4.

<sup>134</sup> NOI, at ¶¶ 86-7.

<sup>135</sup> *Ibid.* at ¶¶ 69-70.

<sup>136</sup> *Ibid.* at ¶¶ 101-05.

open questions, such as the implications changes may have for state and local regulators,<sup>137</sup> and the effect any action taken to reclassify might have on the Communications Assistance for Law Enforcement Act.<sup>138</sup> Comments are due July 15, 2010, and reply comments are due by August 12, 2010. Any decisions that the FCC may make as a result of this proceeding will likely face legal challenge.

## Towards a National Broadband Policy?

Policy issues discussed in the previous sections—universal service reform, intercarrier compensation, mandating of gateway set-top devices, spectrum policy for wireless broadband, and national purposes—all seek to address the NBP’s availability and adoption goals, each in their own way. At the same time, the debate over the FCC’s authority to regulate broadband services will likely impact the FCC’s ability to achieve many of the goals of the NBP.

The cumulative effect of these and other discrete policies and initiatives proposed by and related to the NBP can be viewed as pieces of an overall strategy towards achieving NBP goals. The release of the NBP is seen by many as a precursor towards the development of a national broadband policy—whether comprehensive or piecemeal—that will likely be shaped and developed by Congress, the FCC, and the Administration.

Viewed holistically, several themes emerge from the NBP, with each theme having implications for policymakers with respect to a national broadband policy as it goes forward:

- *Government-private sector balance*—the NBP acknowledges that the growth of broadband in the U.S. has been “fueled primarily by private sector investment and innovation,”<sup>139</sup> and that “the role of government is and should remain limited.”<sup>140</sup> However, given the identified gaps in broadband availability and adoption, the NBP envisions an active role for government, saying that “we must strike the right balance between the public and private sectors,” and that “done right, government policy can drive and has driven progress.”<sup>141</sup> Specifically, the NBP states that “instead of choosing a specific path for broadband in America, this plan describes actions government should take to encourage more private innovation and investment.”<sup>142</sup> The challenge for broadband policymakers will be to assess whether an appropriate balance is maintained between the public and private sectors, and the extent to which government intervention in the broadband marketplace will help or hinder private sector investment and competition.
- *Interconnectedness*—the NBP views broadband as an “ecosystem” and suggests that many of the diverse topics and issues covered in the NBP, though seemingly distinct and separate, are in fact interconnected. For example, the NBP contains recommendations intended to allay consumers’ concerns over Internet privacy,

---

<sup>137</sup> Ibid. at ¶¶ 109-10.

<sup>138</sup> Ibid. at ¶¶ 88-9.

<sup>139</sup> *Connecting America: The National Broadband Plan*, p. xi.

<sup>140</sup> Ibid., p. 5.

<sup>141</sup> Ibid.

<sup>142</sup> Ibid.

which in turn could lead to higher adoption rates and greater broadband and Internet utilization, which in turn could help provide more market incentive for private sector providers to deploy broadband infrastructure. The NBP identifies applications, devices, and networks as the key forces shaping the broadband ecosystem, and states that these three forces “drive each other in a virtuous cycle.”<sup>143</sup> The NBP’s focus on the quality of interconnectedness—and the central metaphor of broadband as an ecosystem—implies that policymakers should consider the various issues not in a vacuum, but as part of an integrated whole.

- *National purposes*—as directed by the ARRA, the NBP emphasizes that broadband infrastructure and services should be utilized to advance important national purposes including health care, education, energy and the environment, economic opportunity, government performance, civic engagement, and public safety. Broadband availability and adoption could both drive and be driven by the growth of these national purpose applications. Recommendations addressing national purpose applications impact different sectors of society (e.g., health care, education, energy), and in turn call for action by different agencies of the federal government (e.g., Department of Health and Human Services, Department of Education, Department of Energy). A challenge for policymakers will be to ensure adequate coordination among the disparate agencies and entities implementing various broadband-related policies.

To achieve the goals it has set for the year 2020, the NBP has called for moving forward on a number of specific initiatives, many of which address some of the ongoing major telecommunications policy issues likely to be debated and considered by Congress, the Administration, and the FCC. A major issue for Congress will be how to shape the Plan’s various initiatives when and if they go forward, either through oversight, through consideration of specific legislation, or in the context of comprehensive telecommunications reform.

While most agree with the general goals of the NBP—for example, that robust and affordable broadband should be available and utilized throughout the United States—disagreement persists on the best ways to reach those goals. A key challenge for Congressional policymakers will be to assess whether an appropriate balance is maintained between the public and private sectors, and the extent to which government intervention in the broadband marketplace would help or hinder private sector investment and competition.

---

<sup>143</sup> *Ibid.*, p. 15.



**Table I. Outline of National Broadband Plan**

<b>1. Establishing competition policies</b>	Collect, analyze, benchmark and publish detailed, market-by-market information on broadband pricing and competition	
	Develop disclosure requirements for broadband service providers	
	Undertake a comprehensive review of wholesale competition rules	
	Free up and allocate additional spectrum for unlicensed use	
	Update rules for wireless backhaul spectrum	
	Expedite action on data roaming	
	Change rules to ensure a competitive and innovative video set-top box market	
	Clarify the Congressional mandate allowing state and local entities to provide broadband in their communities	
	Clarify the relationship between users and their online profiles to enable continued innovation and competition in applications and ensure consumer privacy	
<b>2. Ensuring efficient allocation and use of government-owned and government-influenced assets</b>	Spectrum	Make 500 megahertz of spectrum newly available
		Enable incentives and mechanisms to repurpose spectrum
		Ensure greater transparency
		Expand opportunities for innovative spectrum access models
	Infrastructure	Establish low and more uniform rental rates for access to poles
		Improve rights-of-way management for cost and time savings
		Facilitate efficient new infrastructure construction
	Provide ultra-high-speed broadband connectivity to select U.S. Department of Defense installations	
<b>3. Creating incentives for universal availability and adoption of broadband</b>	Ensure universal access to broadband network services	Create the Connect America Fund (CAF)
		Create a Mobility Fund to provide targeted funding
		Transition the “legacy” High-Cost component of the USF

		Reform intercarrier compensation
		Design the new Connect America Fund and Mobility Fund in a tax-efficient manner
		Broaden the USF contribution base
	Create mechanisms to ensure affordability to low-income Americans	
	Expand the Lifeline and Link-Up programs by allowing subsidies provided to low-income Americans to be used for broadband	Consider licensing a block of spectrum with a condition to offer free or low-cost service
	Ensure every American has the opportunity to become digitally literate	Launch a National Digital Literacy Corps
<b>4. Updating policies, setting standards and aligning incentives to maximize use for national priorities</b>	Health care	
	Education	
	Energy and the environment	
	Economic opportunity	
	Government performance and civic engagement	
	Public safety and homeland security	

Source: Compiled by CRS from the National Broadband Plan.

**Table 2. Recommendations of the National Broadband Plan to Congress**

Chapter	Recommendation
Broadband Competition and Innovation Policy	4.14: Congress, the Federal Trade Commission (FTC) and the FCC should consider clarifying the relationship between users and their online profiles.
	4.15: Congress should consider helping spur development of trusted “identity providers” to assist consumers in managing their data in a manner that maximizes the privacy and security of the information.
Spectrum	5.4: Congress should consider expressly expanding the FCC’s authority to enable it to conduct incentive auctions in which incumbent licensees may relinquish rights in spectrum assignments to other parties or to the FCC.
	5.5: Congress should consider building upon the success of the Commercial Spectrum Enhancement Act (CSEA) to fund additional approaches to facilitate incumbent relocation.
	5.6: Congress should consider granting authority to the FCC to impose spectrum fees on license holders and to NTIA to impose spectrum fees on users of government spectrum.
Infrastructure	6.5: Congress should consider amending Section 224 of the act to establish a harmonized access policy for all poles, ducts, conduits and rights-of-way.
	6.8: Congress should consider enacting “dig once” legislation applying to all future federally funded projects along rights-of-way (including sewers, power transmission facilities, rail, pipelines, bridges, tunnels and roads).
	6.9: Congress should consider expressly authorizing federal agencies to set the fees for access to federal rights-of-way on a management and cost recovery basis.
Research and Development	7.2: Congress should consider making the Research and Experimentation (R&E) tax credit a long-term tax credit to stimulate broadband R&D.
Availability	8.15: To accelerate broadband deployment, Congress should consider providing optional public funding to the Connect America Fund, such as a few billion dollars per year over a two to three year period.
	8.16: Congress should consider expanding combination grant-loan programs.
	8.17: Congress should consider expanding the Community Connect program.
	8.18: Congress should consider establishing a Tribal Broadband Fund to support sustainable broadband deployment and adoption in Tribal lands, and all federal agencies that upgrade connectivity on Tribal lands should coordinate such upgrades with Tribal governments and the Tribal Broadband Fund grant-making process.
	8.19: Congress should make clear that state, regional and local governments can build broadband networks.
	8.21: Congress should consider amending the Communications Act to provide discretion to the FCC to allow anchor institutions on Tribal lands to share broadband network capacity that is funded by the E-rate or the Rural Health Care program with other community institutions designated by Tribal governments.
Adoption and Utilization	9.10: Congress, the FCC and the U.S. Department of Justice (DOJ) should modernize accessibility laws, rules and related subsidy programs.
	9.12: Congress and federal agencies should promote third-party evaluation of future broadband adoption programs.
	9.14: The Executive Branch, the FCC and Congress should consider making changes to ensure effective coordination and consultation with Tribes on broadband-related issues.
Health Care	10.1: Congress and the Secretary of Health and Human Services (HHS) should consider developing a strategy that documents the proven value of e-care technologies, proposes reimbursement reforms that incent their meaningful use and charts a path for their

Chapter	Recommendation
	widespread adoption.
	10.2: Congress, states and the Centers for Medicare & Medicaid Services (CMS) should consider reducing regulatory barriers that inhibit adoption of health IT solutions.
	10.5: Congress should consider providing consumers access to—and control over—all their digital health care data in machine-readable formats in a timely manner & at a reasonable cost.
	10.10: Congress should consider providing an incremental sum (up to \$29 million a year) for the Indian Health Service for the purpose of upgrading its broadband service to meet connectivity requirements.
Education	11.4: Congress should consider taking legislative action to encourage copyright holders to grant educational digital rights of use, without prejudicing their other rights.
	11.22: Congress should consider amending the Communications Act to help Tribal libraries overcome barriers to E-rate eligibility arising from state laws.
	11.25: Congress should consider providing additional public funds to connect all public community colleges with high-speed broadband and maintain that connectivity.
Energy and the Environment	12.4: Congress should consider amending the Communications Act to enable utilities to use the proposed public safety 700MHz wireless broadband network.
	12.7: States should require electric utilities to provide consumers access to, and control of, their own digital energy information, including real-time information from smart meters and historical consumption, price and bill data over the Internet. If states fail to develop reasonable policies over the next 18 months, Congress should consider national legislation to cover consumer privacy and the accessibility of energy data.
Economic Opportunity	13.4: Congress should consider additional funds for the Economic Development Administration (EDA) to bolster entrepreneurial development programs with broadband tools and training.
	13.6: Congress should consider eliminating tax and regulatory barriers to telework.
Government Performance	14.2: When feasible, Congress should consider allowing state and local governments to get lower service prices by participating in federal contracts for advanced communications services.
	14.4: The Executive Branch and Congress should consider using federal funding to encourage cities and counties to gather information on initiatives enabled by broadband in ways that allow for rigorous evaluation and lead to an understanding of best practices.
	14.17: Congress should consider re-examining the Privacy Act to facilitate the delivery of online government services and to account for changes in technology.
Civic Engagement	15.6: Congress should consider increasing funding to public media for broadband-based distribution and content.
	15.7: Congress should consider amending the Copyright Act to provide for copyright exemptions to public broadcasting organizations for online broadcast and distribution of public media.
	15.9: Congress should consider amending the Copyright Act to enable public and broadcast media to more easily contribute their archival content to a digital national archive and grant reasonable noncommercial downstream usage rights for this content to the American people.
Public Safety	16.4: Preserve broadband communications during emergencies.
	16.14: Congress should consider enacting of federal regulatory framework.

Source: Compiled by CRS from the National Broadband Plan.

## **Author Contact Information**

(name redacted)  
Specialist in Science and Technology Policy  
[redacted]@crs.loc.gov, 7-....

(name redacted)  
Specialist in Telecommunications Policy  
[redacted]@crs.loc.gov, 7-....

(name redacted)  
Specialist in Telecommunications Policy  
[redacted]@crs.loc.gov, 7-....

(name redacted)  
Specialist in Telecommunications Policy  
[redacted]@crs.loc.gov, 7-....

(name redacted)  
Legislative Attorney  
[redacted]@crs.loc.gov, 7-....

# EveryCRSReport.com

The Congressional Research Service (CRS) is a federal legislative branch agency, housed inside the Library of Congress, charged with providing the United States Congress non-partisan advice on issues that may come before Congress.

EveryCRSReport.com republishes CRS reports that are available to all Congressional staff. The reports are not classified, and Members of Congress routinely make individual reports available to the public.

Prior to our republication, we redacted names, phone numbers and email addresses of analysts who produced the reports. We also added this page to the report. We have not intentionally made any other changes to any report published on EveryCRSReport.com.

CRS reports, as a work of the United States government, are not subject to copyright protection in the United States. Any CRS report may be reproduced and distributed in its entirety without permission from CRS. However, as a CRS report may include copyrighted images or material from a third party, you may need to obtain permission of the copyright holder if you wish to copy or otherwise use copyrighted material.

Information in a CRS report should not be relied upon for purposes other than public understanding of information that has been provided by CRS to members of Congress in connection with CRS' institutional role.

EveryCRSReport.com is not a government website and is not affiliated with CRS. We do not claim copyright on any CRS report we have republished.