
OVERVIEW OF THE NATIONAL BROADBAND PLAN

CHAPTER 1: INTRODUCTION

In February 2009, Congress gave the Federal Communications Commission (“FCC” or “Commission”) a broad mandate to develop a National Broadband Plan (“Plan”) that would ensure that all Americans have access to broadband service and to set benchmarks to reach that goal. Congress specifically requested that the Plan provide an analysis of the most efficient ways for Americans to access broadband capabilities, strategies for making broadband access affordable, the current state of broadband deployment, and how to use broadband infrastructure to benefit the public.

America faces troubling gaps in deployment of broadband networks. Despite the vibrant information and communications technology industries, approximately 100 million Americans do not have broadband. Further, fourteen million Americans do not even have access to broadband infrastructure sufficient to support current, let alone future, applications, and ten million American children do not have access to broadband.

These gaps in broadband access affect our public health and safety, our access to educational opportunities, and our energy sector. America ranks among the bottom half in adoption of health information technology among comparable countries, smart grid technology has yet to be implemented because the nation’s electric grid is not connected to broadband, and only sixteen percent of public community colleges have high speed connections comparable to our research universities.

Acknowledging these challenges, the Plan is intended to build on American strengths of innovation and inclusion. America has a long tradition of creativity and engineering that has produced many of the world’s leading businesses, applications, and devices. Our innovation must go beyond simply improving the capacity and capability of the networks, and extend to the development of applications that empower individuals to use these capabilities to improve their lives. The ideal of inclusion compels to be proactive in our efforts to provide universal access to communications technology and the opportunities to succeed that accompany it.

Noting that the government cannot predict the future, the Plan describes the limited role that government should take to shape the evolution of broadband.

Instead of choosing a specific path for broadband, the Plan sets out three categories of actions the government should take: “fostering innovation and competition in networks, devices and applications; redirecting assets that government controls or influences; and optimizing the use of broadband to help achieve national priorities.”

CHAPTER 2: GOALS FOR A HIGH-PERFORMANCE AMERICA

The Plan sets out long-term goals and benchmarks to chart the nation’s progress in encouraging private investment, innovation, lower prices, and better options for customers over the next decade.

The first goal is to provide minimum actual download/upload speeds of 100 and 50 megabits per second (“Mbps”), respectively, to 100 million U.S. homes by 2020 in order to foster an attractive market for broadband applications, devices, and infrastructure. Within five years, the Plan aims to provide affordable access of actual download speeds of fifty Mbps and upload speeds of twenty Mbps. The Plan recommends that the government encourage wireless and wired providers to improve network performance and ensure affordability by increasing spectrum availability and use for backhaul. Government can further create demand for broadband applications by enabling new applications for use in the public sector such as health care, education, and energy, as well as ensuring consumers’ control of their personal data.

Mobile broadband is a rapidly expanding relatively new market in which the United States should lead, and the federal government’s spectrum policy must ensure innovation and U.S. leadership in this market. Efficient allocation of spectrum will lower network deployment costs, enable lower prices, and ensure more capital investment and better performance. The Plan recommends making 300 megahertz of spectrum available for broadband by 2015 and 500 megahertz available by 2020.

Every American home must have access to affordable broadband services and the opportunity to develop digital skills to take advantage of these services. To this end, the Plan recommends reforming the Universal Service Fund and intercarrier compensation system to focus resources toward communities unserved by broadband, extending Lifeline and Link-Up programs, and creating a Digital Literacy Corps to ensure access to digital literacy education. Implementing these recommendations could lead to an adoption rate of over ninety percent by 2020, as well as closing the gap in adoption rates among demographic groups, particularly people with disabilities, Native Americans on tribal lands, women, and minorities.

Affordable access to broadband should extend beyond the home and into the community. Providing affordable access to schools, libraries, and health care

facilities will improve the way we learn, stay healthy, and interact with government. Anchor institutions such as schools, hospitals, and government buildings should have affordable access to at least 1 gigabit per second service. The Plan recommends that the government reform the E-rate and Rural Health Care support programs, and that non-profit and public institutions should be able to find efficient alternatives for greater connectivity through aggregated efforts.

In 2004, the 9/11 Commission found that overlapping agencies and jurisdictions led to an inability to communicate in emergencies. The Plan recommends that the country create a nationwide interoperable wireless broadband public safety network by 2020.

The United States must be a leader in the clean energy economy. To accomplish this, the country must modernize the electric grid with broadband and advanced communications, which will provide consumers with real-time data to enable them to save energy and money.

The Plan is divided into three parts. Part I recommends using competition and efficient management of government assets to maximize innovation and investment, and ensure America has the world-leading broadband ecosystem. Part II makes recommendations to ensure access by reforming the Universal Service Fund and intercarrier compensation, which will promote broadband affordability and adoption. Part III makes recommendations to encourage innovation in the following sectors: health care, energy, education, and public safety.

CHAPTER 3: CURRENT STATE OF THE BROADBAND ECOSYSTEM

The broadband ecosystem is an interaction between applications, the devices they run on, and networks they connect to. Improvements in networks allow more powerful devices, which in turn can support more useful applications and attract users to the networks, creating a “virtuous cycle” increasing the speed, functionality, and reach of the networks. The Plan recommends several ways to foster this virtuous cycle.

As broadband connection speeds have grown, so has the diversity of the applications being developed and the hours of time spent online—an average of twenty-nine hours per month at home today. Applications help people find information, entertainment, or banking services. Businesses are using this greater connectivity to better understand and serve their customers, such as by analyzing aggregated data to identify buying patterns and creating services tailored to individual customers.

Although television and films watched on the Internet represents less than two percent of all video consumed, Cisco forecasts that video consumption will grow forty percent on fixed networks and 120 percent on mobile networks

through 2013. More user-friendly smart video devices would drive greater Internet video adoption by making such content available on the television as an adjunct to traditional linear content.

Cloud computing—accessing applications hosted on the Internet instead of on one's computer—also shows promise, particularly in allowing small businesses and consumers to access powerful applications that once required significant IT infrastructure.

The Plan also identifies several hurdles to the development of applications and content online. While technological solutions like content fingerprinting and other industry initiatives have shown promise, piracy still presents a problem to the online ecosystem. Additionally, almost half of all consumers are concerned about online privacy and security, which may limit their adoption of broadband. Finally, the Plan recognizes that opening government information to developers can spur new and useful content and applications, such as the Apps for America competition using information available on Data.gov.

Significant competition and innovation have driven the invention of new devices that interact with broadband networks. Many predict that netbook and tablet growth will soon outpace that of laptops and smart phones will overtake the standard mobile phone. Additionally, many Internet capable devices are being introduced to the market every year. For example, machine-to-machine (“M2M”) technology allows machines to communicate with each other and has been deployed in the auto industry, such as General Motors' OnStar system, the medical industry, and the energy sector. The emergence of these new technologies will give rise to an “Internet of Things” that will create new classes of devices that connect to broadband networks, and this will require more Internet Protocol (“IP”) addresses and more spectrum for wireless communications.

Regarding television set-top boxes, the Plan notes that the FCC has tried, unsuccessfully, to foster competition in this industry with the CableCARD regime, developed in partnership with Multichannel Video Programming Distribution (“MVPD”). However, as of 2008, ninety-seven percent of CableCARD-deployed set-top boxes were leased from cable operators rather than purchased by the consumer. This stagnation limits consumers' control over how they to consume video, inhibits the emergence of new uses and applications, and could be preventing the development of new business models that would integrate traditional television and Internet video.

Terrestrial Fixed Broadband Availability: Currently, 290 million Americans (ninety-five percent) have access to terrestrial, fixed broadband with actual download speeds of at least four Mbps. However, fourteen million Americans, primarily in rural areas, remain without access to this type of broadband network. Although telephone and cable companies have announced aggressive network build outs to more homes, the planned expansions will not greatly

reduce the number of unserved Americans.

Fixed broadband connections advertise maximum download speeds of up to eight Mbps, and the average advertised download speeds have grown by twenty percent every year for the last ten years. Despite these advertised download speeds, consumers actually experience average download speeds of four Mbps. Studies have shown that this gap between advertised download speeds and actual download speeds is consistently found in other countries, including the United Kingdom, New Zealand, Australia, Italy, and Ireland.

Mobile Broadband Availability: A recent study shows that 3G service covers sixty percent of the United States by area, and coverage is available to about seventy-seven percent of the population and ninety-eight percent of the business community. These are likely overstated figures as carriers typically use their own definition of coverage and do not take into account signal strength, bitrate, or in-building coverage, which all significantly affect actual coverage and service. The Plan also notes that operators have announced upgrades to 4G broadband service, using WiMax and Long Term Evolution (“LTE”) standards. This will increase spectrum efficiency and decrease network latency, improving the mobile broadband experience. The effect of 4G broadband will largely depend on the amount of spectrum available for wireless and the availability of high-speed backhaul connections from cellular sites. However, as with fixed broadband providers, actual download speeds are significantly less than advertised. Actual average rates as low as 245 kilobytes per second (“kbps”) down contrast sharply with average advertised download speeds as high as 600 kbps. For both mobile and fixed broadband networks, performance and availability rely on availability of spectrum. The Plan found that more spectrum is needed to maintain robust, high-performing wireless and fixed networks in the future.

Nearly two-thirds of American adults have adopted broadband at home, but different demographic groups have adopted broadband at varying rates. Those earning less than \$20,000 per year have a much lower adoption rate compared to those earning more than \$75,000 per year. Tribal lands have significantly lower adoption rates—perhaps less than ten percent of Tribal land residents have broadband available.

CHAPTER 4: BROADBAND COMPETITION AND INNOVATION POLICY

Chapter 4 examines innovation and competition in the three elements of the broadband ecosystem: networks, devices, and applications.

4.1 Networks

Competition in Residential Broadband Markets:

Competition in industries with high fixed costs: Due to the high cost of investing in wireline networks, new market entrants appear unlikely. Currently, 96 percent of the population is serviced by, at most, two wireline providers. In general, broadband subscribers benefit from the presence of multiple providers, but insufficient data exists to determine whether such providers engage in meaningful price competition. More data will be needed to ensure that policies are put into place to foster meaningful competition.

Fixed broadband service: The presence of facilities-based competitors appears to induce investment in network upgrades. In 2009, cable and telephone companies invested forty billion dollars in capital expenditures, and for the past ten years have advertised increasingly higher download speeds. Currently, little data exist as to whether providers compete on price as well as service, and furthermore, no data exist that can provide the relevant details of promotions through which providers often advertise their bundled and unbundled services. The Plan calls for better data to more effectively analyze price competition.

Mobile broadband competition: In 2009, wireless carriers were expected to spend twenty billion dollars in capital expenditures, including twelve billion dollars for broadband services. As service providers roll out 4G coverage utilizing new technologies such as WiMax, LTE, and High Speed Packet Access, consumers will benefit from new devices supporting innovative applications and uses.

Wireline-Wireless Competition: The Plan notes that consumer preferences will determine whether wireless broadband can compete with wireline. Although presently wireless broadband may not be able to offer consumers high-speed connections with prices competitive to wireline providers, the development of new technologies and spectral efficiencies may make wireless a viable competitor to wireline service in the future. The Plan recommends that the FCC should carefully monitor the affordability of low-end mobile broadband offerings and take further steps if affordability does not improve.

Potential future issues for fixed broadband competition: The upgrade of cable systems to DOCSIS 3.0 will likely result in ninety percent of the population having access to broadband networks capable of exceeding fifty Mbps. This will change the competitive dynamics among broadband providers. Once the current upgrades are complete, around fifteen percent of the population will be able to choose from two providers offering high speed broadband. However, seventy-five percent of the population will likely only have one provider for such high peak speeds—cable companies with DOCSIS 3.0. If consumers do value higher speeds and are willing to pay more for them, and only one provider can offer them, users may face higher prices with fewer choices and less

innovation. The FCC should carefully track pricing in areas with two high speed broadband providers compared to areas where there is only one provider of high speed broadband and include this data in future reports on the state of broadband deployment.

The FCC should make more spectrum available to foster greater competition in the broadband market. The FCC and Bureau of Labor Statistics (“BLS”) should collect more accurate data of actual availability, penetration, prices, churn rates, and bundles offered by broadband service providers. To do this, the Plan suggests the FCC revise Form 477 to collect data relevant to broadband availability, adoption, and competition. The FCC should also transition to collecting location-specific subscribership data by provider, technology, actual speed, and offered speed. In addition, the FCC should continue to collect data on advertised prices, prices actually paid by subscribers, plans, bundles and promotions of fixed and mobile broadband services, as well as information related to switching barriers such as early termination fees and contract length.

Transparency in the Retail Broadband Market:

In order to promote meaningful competition and spur innovation, the FCC should make more information available to consumers. Consumers should have information on the actual speed and overall performance of services they receive and competitive offers in their area. Currently, lack of standards make it impossible for consumers to compare providers and service offerings. The Plan recommends four steps to encourage transparency:

The FCC should establish technical standards that measure the actual speeds and performance over broadband service providers’ networks at peak use hours, the probability those speeds and performance will be reached over a set time period, and the testing of those speeds against a given set of standards and protocols.

The FCC should make actual performance of fixed broadband services. The Plan recommends this data be made available on a public and searchable database. Furthermore, the FCC should publish a report providing information on different broadband service providers across different geographic markets.

The FCC should issue a Notice of Proposed Rulemaking (“NPRM”) for performance disclosure requirements for broadband, including various ways to disclose such information to consumers, such as an online decision making tool to help consumers choose an Internet Service Provider (“ISP”). One way to assist customers is a “broadband digital label” that would attribute labels to different qualities of service such as upload/download speeds, delay, jitter, as well as lists of standard applications that can be used on the service. The FCC should also require clear, understandable, and reasonably precise estimates of the fees and taxes of any given contract.

Finally, the FCC should develop and maintain standards of measurement by

location, carrier, and spectrum band usage for mobile, multi-unit buildings, and small businesses. The FCC should create an online database of mobile broadband providers with its measurements and continue to encourage industry to provide transparent disclosures of coverage, speeds, and performance.

Competition in Wholesale Broadband Markets:

It is not economically or practically feasible for broadband providers to build facilities in all geographic areas. Currently, the FCC's regulatory approach to wholesale broadband markets is not in line with the current evolution of networks to integrated packet-mode IP networks. The FCC should review its current policies and develop a more cohesive approach to regulating wholesale broadband markets to foster competition.

The FCC should develop a coherent and effective framework for evaluating its current wholesale competition regulations to ensure availability inputs for broadband services to small businesses, mobile providers, and enterprise customers. In addition to reviewing wholesale competition regulations, the FCC should rule on additional dimensions of the wholesale broadband network, such as competitive access to local fiber facilities, copper retirement rules, and implementation of Section 271 of the Communications Act.

Special access circuits are means by which businesses provide broadband service to customers that are off their networks. These special access circuits are sold by incumbent local exchange carriers ("LECs"), and the cost of these circuits is a significant expense for businesses offering broadband service. The FCC regulates the rates, terms, and conditions of these services through interstate tariffs, but since 2006, the FCC has deregulated many of these services. The FCC should consider what the appropriate analytical framework is for the sale of these special access circuits and ensure that these rates, terms, and conditions are just and reasonable.

Incumbent carriers are required to share certain copper loop facilities with competitive carriers, who connect these copper loops to their own DSL or Ethernet service and provide an alternative to broadband service. Current FCC rules permit incumbents to retire or remove copper facilities as they deploy fiber, which reduces the incumbent's maintenance costs but also eliminates competitors' ability to offer service to customers. Any copper retirement plan must balance the inefficiency of forcing an incumbent to bear the cost of maintaining two parallel networks with the value of preserving competitors' access to an incumbent's consumers.

Interconnection refers to the ability of customers of one service to connect with customers of another. In the current broadband market, it is an essential means by which a broadband provider can capture voice revenues, making broadband entry economically viable. Recent court decisions have upheld rural carriers' arguments that they have no obligation to negotiate interconnection

agreements. The Plan noted that these decisions were based on a misinterpretation of the Act's rural exemption and interconnection requirements. To prevent further misinterpretation, the FCC should confirm that rural carriers have a duty to interconnect their networks and determine how to encourage IP-to-IP interconnection.

Roaming agreements allow customers to stay connected when outside the area of their provider's network. The FCC should encourage these agreements among mobile broadband services, specifically for data roaming, which would enable customers to access e-mail and other broadband services outside their provider's networks.

4.2 Devices

In the mobile phone and computing device markets, competition from start-up companies has driven innovation and investment, benefiting consumers. Innovations in the set-top box market could also lead to more applications and lower prices for consumers, more variety in video content, an integrated user interface combining Internet content and traditional television, and higher usage of broadband. Despite Congressional and FCC intentions, the CableCARD has largely failed to stimulate a competitive retail market for set-top boxes. FCC rules require MVPDs to separate the system that customers use to access programming from the physical device, a process called the conditional element, but the FCC has only applied these rules to cable operators, exempting other MVPDs such as satellite, which today account for four out of the top ten MVPDs. In order to stimulate competition in the set-top box market, the should FCC apply Section 629 to all MVPDs.

The FCC should initiate a proceeding to ensure that all MVPDs install open gateway devices or equivalent functionality in all new subscriber homes and in all homes requiring replacement set-top boxes, starting on or before December 31, 2012. The Plan suggests key principles that should apply to the gateway device: the device should be inexpensive and MVPDs should not inhibit third party manufacturers from innovating in the user interface of their devices. In allowing innovation in their devices, the Plan further specifies that the gateway device should use open standards, allow retail devices to access all MVPD content without restrictions on user interface, not require restrictive licensing, and allow video to pass through to the retail devices with existing copy protection flags from the MVPD.

The FCC should adopt rules to fix other CableCARD issues, including allowing retail devices to receive and transmit out-of-band communications with the cable headend over IP, establishing transparency in pricing for leased set-top boxes and purchased set-top boxes, standardizing installation policies, and

streamlining the certification process for retail CableCARD devices.

The collection, aggregation, and analysis of personal information has been a large part of application innovation, that has benefited consumers and businesses, and the FCC should enact policies that reflect consumers' desire to protect sensitive data and to control the dissemination and use of their digital identity.

4.3 Applications

Personal Data, Innovation and Privacy:

Digital identities developed from the collection of personal data are a major source of innovation and provide increased opportunities for monetization. The ability to collect personal data and create digital identities gives companies, particularly large incumbents, a powerful tool for generating more use and advertising. Giving consumers control over their information, and the ability to transfer it to a third party, can help continue the trend of innovation by removing barriers to entry for new firms. Greater user control of their data will also help address concerns over privacy and anonymity online.

Privacy and Anonymity:

Privacy concerns can prevent consumers from adopting and utilizing broadband. A recent FCC survey found that almost half of all consumers are concerned about privacy and security online, and the Plan recommends consumer protections to disclose when and how users' personal data are being used.

Framework for Federal Involvement:

The existing regulatory framework for protecting consumers' data is a patchwork of potentially confusing regulations. For example, the Gramm-Leach-Bliley Act, which protects personal financial data, does not apply to non-financial institutions that could have comparable information. A host of regulations prohibit the disclosure of personally identifiable information, but it is difficult to define what constitutes personally identifiable information. Three questions should be addressed to clarify the relationship between consumers and their online profiles:

What obligations do firms that collect, analyze, or monetize personal data or create digital profiles of individuals have to consumers in terms of data sharing, collection, storage, safeguarding, and accountability?

What new obligations, if any, should firms have to transparently disclose their use of, access to, and retention of personal data?

How can informed consent principles be applied to personal data usage and disclosures?

Congress should also develop strict guidelines and audits on data protection that would allow companies to be acknowledged as trusted intermediaries, and

should consider creating a regime to provide insurance to companies that are acknowledged as trusted intermediaries.

The FCC and FTC should develop principles that require informed consent to use a customer's information. This information would include patterns of Internet usage and other personally identifiable information.

Identity Theft and Fraud: With increasing electronic communications and online commerce, online identity theft is a growing concern. The FTC should put more resources into OnGuard Online, a website that makes available several guidebooks on actions that consumers can take if they believe they are victims of identity theft. The FTC should also maintain and publicize a database of agencies responsible for identity theft information and continue to educate consumers and businesses on how to properly collect personal data.

Consumer Online Security: Spam, malware, and other viruses have increased since the first virus was unleashed onto the Internet in 1988. The FCC's consumer online security efforts should support the broader national online security policy and coordinate with the Department of Homeland Security ("DHS") and the FTC. Federal agencies should also connect OnGuard Online to their Web sites.

Child Protection: The Plan recommended that an interagency working group be created to coordinate with child online safety initiatives and evaluate government efforts. Furthermore, the working group should consider a national education and outreach campaign involving governments, schools, and caregivers.

Content and Online Copyright Protection: The Internet has tremendous value as a platform for new content and to drive adoption and use of broadband. Copyright protections are important to protect creators' incentives to create and put their works online. However, copyright protections should not stifle innovation by preventing lawful uses of copyrighted material.

Digital Goods and Services Taxation: Currently, laws regulating taxation of digital goods and services may hinder new investment and business models. Congress should consider a national framework for the taxation of digital goods and services taxation to reduce uncertainty and encourage online business.

4.4 Competition for Value Across the Ecosystem

Recognizing that the open nature of the Internet has been critical to its success as a platform for investment and innovation, the FCC issued an NPRM in 2009 that sought public comment on six principles that would impose obligations on broadband Internet service providers. The first three principles would guarantee users the access to and use of the lawful content, applications, and

devices of their choice. Principle Four would prohibit an ISP from depriving a user of competition among network, application, and content providers. Principle Five would require ISPs to treat applications and services in a non-discriminatory manner, and Principle Six proposes transparency requirements to ensure that users enjoy the protections specified in the previous principles. The guarantees of these principles would be limited to lawful content, services, and devices, and would be subject to the needs of reasonable network management and law enforcement.

4.5 Transition from the Circuit Switched Network

The transition from a circuit-switching network to an IP-based platform will take several years. The FCC should ensure that regulations do not hinder investment in IP-based services and that communications are not disrupted as customers leave the Public Switching Telephone Network (“PSTN”) for IP-based services. The FCC seeks comment on the following questions: whether the FCC should set a timeline for transition and if so, what it should be; what should the quality of service requirements be; and how should emergency communications be safeguarded. In addition, the FCC should consider questions of jurisdiction, regulatory structure, legacy voice-specific regulations, and interconnection, as well as the impact the transition will have on employment in the communications industry.

4.6 Leveraging the Benefits of Innovation and Investment Internationally

The policies of the Plan form the basic foundations of the U.S. international telecommunications agenda: pro-competitive, transparent, and technology neutral. In order to continue to encourage mobile broadband access, the United States should continue to support the rollout of telecommunications technology that bridges the international digital divide. The United States needs to continue to provide leadership in cooperating with intergovernmental agencies, non-governmental agencies, and technical bodies—in particular, the International Telecommunications Union—to harmonize global spectrum usage and international standards. The United States should promote universal and unrestricted access to the Internet, while also maintaining cyber security as a policy objective.

CHAPTER 5: SPECTRUM

5.1 The Growth of Wireless Broadband

The rapid growth of 3G services, mobile computing, and emerging 4G technologies, including LTE and WiMAX, necessitates a reevaluation of U.S. spectrum policy. Spectrum must be made available to network expansion projects and technology upgrades, or mobile broadband quality will suffer, and the United States will fall behind in global broadband deployment and innovation. Spectrum availability should be expanded in both the wider and narrower channels of the spectrum. 4G technologies may require larger blocks of spectrum, while other new innovations may be able to operate on narrower bands. Realizing the full potential of 4G technologies requires more than just “re-farming” the 700 MHz, AWS, and 2.5 GHz bands; it must address other potential bottlenecks, including backhaul.

Under the current policy framework, spectrum is often assigned to specific uses and possibly specific technologies, resulting in an impediment to the transfer of spectrum to areas in which it would be put to better use. For commercial spectrum use, the current framework impedes innovation because “particular use” allocation has made it hard for licensees to transfer their spectrum to others who wish to use it for new services.

A renewed emphasis on flexible policies and the use of voluntary spectrum transfers will help ensure continued innovation and investment, but the government’s ability to free up and re-auction spectrum should be used as the ultimate backstop if the voluntary process stalls entirely.

5.2 Ensuring Greater Transparency Concerning Spectrum Allocation and Utilization

The Plan notes the importance of transparency in the spectrum allocation process. Continued improvement of the FCC’s spectrum dashboard software will provide the public with information on spectrum use and licenses in non-federal spectrum ranging from 225 MHz to 3.7 GHz. This dashboard should be expanded to include information on all spectrum bands, as well as to support a secondary market in spectrum.

The FCC and National Telecommunications and Information Administration (“NTIA”) should develop scientifically rigorous methods to measure and report the utilization of spectrum bands between 225 MHz and 3.7 GHz, and make this information available to the public. Finally, the FCC should continually update its analysis of the spectrum market by assessing supply, demand, and usage and should publish assessments every three years.

5.3 Expanding Incentives and Mechanisms to Reallocate or Repurpose Spectrum

In order for reallocation of spectrum to occur efficiently and effectively, the FCC needs to create incentives for incumbents to give up spectrum to those who wish to use it for next-generation applications.

First, Congress should grant the FCC authority to hold incentive auctions. In such an auction, incumbents would be able to share in spectrum license proceeds, providing an incentive to relinquish unused or underused spectrum. Second, Congress should fund additional approaches to ease reallocation, such as extending the Commercial Spectrum Enhancement Act, which encourages federal incumbents to clear spectrum not being put to its most productive use.

Congress should also consider granting the FCC and the NTIA authority to impose spectrum fees on license holders and users of government spectrum. Such fees may incentivize new uses of spectrum by making it costly to hold unused or underused spectrum. These fees would only apply to spectrum not licensed for exclusive flexible use.

Finally, the FCC should evaluate the effectiveness of its secondary market policies to further promote access to unused and underused spectrum. This would involve the FCC identifying and addressing impediments to efficient and effective allocation through secondary markets.

5.4 Making More Spectrum Available Within the Next Ten Years

Several specific recommendations can help meet the spectrum needs of the current marketplace. First, 500 MHz nationwide must be made available for broadband use within ten years. Based on current trends in the wireless industry, service providers are estimated to need between 40 and 150 MHz each.

To help close the shortfall, the FCC should make twenty MHz available for mobile broadband use in the WCS band, including revising rules limiting WCS out-of-band-emissions ("OOBE"), enabling use of the 2.3 GHz WCS spectrum for mobile broadband, and protecting federal and non-federal AMT and satellite radio from the SDARS band.

The FCC should also hold an auction for the commercial use of the Upper 700 MHz D Block (10 MHz) that would be predicated on commercial use with limited technical requirements, to ensure compatibility with both the D Block and the public safety spectrum. This recommendation is intended to unlock the value of the D Block, within the construct of several principles: First, any D Block licensee must use a standard air interface. Second, the FCC should authorize state, local, and federal public safety users to have priority access on any auctioned spectrum used for commercial networks. Third, licensees must offer devices that operate on the D Block and the public safety spectrum.

Fourth, licensees will be subject to reasonable build-out requirements.

Further, the FCC should auction off 60 MHz from the AWS bands, including 20 MHz from federal allocations. The three bands in question are the AWS-2 H Block, the AWS-2 J Block, and the AWS-3 Band. Furthermore, the NTIA should consult with the FCC to decide whether to reallocate a portion of the 1755–1850 MHz band along with the AWS-3 Band, and also to decide whether the AWS-2 J block could be integrated with the AWS-3 Band or the MSS S-Band to maximize the broadband potential of the spectrum.

The FCC should also quickly deploy 90 MHz of Mobile Satellite Spectrum. Specifically, the FCC should work with L-Band licensees and foreign parties to rationalize ATC-authorized L-Band spectrum to broadband ATC uses, add a terrestrial allocation to the S-Band, and grant more flexibility in the 2.4 GHz Big LEO Band to enable this spectrum for use in the provision of terrestrial broadband service.

Finally, the FCC should start a rulemaking proceeding to reallocate 120 MHz from the broadcast television bands. This would include: updating rules concerning television service areas and distance of separation, a revision of the Table of Allotments ensuring efficient allotment, establishing rules to allow two or more stations to share a six-megahertz channel, and creating rules on reclaimed broadcast spectrum auctions.

The FCC should update rules on television service areas and distance separations and revise the Table of Allotments to ensure the most efficient allotment of 6 megahertz channel assignments as a starting point. A change in the rules governing broadcast television channel assignments could reduce spectrum use without hampering an individual station's bandwidth, since stations could operate closer together, but not to the extent where interference would be unreasonable. Also, the FCC may be able to repack channels more efficiently to fit more channels into fewer total channels, freeing spectrum for broadband use.

The FCC should establish a licensing framework to permit two or more stations to share a 6 megahertz channel. While currently each licensee is allotted a six-megahertz channel, the Plan believes it is possible that two or more licensee could broadcast on the same six-megahertz channel without interference, freeing the excess spectrum for broadband use.

The FCC should determine rules for auctions of broadcast spectrum reclaimed through repacking and voluntary channel sharing. The Plans suggests that the FCC conduct an auction to sell spectrum recovered through repacking. One suggestion to maximize the amount of spectrum collected would be to conduct incentive auctions. Under this idea, licensees who relinquished spectrum would share in the proceeds of these auctions. After such auctions took place, those licensees who gave up spectrum would be reassigned based on the

updated Table of Allotments with modified licenses if they are sharing a channel, and would be reimbursed any costs incurred in repacking.

This voluntary relocation should be implemented in such a way as to limit negative impacts on consumers, the public interest, competition, diversity, and localism. The impact on over-the-air consumers could be mitigated through a policy of rural and small market protection. Also, the FCC should issue a rulemaking to create appropriate compensation mechanisms and levels to retain free television service.

The FCC should explore alternatives—including changes in broadcast technical architecture, an overlay license auction, or more extensive channel sharing—in the event the preceding recommendations do not yield a significant amount of spectrum. The FCC could call for a “transition to a cellular architecture on a voluntary or involuntary basis.” The FCC could also hold overlay auctions for secondary rights in the broadcast television bands. Furthermore, the FCC could also mandate further channel sharing for multiple television stations across each 6-megahertz channel.

The Commission should take additional measures to increase spectrum efficiency in the broadcast television bands. First, the FCC should consider full-power television spectrum fees. Second, the FCC should create a 2025 deadline for the digital transition of Low Power Television (“LPTV”) stations. Third, the FCC should address VHF issues including power limits and antenna and receptor standards. Finally, Congress should consider creating a trust fund for public interest media funded by auction proceeds and spectrum fees.

5.5 Increasing the Flexibility Capacity and Cost-Effectiveness of Spectrum for Point-to-Point Wireless Backhaul Services

Given that many wireless providers rely on microwave spectrum for backhaul, the FCC should ensure that enough spectrum is available to these providers, particularly in bands below 12 GHz. Specifically, the FCC should revise Part 101 rules to allow for wider channels in the Upper 6 GHz Bands and faster activation of links on additional channel pairs in the 23 GHz Band.

In addition, the FCC should revise its rules to allow more spectrum sharing between compatible point-to-point microwave services. Specifically, the Plan calls for revision of Parts 74, 78, and 101 of the FCC rules, and also for an examination on how an increased sharing of spectrum bands for Mobile Broadcast Auxiliary Service (“BAS”) and Mobile Cable Television Relay Service (“CARS”) use can be accomplished. The FCC should also make current “white spaces” available for backhaul in certain areas.

Finally, the FCC should allow for more flexibility in deploying wireless backhaul. Such an undertaking would include greater reuse of microwave fre-

quencies, modifying throughput rules, restrictions on antenna size, and a use of higher frequencies.

5.6 Expanding Opportunities for Innovative Spectrum Access Models

The federal government should craft a spectrum policy that allows for experimentation and innovation in new technologies for more efficient spectrum access. To facilitate this, the FCC should make available a new, contiguous nationwide band for unlicensed use within the next ten years. This can be done through Part 15 of the FCC rules, which permits unlicensed use of the spectrum not already designated for licensed use. As it stands currently, unlicensed devices cannot operate at high power for fear of interfering with licensed use, which may stifle innovation. Providing additional spectrum specifically designed for unlicensed use will remedy this problem.

Second, the FCC should move to finalize the Television white spaces proceeding. Using a database and cognitive radio techniques could conceivably provide more access to spectrum, and the FCC should finalize a rulemaking in this docket to accelerate the introduction of new innovative products and services and determine whether the use of Television white spaces is viable for these uses.

Third, the FCC should call for the development and deployment of opportunistic use across more radio spectrum. New technologies could allow access spectrum unused in given locations and at given times. The FCC and NTIA should foster the development of these opportunistic technologies through the allocation of unlicensed spectrum, the creation of a geo-location database, and identification of frequencies that would be best suited for this use.

5.7 Taking Additional Steps to Make U.S. Spectrum Policy More Comprehensive

The FCC and NTIA should identify federal and non-federal spectrum that can be used for wireless broadband purposes by October 1, 2010. The FCC should collaborate with the ITU to promote new approaches to global spectrum allocation that enable global development of broadband services, taking into consideration convergence of radio communications services. Furthermore, in international and domestic organizations, the FCC should promote new spectrum allocation approaches to promote flexibility to enhance global broadband services.

The FCC must address the needs of U.S. Tribal communities when implementing this Plan. First, Tribal access to spectrum innovation should be enhanced by identifying spectrum allocated for Tribal purposes. Second, the Tri-

bal Land Bidding Credit should be reevaluated to determine its efficacy in expanding Tribal access to spectrum. Third, the existing Tribal priority in AM and FM allocation could be expanded for fixed and mobile wireless purposes. Fourth, the FCC should incentivize build-out in Tribal lands by making the process more flexible. Finally, the conclusion of the white spaces proceedings should also determine whether to exclude LPTV band devices from rural and border areas, including Tribal lands.

CHAPTER 6: INFRASTRUCTURE

6.1 Improving Utilization of Infrastructure

The Plan recognizes the significant costs that service-providers may incur in securing access to poles, ducts, conduits and rights-of-way, and that reducing these costs can result in quicker and more widespread buildout.

To this end, pole attachment rental rates should be lowered and made as uniform as possible, and reducing the cost of the “make-ready” process should be reduced by establishing a schedule of charges, requiring that attachers be given the right to use practical space- and cost-saving techniques, ensuring that existing attachers give timely accommodations to new attachers, and by linking the make-ready payment schedule to the actual performance of work. In addition to these cost saving measures, the FCC should adopt a stricter timeline for the Section 224 access process, as well as implementing dispute resolution reform for infrastructure access disputes and more effective data collection in regards to the location and availability of poles, ducts, conduits, and rights-of-way. The Plan also calls on Congress to amend Section 224 to universalize access policy for all poles, ducts, conduits, and rights-of-way.

6.2 Maximizing Impact of Federal Resources

The Plan further seeks to lower infrastructure costs by simplifying access to federal rights-of-way. The Department of Transportation (“DOT”) should make all federal funding of highway and bridge projects contingent upon allowing joint deployment of conduits. It also calls for Congress to consider “dig once” legislation for all future federal rights-of-way projects, as well as further calling on DOT to implement joint trenching policies. This would lower costs of fiber deployments by coordinating deployment with the construction of new rights-of-way. Congress should also authorize federal agencies to set fees for access to federal rights-of-way on a management and cost recovery basis. Finally, the executive branch should expedite the placement of wireless towers on federal property through the use of master contracts.

CHAPTER 7: RESEARCH AND DEVELOPMENT

The Plan's research and development recommendations are based, for the most part, on the idea that government should fill any gap that would be beneficial to the overall broadband network, but would not be profitable to be undertaken by the private sector. The Plan also promotes research and development through regulatory policies that open more government resources for research and development purposes, as well as deploying ultra-high-speed broadband between Department of Defense locations with the goal of creating next-generation applications.

Research and development funding programs could involve direct funding to complicated, cross-discipline research projects that would otherwise be underfunded by the private sector. Furthermore, indirect funding could be used by extending long-term status to all Research and Experimentation tax credits. These funding programs would be prioritized by the National Academy of Sciences and the National Academy of Engineering, who would identify gaps, critical issues, competitive shortfalls, and key opportunities in areas associated with broadband networks, devices, and applications.

Furthermore, the National Science Foundation ("NSF") should establish an expansive research center devoted to many aspects of broadband technology, policy, and economics. The NSF should work with the FCC to fund testbeds for real world research into complex spectrum dynamics and network security issues that would be difficult or impossible to assess through simulation.

CHAPTER 8: AVAILABILITY

Chapter eight addresses efforts to close the broadband availability gap and help the FCC achieve its national broadband availability target. The broadband availability gap occurs primarily in areas with low population density, where deployment is uneconomical. To close this gap, public funding should assist in these areas with both initial deployment costs and ongoing maintenance costs.

Universal Service Reform

The Plan discusses a ten-year, three-stage outline for USF reform with the underlying goal of universalizing broadband.

Stage One: Laying the foundation for reform begins in 2010-2011, with the FCC creating a Connect America Fund ("CAF") and Mobility Fund by 2011 to replace the current High-Cost program. Because the High-Cost program was originally developed to ensure affordable access to voice service over circuit-switched networks, the program encounters difficulties in promoting the expansion of IP-based broadband networks. The current High-Cost program does

not support the infrastructure required for the transfer of data across broadband networks, and furthermore suffers from limited oversight and lack of coordination across federal agencies.

The CAF would target funding to areas in which the private sector has little incentive to invest. The FCC should consider market forces in determining appropriate support levels, and should determine CAF eligibility on a technology-neutral basis so that providers only have to meet minimum, FCC-established levels of broadband service to be eligible for support. After determining which providers are eligible, the FCC should implement timeframes to expedite the process and subject funding recipients to reporting requirements. A fast track process could accelerate deployment in unserved areas.

The Mobility Fund will provide funding for the initial deployment of 3G networks to remaining unserved areas, bringing all states to a minimum level of 3G availability which will improve the business case for investment in the rollout of 4G in harder-to-serve areas.

Stage One also recommends the implementation of numerous reforms that will transfer up to \$15.5 billion from the High-Cost programs into the CAF and Mobility Fund. First, the FCC should issue an order to implement voluntary merger commitments in which Sprint and Verizon Wireless agree to gradually eliminate the High-Cost funding they receive over a five-year period. Second, rate-of-return regulation should be replaced with incentive regulation to account for an increasingly competitive marketplace. Third, the FCC should eliminate the Interstate Access Support funding program and redirect its funds toward broadband. Fourth, the FCC should eliminate High-Cost support for voice service, and redirect those funds to efforts toward universal broadband.

Stage Two: The next step, between 2012 and 2016, focuses on distributing CAF funding to unserved areas. The Plan acknowledges the need for an expanded universal service contribution base, while conceding that it remains unknown what method will be implemented to expand the base.

Stage Three: The USF transition should be completed between 2017 and 2020. During this stage, the Plan recommends taking steps to maintain the present-day size of USF and to fully eliminate the High-Cost program by 2020.

In addition to USF reform policies, additional Congressional funds would assist in accelerating broadband deployment, reducing regulatory uncertainty, and achieving the National Broadband Availability Target more rapidly. In conjunction with the reform policies, the Plan also highlights the importance of soliciting Tribal input throughout the reform process, as well as the need to review special access policies and middle-mile costs and pricing.

Intercarrier Compensation Reform

The National Broadband Plan also contemplates long-term intercarrier compensation (“ICC”) reform. The current per-minute ICC system for the origination and termination of telecommunications traffic as originally developed deliberately overpaid local carriers for termination fees as an implicit subsidy to maintain low rates and promote universal service. However, because the system was designed with traditional telephone service in mind, the current ICC system creates inefficiencies that hinder broadband deployment.

To better promote broadband, the system of per-minute charges should be gradually replaced with bandwidth-dependent rates. Specifically, intrastate terminating switched access rates should be reduced to interstate levels in equal increments, while allowing gradual increases in subscriber line charges to offset the lost revenue. Doing so would transition all ICC terminating rates to a uniform rate per carrier, which is an important step to eliminate inefficient economic behavior. The staged approach to rate reduction will give carriers adequate time to prepare and make adjustments to offset the lost revenues.

To encourage public institutions to serve as community broadband anchors in rural and Tribal areas, these publicly funded institutions share should be permitted to share connectivity with other users within communities. By allowing wider uses of federally funded networks and aggregating demand with other potential broadband purchasers, institutions will maximize the efficiency of federal funds and be able to better connect their communities as a whole. To support anchor institutions in developing the necessary institutional knowledge and resources to utilize broadband effectively, many research and education networks recommend the creation of a non-profit coordinating entity, the Unified Community Anchor Network, which would assist anchor institutions in obtaining and utilizing broadband connectivity.

Restrictions on local governments and institutions ability to provide broadband hinder efforts to close the broadband availability gap. Congress should make it clear that if communities are unable to attract private investment, local governments would be allowed to fund and construct municipal broadband networks.

Finally, the unique connectivity challenges could be better addressed by a Congressionally-established Tribal Broadband Fund administered by NTIA for costs related to deploying broadband to Tribal areas. Congress should also amend the Communications Act to allow the FCC to determine when institutions receiving public funding may share network connectivity with community institutions designated by Tribal governments.

CHAPTER 9: ADOPTION AND UTILIZATION

Chapter nine examines barriers to broadband adoption and utilization and recommends policies to overcome these barriers. Currently, certain disadvantaged demographic groups fall well below average national adoption levels. To encourage greater adoption of broadband services, the chapter explores potential federal, state, and local government actions, focusing on collaborations that would help ensure sufficient resources for broadband initiatives. Various factors including cost, digital literacy, and relevance contribute to lower adoption levels. The following recommendations will help surmount these barriers.

9.2 Addressing Cost Barriers

The Plan identifies cost as the principal barrier to broadband adoption, and recommends the expansion and modification of Lifeline Assistance (“Lifeline”) and Link-Up America (“Link-Up”) low-income support programs, and the designation of a spectrum band that provides free or low-cost broadband services.

Lifeline and Link-Up: The FCC has successfully promoted the adoption of traditional local telephone service through low-income support programs, and by subsidizing monthly costs and providing discounts on one-time installation fees through Lifeline and Link-Up, respectively, telephone subscribership increased from 80.1 percent in 1984 to 89.7 percent in 2008. However, currently, no universal service support for broadband currently exists, and Lifeline discounts apply only to voice services. Therefore, the Lifeline rules should be expanded to allow discounts to apply to packages that bundle voice and broadband service and, ultimately, to any package with broadband service. Pilot studies should be conducted to determine ways to increase adoption levels among low-income communities, and the FCC should coordinate with state social services agencies and other low-income support programs to improve outreach efforts and expedite enrollment in the low-income support programs.

Free or low-cost wireless: Another option to reducing the affordability barrier is the designation of a spectrum band or bands for providers requiring providers to offer a free or very low-cost wireless broadband service tier. While this affordable-access spectrum could give low-income users access to twenty-first century infrastructure that might otherwise be beyond their means, free and ad-supported broadband has historically not performed well. Additionally, the value of the spectrum would be reduced by the regulatory encumbrances and the opportunity cost of deliberately not adopting flexible rules. Decisions about dedicating a particular band for a specific use should be made with special attention paid to whether a suitable band is available for this purpose, and be made at the same time that broadband Lifeline pilot programs are launched.

9.3 Addressing Digital Literacy Barriers to Broadband Adoption and Utilization

To ensure that citizens have the skills to utilize broadband in meaningful ways, the NTIA should create a National Digital Literacy Program with three objectives: establishing a Digital Literacy Corps (“DLC”), increasing the capacity of local institutions, and developing an Online Digital Literacy Portal (“ODLP”). Congress should allocate additional funds to NTIA for the creation of the DLC, which NTIA would jointly design and manage with the Corporation for National and Community Service (“CNCS”). The DLC would help non-adopters overcome any discomfort with technology and helping people become more comfortable with content and applications that are of immediate and individual relevance. The DLC would focus its educational efforts on demographic groups with lower broadband adoption rates and would accommodate communities that primarily speak foreign languages.

Because many low-income Americans gain access to Internet solely through public institutions such as libraries and local community centers, Congress should consider additional public funding to improve technology and facilitate broadband training at these locations. Based on guidelines developed by the Institute of Museum and Library Services (“IMLS”), these institutions should develop and annually review a set of guidelines for each location to help assess current and future needs. In addition, a minimum amount of funding should be set aside for institutions other than libraries, and the Office of Management and Budget (“OMB”) should create guidelines to assist federal agencies in adequately training personnel at public institutions.

With additional funding from Congress, the FTC, FCC, Department of Education, and NTIA should collaborate with community and educational institutions to create the ODLP with online lessons that educate users about broadband.

9.4 Addressing Relevance Barriers

Public-private partnerships and reliance on agencies and institutions with pre-existing relationships with non-adopting communities will help overcome relevance barriers. Broadband providers should collaborate with non-profit institutions to create a national campaign that increases outreach and awareness. By delivering targeted messages through trusted sources and non-profits with strong ties to underserved communities, these agencies can encourage adoption by helping individuals understand how broadband will benefit them and improve their lives.

To address the relevance barrier among older populations, the FCC should collaborate with the National Institute on Aging (“NIA”) to identify and de-

velop solutions for specific barriers that prevent broadband adoption among older Americans. Areas of focus should include health care applications, and the development of new social networking sites.

Finally, mobile broadband itself is an additional means to overcome the relevance barrier, and the federal government should examine mobile broadband use among populations with lower adoption levels to identify new opportunities.

9.5 Addressing Issues of Accessibility for Broadband Adoption and Utilization

To ensure equal and affordable access for Americans with disabilities, a Broadband Accessibility Working Group (“BAWG”) should be established to coordinate federal efforts to increase broadband adoption. The BAWG would prepare a biennial report on the status of broadband accessibility and examine federal government compliance with Section 508 of the Rehabilitation Act. The creation of an Accessibility and Innovation Forum would improve information sharing and discussion private industry, non-profit institutions, and all levels of government.

The current accessibility regulations should be modernized, including expanding and clarifying existing FCC and DOJ rules, as well as the initiation of new proceedings that encourage broadband adoption among individuals with disabilities.

9.6 Expanding Federal Support for Regional Broadband Capacity Building, Program Evaluation, and Sharing of Best Practices

The Plan makes additional recommendations to ensure that broadband initiatives have sufficient funding. For example, recognizing that the Broadband Data Improvement Act of 2008 (“BDIA”) enabled many states to develop successful broadband adoption programs, Congress should provide additional federal funding to encourage increased state participation and oversight of BDIA programs. To improve information sharing, a National Broadband Clearinghouse and National Broadband Data Warehouse should be created to collect consumer data and incorporate data from NTIA’s Broadband Technologies Opportunity Program.

Finally, the FCC should create a Tribal Broadband Task Force and an FCC Office of Tribal Affairs to facilitate government relations with Tribal communities. Congress should also fund the expansion of the Indian Telecommunications Initiatives workshops to improve broadband education and outreach, as well as improve the data collection process on Tribal land.

CHAPTER 10: HEALTH CARE

This section of the National Broadband Plan focuses on the important role that broadband can play in improving the health care of Americans through the use of health information technology (“IT”). Health IT can improve the treatment of patients, while simultaneously reducing health care costs.

Health IT will improve the collection, presentation and exchange of health care information and provide clinicians and consumers the tools to transform the delivery of care. Broadband can expand the use of electronic health records and allow doctors and patients to use video conferencing and remotely monitor patients. Congress and the U.S. Department of Health and Human Services (“HHS”) should restructure current federal government programs through an “e-care strategy” to create incentives to adopt health IT, including changing the current fee-for-service reimbursement mechanism to an outcomes-based reimbursement system.

Congress and the Centers for Medicare and Medicaid Service (“CMS”) should also reduce regulatory barriers that may inhibit health IT utilization, such as by lifting restrictions on e-prescribing, and the Federal Food and Drug Administration (“FDA”) should revamp current regulations regarding the use of communications and health care devices such as smart phones. Additionally, Congress should consider providing patients greater control over their health IT records, including readily transferrable records in a machine readable format.

Furthermore, applications and services in health IT require significant bandwidth, and doctors and hospitals will need to have access to affordable high-speed broadband. The current Internet Access Fund should be replaced with a Health Care Broadband Access fund that would subsidize broadband services for health care providers.

CHAPTER 11: EDUCATION

America is trailing the rest of the world in science, technology, engineering, and mathematics, and in the disparity in achievement among African American and Hispanic students. Greater access to broadband will help address these and other educational concerns by supporting and promoting online learning.

Digital educational content should be expanded by establishing standards for finding and sharing such content, as well as by licensing education material for digital use. The Plan also recommends that the Department of Education should also create a pool of digital resources for teachers.

The Plan calls for reducing disparities in educational opportunities throughout the United States by directing states to change accreditation requirements to allow students to take more classes online, including across state lines. With

improving digital literacy a key element in improving the future workforce of America, state agencies should consider adopting digital literacy curricula. The Department of Education encourages the adoption of standards for electronic educational records. By having more accurate records of student performance, the efficiency and success of the educational system could be better evaluated.

11.3 Modernize Educational Broadband Infrastructure

Pursuant to Congressional direction, the FCC adopted the schools and libraries universal support mechanism, commonly called E-Rate. The E-rate program has provided billions of dollars in its twelve years, and as a result, ninety-seven percent of public schools have access to the Internet. Despite these successes, however, it has become clear that the E-Rate program is not keeping up with the rapid growth of online learning tools. Several recommendations can make the program more flexible, efficient, and innovative, including the FCC's pending NPRM to allow off-hours community use of E-rate funded resources, and the identification of minimum broadband service levels for E-rate customers. Additionally, to stimulate innovation and make efficient use of scarce resources, the FCC should consider awarding some E-rate funds competitively to programs that have successfully integrated broadband into their educational mission.

CHAPTER 12: ENERGY AND THE ENVIRONMENT

12.1 Broadband and the Smart Grid

This section suggests that the Smart Grid the government is constructing will need improved communication networks and increased bandwidth to turn the current one-way power system into a two-way system where homes and buildings can have more control on how much power they draw from the grid. The current narrowband solution is inadequate to support the growing number of endpoints needed, and the amount of data moving across Smart Grid networks is expected to grow significantly in the future. The Plan recommends a three-fold solution: having existing mobile networks support Smart Grid applications, allow utilities to share the public safety mobile broadband network, and empower utilities to construct and operate their own broadband networks.

The FCC should explore the reliability of commercial broadband communications networks, particularly wireless networks, because a more reliable commercial network has benefits greater than just enabling the Smart Grid. States should reduce financial disincentives for utilities to use commercial service providers for Smart Grid communications. Commercial networks are al-

ready in existence and are the easiest current solution for Smart Grid use, but state public utility commissions do not offer any incentives for delivering energy more efficiently, giving utility providers little motivation to upgrade to broadband.

The North American Electric Reliability Corporation (“NERC”) should revise its security requirements to give more guidance to utilities regarding the use of commercial networks for Smart Grid communications. Congress should amend the Communications Act to allow utilities to use the proposed 700 MHz public safety network. NTIA and the FCC should consider allocating federal spectrum for Smart Grid networks. The Department of Energy (“DOE”) and the FCC should study the current and projected communications requirements of electric utilities.

12.2 Unleashing Innovation in Smart Homes and Buildings

Energy efficiency in homes and business can assist in meeting national energy goals, and broadband can play a major role by giving consumers access to smart meters, allowing them to take a more hands-on approach to managing their energy use. For instance, California’s power grid has enough spare capacity at night to power a fleet of ten million plug-in hybrids cars; those same ten million cars plugged in at the end of the work day would require ten gigawatts of additional capacity. Studies indicate that simply providing consumers better information about their energy use will reduce energy consumption, and broadband will assist in allowing them access to real-time consumption and price data. Ideally, consumers will be able to monitor and control their real-time home energy use from anywhere. Giving authorized third parties access to this data will help further innovation by allowing private companies to design devices to assist in monitoring energy use.

States should require utilities to provide consumers access to, and control of, real-time energy information over the Internet. If the states do not develop policies in eighteen months, then Congress should consider national legislation to do so. Ideally these services would be in place by the end of 2011.

The Federal Energy Regulatory Commission (“FERC”) should adopt accessibility and control standards as a model for the states.

The DOE should consider a utility company’s data accessibility policies when evaluating Smart Grid grant applications as well as report on and develop consumer data accessibility. The Rural Utilities Service (“RUS”) should prioritize giving out Smart Grid loans to rural electric cooperatives and should favor utilities and states with strong consumer data accessibility policies.

12.3 Sustainable Information and Communications Technology

The Information and Communication Technology industry uses approximately three percent of the nation's power output at any given moment, and accounts for two and a half percent of the nation's greenhouse gas emissions. This section advocates making communications networks and data centers more environmentally friendly by making them more efficient. The FCC should start a notice of inquiry to examine how to improve the energy efficiency and environmental impact of the communications industry. The federal government should lead by example and improve the energy efficiency of its data centers. Their goal should be earning an Energy Star designation for all eligible data centers.

12.4 Smart Transportation

Our transportation system is the nation's second largest consumer of energy, and a primary reason for the nation's reliance on fossil fuels. Incorporating broadband into the transportation infrastructure can create "smart transportation" systems which are safer, cleaner and more efficient. Adding communications technology to vehicles and infrastructure will help reduce the time spent on the roadways, cutting greenhouse gas emissions. This section also discusses using broadband to Plan public transit routes as an alternative to driving. By 2013, the DOT will revisit the concept of Dedicated Short Range Communications ("DSRC") systems, which could allow vehicles to communicate with one another and reduce accidents.

CHAPTER 13: ECONOMIC OPPORTUNITY

13.1 Supporting Entrepreneurship and America's Small Businesses

Broadband can help small businesses by increasing efficiency, improving market access, reducing costs and increasing the speed of transactions and interactions. However, many small businesses do not know how to best utilize broadband tools, and government support can help these businesses achieve optimum broadband use. Most notably, broadband allows for small businesses to achieve operational scale more quickly because it allows easier access to new markets and lower barriers to communications. Small businesses are not fully capitalizing on these opportunities, however, since training is often too expensive or unavailable for small businesses.

To promote broadband in small businesses, the Small Business Administration ("SBA") resource partner programs should provide information technol-

ogy application training that would teach small businesses the basics on how to capitalize on broadband in their business. Federal small and medium enterprise (“SME”) support programs should use broadband to give small businesses access to “virtual experts” who have the ability and aptitude to act as mentors to businesspeople who want help leveraging broadband in their own business.

The government should provide technology training for SMEs in low-income and rural areas where digital literacy and knowledge of the Internet is low. SBA and the Service Corps of Retired Executives (“SCORE”) should enter into partnerships with private communications firms to learn to address their constituents’ needs from a technology perspective. Congress should provide the Economic Development Administration (“EDA”) with additional funds for broadband training in their entrepreneurial development programs.

13.2 Job Training and Workforce Development

Broadband can help train large numbers of low-income, low-skilled Americans to assist them in finding jobs. The resources of the Department of Labor’s (“DOL”) One-Stop Career Centers should be available online, providing low-income Americans with information they may not have otherwise had access to.

The DOL should create an online platform that delivers employment assistance programs and individualized job training to disadvantaged Americans. Version 1.0 of the online program would provide many of the same programs that One Stops currently deliver. Version 2.0 would provide basic skills training, digital literacy training, and ESL courses. Version 3.0 would serve as a long-term career planning and job training tool. The DOL would provide extra funding to private sector firms that aid in building these platforms.

13.3 Promoting Telework

Increasing broadband access and adoption would boost telework numbers and give opportunities to millions of Americans who currently are unable to work. In addition, telework can help the environment by reducing pollution caused by commuting.

To unlock the full potential of telework, Congress should eliminate tax and regulatory barriers to telework, as many teleworkers who live in a different state than their office is located are currently subject to taxation by both states. The federal government should take measures to promote telework, such as like developing guidelines for managers of teleworkers, and the deployment of a unified communications platform that would include instant messaging and web conferencing.

13.4 Local and Regional Development

Broadband infrastructure in communities is key to attracting and fostering new businesses, and thus broadband should be incorporated into local economic development strategies. Therefore, the federal government should work with economic development programs to set regional and community broadband benchmarks. Further, the Department of Commerce and the USDA should oversee integration of broadband into local economic development. The Department of Housing and Urban Development should also incorporate technology assessments into their Empowerment Zone, Enterprise Community, and Renewal Community programs, which aim to revitalize impoverished urban and rural communities.

The Economic Development Administration should create an online information center that allows regional development managers up-to-date access to key economic development indicators at the federal, local and Tribal level. The information center would continuously update its database, offer a searchable database of federal programs usable by local developers, and would provide a map of all previous and current grantees.

NSF should use its technology transfer grants to encourage local technological innovation and development. NSF should also encourage collaboration among smaller colleges and universities to pool their resources both to apply for these grants and to have a larger pool of resources to draw upon to address innovation challenges.

CHAPTER 14: GOVERNMENT PERFORMANCE

14.1 Improving Connectivity Through Government Action

Federal government broadband connections can be leveraged to improve service in local communities in several ways. The federal government should use its existing broadband infrastructure to expand service to nearby unserved and underserved local communities. The “spillover benefits” would allow these communities to enjoy benefits they could normally not afford.

The federal government already purchases telecommunications services in bulk at a rate ten to forty percent below the market price. The federal government should encourage and allow state and local governments to take advantage of similar prices.

The federal government should not require broadband connectivity clauses in federal grant contracts unless absolutely necessary, to avoid redundancy.

Finally, the federal government should provide funding for local initiatives and pilot programs that use broadband to research critical public policy issues.

Recipients would be subject to strict reporting requirements to inform the government of how to design similar programs in the future.

14.2 Improving Government Performance

More efficient use of broadband by the federal government would provide higher-quality service for Americans as well as save billions of taxpayer dollars. Additionally, cybersecurity presents a great threat to the United States. A cyber attack could have dire effects on several important private industries including the financial sector. The Plan makes several recommendations for federal agencies to improve their Web site operation and establishing better security protocols.

The OMB should establish a plan for agencies to use cloud computing. Several agencies have already consolidated their systems for cloud computing, saving the government more than one billion dollars over the next ten years.

The federal government should create initiatives encouraging employees to submit ideas on how to use broadband to improve government services. The recently launched Securing Americans Value and Efficiency award generated more than 38,000 suggestions from government workers on how to eliminate waste.

Grants.gov, currently a portal for federal agency grant applications, recently received an average satisfaction score of 56/100 from users. The Plan makes several suggestions to improve the Web site including providing users the ability to tab grants, making searches easier.

The federal government should encourage more agencies to take advantage of social media platforms. Some federal agencies have already started to use platforms for innovative use. For example, the Transportation Security Administration created a platform called IdeaFactory that allows employees to share ideas for improving the workforce.

Cybersecurity is one of the biggest threats the United States currently faces. The federal should create machine-readable repositories that will detect real-time threats. The government should also create partnerships with foreign countries, ISPs, and other private entities to help secure government networks and better detect these threats.

The federal government should create a Web site for people to access personal information the government currently holds on citizens. The website would allow citizens to verify their personal information and make any necessary corrections.

The Plan makes several recommendations for improving the carriage of government services on the Internet. The OMB and the Federal CIO Council need to create a single protocol for transmitting services, such as passport and

loan applications. Additionally, studies show that many government websites are well behind private sector websites in usability and design. The Federal Web Managers Council can assist in this process by establish web standards and creating a platform for agencies to share best practices. Congress should update the Privacy Act to account for these new services and changes in technology. Additionally, the White House Office of Science and Technology should create a long-term plan for how agencies can continue to improve these services.

Congress should update the Paperwork Reduction Act to allow agencies to obtain user-generated input without having to conduct a survey-approval process that could take several months.

CHAPTER 15: CIVIC ENGAGEMENT

Broadband can provide the American public with a medium through which they may remain engaged in a national discussion that will permit our democracy to continue to thrive. Traditional media sources are facing significant obstacles, and the Internet will continue to provide more and more Americans with their news and information. Providing broadband access to more citizens will strengthen our national ties and uphold the founders' principle: that a functioning democracy requires informed and invested citizens.

15.1 Create an Open and Transparent Government

The Plan seeks to make all U.S. laws available and free online, including federal court decisions, executive orders and memoranda, and Congressional votes and legislation. Further, all government meetings should be streamed online, allowing individuals to watch live or review older meetings at their convenience. Americans should be allowed to track legislation electronically and be permitted to comment on the laws in a public forum as they see fit.

All responses to Freedom of Information Act ("FOIA") requests should be made available online, so that the public could first refer to agency websites to obtain information they are seeking, and to assist the agencies in preventing numerous duplicates requests of information. This would lend efficiency to the FOIA process, and also get more data into the public domain.

Finally, the Data Quality Act should be revised in order to make the dissemination and release of data to the public more consistent and efficient. The purpose of the Act is to ensure accurate and legitimate information reaches the public at large, but in its current state, often inhibits the sharing of data by requiring redundant recertification.

15.2 Building a Robust Digital Media Ecosystem

Undoubtedly, the significant change in the manner in which many individuals receive their news and information raises a number of questions. Many of these questions will be addressed by the FCC's project on the Future of Media and Information Needs of Communities in a Digital Era ("Future of Media"). Essentially, the Future of Media project will attempt to determine what is required to ensure that all citizens have a broad and diverse array of sources from which to receive their news and information, realizing that while the medium through which people receive their information may change, essential choices among information sources must remain.

Congress should seek to support public media through increased funding for broadband-based distribution and content and should also seek to amend the Copyright Act to allow public media to create and distribute high quality programming. The federal government should also establish a national video archive—Video.gov—that would pull together public interest video from a number of sources, including public broadcasting, to make important social and historical footage and programming available.

15.3 Expanding Civic Engagement Through Social Media

All federal agencies need to follow the lead of the Centers for Disease Control and Prevention and the Transportation Security Administration's lead in using social media to reach the public. With a large and growing percentage of Americans already using social media, the government has an opportunity to engage and update the public in a way never before possible.

15.4 Increasing Innovation in Government

The White House Office of Science and Technology Policy should create an Open Platforms Initiative that calls upon the expertise of private citizens to help the government resolve technology-based problems. The increased leveraging of interested citizens' technological expertise would prove highly valuable to the government and also serve as another avenue of engagement between the government and citizens. Further, government agencies should create more opportunities for individuals to lend their services to the government through a variety of volunteer programs geared toward maximizing the government's platforms and applications.

15.5 Modernizing the Democratic Process

The election process has yet to catch up to the digital age. Lawmakers at all

levels must push for modernization of elections through electronic voter registration and portability standards that allow for voter records to be easily updated or transferred when a voter moves, changes party, or gets married. The Department of Defense should implement a program that allows military personnel overseas to vote online.

CHAPTER 16: PUBLIC SAFETY

The expansion of broadband throughout the country will enable significant advances in communication among law enforcement and first responders. Too often in the past, the inability for agencies to communicate has exacerbated the challenges faced during large-scale emergencies. New ways for individuals to alert authorities and for those authorities to communicate with each other are key to a next generation public safety system.

16.1 Promoting Public Safety Wireless Broadband Communications

The Plan suggests a “three-pronged” approach to the development, deployment, and successful adoption of an interoperable broadband network. First, an administrative system should be created to ensure that the relevant agencies are receiving the appropriate amount of spectrum to carry out the needed public safety responsibilities. This administrative system should also be flexible in working with commercial entities to maximize the efficiency and reliability of the network. Second, an Emergency Response Interoperability Center (“ERIC”) should be created to oversee the use of the network and ensure that public safety agencies are able to communicate with one another when emergencies arise. ERIC will be tasked with maintaining the network and monitoring its use so that challenges can be addressed as they arise. Finally, a federal grant program should be created to help fund local costs in establishing and maintaining a public safety broadband network.

16.2 Promoting Cybersecurity and Protecting Critical Infrastructure

Cybersecurity has become an increasing concern, and the FCC has been tasked with a number of duties to help protect our country from cyber-attacks. First, the FCC should create a “cybersecurity roadmap” that details the most critical threats to our cybersecurity and the manner in which the FCC plans to address the threats. Additionally, the FCC should create heightened requirements for reporting broadband outages, initiate a voluntary cybersecurity certification program to allow the public to better educate themselves on threats, and, along with the DHS, create a cybersecurity reporting system that would

report critical information during major cybersecurity events.

The FCC should also make efforts to study and enhance the resilience of broadband networks and to test preparedness for response to major outages or attacks. Along with the National Communications System, the FCC should create priority access for public safety broadband users. Finally, the FCC should establish standards for public safety broadband networks to adhere to, ensuring they will provide the reliability and responsiveness required of them during times of emergency.

16.3 Leveraging Broadband Technologies to Enhance Emergency Communications with the Public

A major evolution in emergency communications has arrived with the transition to Next Generation 911 (“NG911”). This program will retain the core components of the current 911 system, but will add new capabilities and new formats, including, texts, photos, video, and e-mail. The advent of NG911 will permit faster, more accurate transmission of information to responders, while also removing language barriers and enhancing the ability of the first responders to evaluate the emergency.

The Plan calls for the National Highway Traffic Safety Administration to prepare a report on the cost of establishing a nationwide NG911 system and request that Congress allocate funds for its creation. Because of the technological advances that have brought NG911 into existence, Congress should create a federal framework for regulating NG911. The 911 programs in place in many states do not account for recent advances in technology and as a result could hamper implementation of NG911.

The FCC should also conduct an investigation into a next-generation alerting systems in hopes of eventually establishing a “multi-platform, redundant” alerting system. The purpose would be to create a system that reaches the widest range of individuals possible and would not limit the alerts to those using a particular technology during the emergency.

CHAPTER 17: IMPLEMENTATION AND BENCHMARKS

The National Broadband Plan does not represent a final plan. It will be a constantly evolving document designed to address new concerns and challenges as they arise. This version of the plan serves as a baseline and starting point to connect all Americans to broadband.

17.1 Implementation

The executive branch is charged with creating a Broadband Strategy Council to oversee the implementation of the Plan and to assure that federal agencies have adequate support and direction in putting the plan into action. The FCC is responsible for approximately half of the implementation of the plan, and as a result should publish a timetable for implementation of the plan. Furthermore, as the implementation and plan progresses, the FCC should evaluate the effectiveness of the implementation and of the Plan itself. The Plan will evolve over time, and the FCC may need to alter the timetable or adjust requirements to sufficiently comply with the purpose of the Plan. The FCC should also create a Broadband Data Repository so that the public is able to monitor the progress of the plan and review the policies that are behind the implementation strategy.

17.2 Benchmarking

Measuring the effects of the plans' recommendations over time is a critical challenge, and critical to the success of the plan. The FCC will be responsible for publishing a Broadband Performance Dashboard designed to track Plan goals. The dashboard should provide the public with an easy to read snapshot of the Plan goals and the progress made towards achieving them.

17.3 The Legal Framework for the FCC's Implementation of the Plan

As a strategic vision establishing national goals and recommending policies to achieve those goals, the Plan is not intended to reach conclusions about the legal authority required to implement these policies. These issues will be fully explored in notice and comment proceedings following the plan, but a brief summary of the overall question and the leading proposed solutions will help frame the later proceedings.

After historically treating broadband access as a common carrier service regulated under Title II, the FCC adopted a series of orders reclassifying broadband, including cable, DSL, broadband over power lines, and wireless, as an "information service" regulated under Title I. Unlike Title II, Title I does not establish specific rules for providers. This lack of specific rules could limit the FCC's authority to carry out many provisions of the Plan. One option would be for Congress to direct or enable the FCC to implement the recommendations in the Plan. Absent congressional action, however, the FCC must proceed using the authority it presently has.

Under option one, the FCC could rely on the "ancillary authority" granted to it in Title I of the Communications Act. Because the FCC has explicit authority over many areas closely related to the recommendation of the Plan, such as

spectrum, cable television, and universal service, many commentators believe that ancillary authority sufficiently expands the FCC's reach to advance broadband deployment and adoption.

Under option two, the FCC could classify broadband services as telecommunication services, placing it firmly within Title II authority. Some commentators believe this approach would provide a sounder legal basis to carry out the recommendations in the Plan. Additionally, reclassification would not require application of all the Title II requirements to broadband, because the FCC could use its forbearance authority to tailor the applicable requirements to best support the policy goals in the Plan. Nonetheless, there remains significant concern that the Title II common carrier framework would place too many regulations in the dynamic marketplace of broadband services. The FCC will consider both recommendations as it moves forward with the Plan.

17.4 Conclusion

While broadband is not a guarantee of economic success, social equality, or good governance, it is a critical prerequisite to the solutions to these and many other problems facing America. Broadband, like electricity before it, has gone from a luxury to a modern necessity of life. This Plan is intended to transition from lofty goals chatter to the difficult, but achievable reality of implementation.

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