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June 9, 2009

VIA ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: **In the Matter of International Comparison and Survey Requirements in the Broadband Data Improvement Act, GN Docket No. 09-47;**
Ex Parte Communication

Dear Ms. Dortch:

Attached for inclusion in the above-captioned proceeding are the comments Comcast Corporation ("Comcast") filed on June 8, 2009 in response to the Commission's Notice of Inquiry for developing a National Broadband Plan, GN Docket No. 09-51. Of particular relevance to the above-captioned proceeding is the appendix attached to the comments, which provides an analysis of international rankings and reports and provides insights into how the Commission can best utilize those rankings and reports in developing the National Broadband Plan.

Sincerely,

/s/ David M. Don
David M. Don
Senior Director, Public Policy
Comcast Corporation

BEFORE THE

Federal Communications Commission

WASHINGTON, D.C.

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In the Matter of	)	
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
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COMMENTS OF COMCAST CORPORATION

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June 8, 2009

EXECUTIVE SUMMARY

The Internet has become a central feature in the lives of hundreds of millions of Americans. It is a hub for information, entertainment, commerce, politics, learning, social and cultural development, and so much more. When Congress passed, and the President signed, the Telecommunications Act of 1996, declaring their faith in competition and their desire to keep the Internet unregulated, they paved the way for an unprecedented private-sector infrastructure boom. The 1996 Telecom Act foresaw that the Internet represented "an extraordinary advance in the availability of educational and informational resources to our citizens" that would "offer users a great degree of control over the information they receive"; provide "a forum for a true diversity of political discourse, unique opportunities for cultural development, and myriad avenues for intellectual activity"; and deliver "a variety of political, educational, cultural, and entertainment services." That vision is a reality for the more than 70 million American households that have broadband Internet service today – and it is being delivered on competitive broadband networks. But not every American is using broadband Internet service, so tens of millions are still not enjoying the benefits that service has to offer.

In the American Recovery and Reinvestment Act of 2009 (the "Recovery Act"), Congress appropriated hundreds of billions of dollars to stimulate our nation's flagging economy to create new jobs and preserve existing ones. As a part of that effort, Congress dedicated $7 billion to advance efforts to make sure that all Americans have access to, and to stimulate adoption of, broadband Internet service. In addition, the Commission was assigned an important mission: to submit to Congress "a report containing a national broadband plan" (the "National Broadband Plan" or the "Plan"). In order to be successful, that Plan should have one paramount goal: making the United States the most connected nation in the world. This is an important undertaking, and one that will require successful collaboration among federal, state, and local government agencies; numerous and diverse private sector companies; and the full gamut of community, educational, cultural, and advocacy organizations.

To determine where we need to go on broadband, and how we should get there, it is essential that we first understand where we are, and how we got here. The pro-competitive, deregulatory policy framework established in 1996 – and the regulatory restraint exercised by Democratic- and Republican-led Commissions – induced cable companies to introduce and widely deploy high-speed cable Internet, a service that has succeeded beyond anyone's predictions. That service is now available to over 92 percent of American households and subscribed to by over 39 million of those households. The launch of cable Internet service provided the competitive spur that led telephone companies to offer digital subscriber line ("DSL") service and other high-speed Internet alternatives, which are now available to over 80 percent of American households and subscribed to by more than 30 million households. Americans have embraced broadband Internet service more quickly than they did personal computers, CD players, electricity, or telephones, or practically any other communications technology introduced in the past 150 years.

The success of cable and telco broadband Internet alternatives encouraged expanded investment in wireless broadband, now offered by multiple competing providers across great swaths of America, with coverage areas and provisioned speeds growing rapidly. And the widespread availability of broadband Internet services has made possible, and has benefited from, the growth of broadband content, applications, and services – YouTube, Hulu, Facebook, Wikipedia,

WebMD, HealthCentral, Monster, Expedia, iTunes, Yahoo!, Blogger, Skype, Amazon, Google, eBay, evite, eHarmony, Craigslist, Flickr, Hotmail, LinkedIn, OpenTable, Twitter, My Space, Thumbcast, Snapfish, Ask.com, Peapod, Yammer, Huffington Post, Drudge Report, Jaiku, University of Phoenix online, and thousands upon thousands of others. The relationship between providers of broadband Internet services and the creators of Internet content, applications, and services that benefit from those services is profoundly symbiotic. They are part of the most complex and rapidly evolving economic, social, educational, cultural, and political ecosystem in human history.

But this ecosystem can be greater still. It is a fundamental tenet of networks that the more people that connect to the network, the more valuable it becomes. But, broadband Internet service is not yet accessible to millions of Americans – and *tens of millions* of Americans who do have access to broadband Internet services choose not to use them, either because they do not yet see the utility, do not have the requisite equipment or skills, lack the discretionary income, or for other reasons. The challenge now is to assess this complex ecosystem, in all its dimensions, and then to devise a Plan that encourages continued investment and growth and focuses on real and realistic measures that are consistent with the two key goals: access and adoption.

If the United States is truly to become the connected nation that the President, Congress, the Commission, and others envision, and if all Americans are going to benefit from the Internet's ability to deliver economic, social, educational, cultural, and political enrichment, we must overcome the remaining hurdles to deployment and adoption of broadband Internet services.

The priorities for the National Broadband Plan should be clear: ensuring that broadband Internet services are available everywhere and, more importantly, achieving widespread adoption of broadband Internet service by breaking down barriers to affordability and use.

To accomplish these priorities, the Commission must first identify those areas where broadband Internet service is not available. The Plan should recommend a strategy for assisting, in an efficient and cost-effective manner, the deployment of networks providing access to broadband Internet service to (1) schools, libraries, hospitals, and other public facilities, and (2) homes and businesses in the remaining geographic areas of the country where private sector entry has not been economically feasible.

Second, the Plan should recommend a strategy for promoting use of broadband Internet service by addressing barriers to adoption, including government policies that have failed to encourage all Americans to use broadband services. The adoption challenge is four times as large as the access challenge, and deserves commensurate attention.

To ensure that broadband is deployed to all Americans, the Plan should adopt benchmarks for ubiquitous deployment of a basic level of broadband Internet service by 2011, with more advanced broadband Internet services being deployed to all Americans by 2016. To meet those benchmarks, the Plan should consider a number of policy strategies, ranging from incentives for investment, to removal of barriers to deployment, to direct government investment (potentially in deployment of broadband to schools, libraries, hospitals, and public safety facilities, and as a last resort in remote geographies). To measure success toward these two goals, the Commission should adopt metrics that are meaningful to the United States. It should recognize the shortcomings of international rankings and reports and should be cautious in relying on them.

To ensure that broadband is adopted by as many Americans as possible, the Plan should recommend that Congress and the Administration direct federal departments and agencies to digitize services and incorporate broadband policies into the programs they implement. Every department and agency should be required to determine how its programs can become more valuable and relevant to consumers through the use of broadband Internet service. Promoting digital literacy and better education about the value of broadband will contribute further to adoption. And to the extent that the lowest-income households face the barrier of affordability, the Plan should recommend that Congress provide an efficiently targeted subsidy to those households.

But with all of this, the Commission must remain focused on the task at hand; Congress did not charge the agency to develop a new Internet regulatory regime. Nor did it repeal the policy established in the 1996 Telecom Act "to promote the continued development of the Internet and . . . to preserve the vibrant and competitive free market that presently exists for the Internet . . ., unfettered by Federal or State regulation." Congress expressly recognized in the Recovery Act that the private sector will continue to play a central role in ensuring widespread broadband Internet deployment and adoption and, consistent with the 1996 Telecom Act, that the Plan should consider how to advance continued private sector investment in broadband. Accordingly, the Commission should eschew radical proposals that may, in the end, cause more harm than good, or create the kind of regulatory uncertainty that could thwart future investment in an already skittish investment climate.

Comcast shares the nation's excitement about the transformative potential of broadband Internet service. We are privileged to have done as much as any company to deliver high-speed Internet to America: we have built advanced broadband networks that make broadband Internet services available to 99.4 percent of the homes that we pass; we have doubled, and redoubled, and are doubling again the speeds we offer; we are deploying next-generation broadband Internet services with faster speeds throughout our footprint; and we have attracted over 15 million customers in a hotly contested marketplace.

Comcast wants to work with the Commission and all stakeholders to shape a wise, efficient, and investment-friendly Plan that ensures that all Americans have access to high-speed Internet services and achieves the maximum utilization feasible by the American public.

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BEFORE THE

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WASHINGTON, D.C.

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A National Broadband Plan for Our Future	)	GN Docket No. 09-51
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COMMENTS OF COMCAST CORPORATION

Comcast Corporation ("Comcast") hereby responds to the Commission's Notice of Inquiry ("*Notice*") in the above-captioned proceeding.[1]

I. INTRODUCTION

Every day, tens of millions of Americans use high-speed Internet services delivered on broadband networks at home, at school, in the office, in the library, at the hospital, at the airport, on the train, at the coffee shop, and at many other locations, public and private. They use broadband Internet service to reach people and access information and entertainment from every corner of the world. They communicate using email, instant messaging, Internet voice and video services, tweets, blogs, social media, and other tools. They retrieve news from around the corner and around the globe. They research goods and services, shop for them, order them, pay for them, and share their ratings and opinions of them with others. They entertain themselves (and one another) with words, music, games, pictures, and video.

Doctors can diagnose, prescribe, and research the latest medical techniques from anywhere. Patients can learn more about their symptoms and about the doctors who might treat

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[1] *See In re a National Broadband Plan for Our Future*, Notice of Inquiry, GN Docket No. 09-51, FCC 09-31 (Apr. 8, 2009) ("*Notice*").

them. Students can research, study, and learn from their homes, the public library, or the local cafe. Telecommuters can write legal briefs, trade stocks, process claims, make airline reservations, videoconference with their colleagues, share and collaborate on documents in real time, and do just about anything else they could do in an office.

Americans can do all of these things, and so much more – and take it all for granted – because of the hundreds of billions of dollars that cable companies, phone companies, wireless companies, satellite companies, and other providers have invested in building networks that provide high-speed Internet service (or "broadband Internet service," two phrases we will use interchangeably) along with, in most cases, a variety of other services such as video and voice. Since the mid-1990s, the deployment of broadband networks and the widespread introduction of high-speed Internet services over those networks have directly and indirectly created millions of jobs and have been an integral part of this nation's economic growth and development. The cable industry alone has invested $145 billion in broadband networks in that timeframe. Information and Communications Technology ("ICT") industries such as cable, telecommunications, computer system design, tech manufacturing, applications development, publishing and software, and others, have seen 15 years of enormous investment and growth – investment that has continued even as other parts of the American economy have faltered.

By most accounts, the Internet ecosystem is thriving. Nationally, over 90 percent of American homes have access to broadband Internet service – i.e., a physical connection to broadband Internet service is readily available – and over 60 percent of homes subscribe to a broadband Internet service. Over 99.4 percent of the homes passed by Comcast's cable systems have access to Comcast High-Speed Internet ("HSI"), and over 15 million (30 percent) of those

homes have signed up. At the same time, millions of other homes have connected through companies that compete head-to-head with Comcast in providing high-speed Internet services.

The widespread availability of Comcast HSI and other broadband Internet services has made it possible for all manner of innovative Internet-based services and applications to emerge, develop, and thrive. Countless entrepreneurs and companies have created content, applications, and services that exploit the features and potential of broadband Internet service. The deployment of broadband Internet service has generated trillions of dollars in economic growth. In 2008 alone, E-commerce sales in the United States totaled $133.6 billion.[2] Internet service providers have enjoyed a symbiotic relationship with those who have created broadband Internet content, applications, and services. It is the massive investments in the deployment and continuing upgrades of broadband facilities and Internet services that have made it possible for entrepreneurs to create viable businesses that capitalize on the availability and pervasiveness of those facilities and services; in turn, innovation and growth in Internet content, applications, and services helps to drive broadband Internet subscribership growth.

Private investment in broadband networks continues. In 2008, wireline and wireless broadband network operators invested over $60 billion in capital on innovative technologies to expand their reach, capacity, and speeds. And those capital expenditures and network innovations must continue, as consumers' appetite for innovative applications and services fuels demand for more bandwidth and even faster speeds. Last year, cable operators began deploying Data Over Cable Service Interface Specification ("DOCSIS") 3.0 technology, a dramatic innovation that makes possible what Comcast calls "wideband" Internet services – at speeds of

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[2] *See* Press Release, U.S. Census Bureau, *Quarterly Retail E-Commerce Sales 4th Quarter 2008* (Feb. 17, 2009), *available at* http://www.census.gov/mrts/www/data/html/08Q4.html.

50 Mbps, 100 Mbps, and more.[3] Telephone companies continued to expand their fiber-to-the-home and fiber-to-the-node investments to compete with cable, and wireless companies increased their investment in spectrum and technology to provide faster speeds – and greater mobility, a feature that their wireline competitors do not offer.

The success of broadband Internet service in the United States follows government policies that focused on removing barriers to investment in competitive broadband facilities. But the job is not done. A small percentage of American households have no physical access to broadband Internet service. And, about a third of those households that do have access have chosen not to subscribe.

If the United States is truly to become the connected nation that the President, Congress, the Commission, and others envision, and if all Americans are going to benefit from the ability of broadband to deliver economic, social, educational, cultural, and political enrichment, we must overcome these remaining hurdles to success.

With the Recovery Act, Congress and President Obama appropriated over $700 billion to stimulate the struggling economy to create new jobs and preserve existing ones. In addition, they used the Recovery Act as an opportunity to target some important policy goals, including the ubiquitous deployment and widespread adoption of broadband Internet service. To that end, Congress appropriated the relatively small sum of $7.2 billion to help facilitate broadband data collection, deployment, and adoption, and directed the Commission to submit to Congress "a report containing a national broadband plan" (the "National Broadband Plan" or the "Plan").

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[3] All Comcast speeds referred to herein are "provisioned speeds," as discussed below, *see infra* Section II.A.1.a.

The Plan should have one paramount goal: making the United States the most connected nation in the world. And to achieve that goal, the Plan should have two key strategies. *First*, the Plan should recommend a strategy for facilitating, in an efficient and cost-effective manner, the deployment and maintenance of broadband networks capable of providing access to broadband Internet service to homes and businesses in the remaining geographic areas of the country where private sector entry has not been economically feasible and to schools, libraries, hospitals, and other public facilities. *Second*, the Plan should recommend a strategy for effectively promoting consumer adoption of high-speed Internet service by addressing barriers to adoption – including lack of access to computers, digital illiteracy, perceived lack of value, and (where relevant) the affordability of high-speed Internet services – and dismantling other barriers, including government policies that have failed to encourage, and in some ways have deterred, the adoption of broadband Internet services by all Americans. Because almost four times as many American households have access but do not subscribe than have no access at all, a Plan for stimulating adoption will have the greatest impact in making the United States the most connected nation in the world.

In addition, given the charge in the Recovery Act to work across agency and departmental lines, we urge the Commission to play an important convening role during the next nine months. Specifically, the Commission should hold hearings with independent experts in engineering, economics, and human dynamics; solicit direct involvement by those in health care, education, energy, and other fields, and engage them in a discussion of the role of broadband networks in achieving important national objectives in those fields; and coordinate with the federal Chief Technology Officer, the federal Chief Information Officer, as well as the National Telecommunications & Information Administration ("NTIA"), the Department of Agriculture,

the Federal Trade Commission, and other federal departments and agencies to align the federal government's strategy toward the goal of the Plan.

These comments address many of the questions asked in the *Notice*, but two questions remain at the forefront of our analysis: (1) which government policies and processes have worked, and (2) which government policies and processes must be improved so we can achieve the goals of the Plan.

II. CONGRESS SET FORTH TWO CLEAR PRIORITIES FOR THE NATIONAL BROADBAND PLAN – ACCESS AND ADOPTION – WITH THE GOAL OF MAKING THE UNITED STATES THE MOST CONNECTED NATION IN THE WORLD.

In the Recovery Act, Congress set forth clear priorities for the National Broadband Plan: "to ensure that all people of the United States have access to broadband capability" and to achieve widespread adoption by promoting "affordability of [broadband Internet] service and maximum utilization of broadband infrastructure and service by the public" in ways that advance consumer welfare, civic participation, and other important policy goals.[4] To accomplish these priorities, the Commission must think clearly and creatively about its proposed strategies, retaining the approaches that have succeeded in encouraging investment and job growth, and avoiding distractions from the priorities at hand. More importantly, the Commission should take a holistic approach, one that recognizes that it will take a collaborative effort on the part of Congress, the Administration, the Commission and other federal agencies, and state and local governments, all working hand-in-hand with the private sector, to achieve ubiquitous broadband Internet service deployment and widespread adoption.

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[4] American Recovery & Reinvestment Act of 2009, Pub. L. No. 111-5, § 6001(k)(2), 123 Stat. 115, 516 ("Recovery Act"); *Notice* ¶ 13.

The *Notice* opens by asking about the best approach for the Commission to take, and how it should define its goals and benchmark the success of the Plan. We first address those questions.

A. The Commission Should Focus on the Purposes of the Plan as Set Forth in the Recovery Act.

The *Notice* poses hundreds of questions on a broad array of issues related to broadband Internet services. While many of these issues are important, they should not become a distraction from the priorities stated by Congress.[5] If broadband Internet services are not available, they cannot be adopted; and if there are barriers to adoption, broadband Internet services cannot be utilized in ways that advance Congress's goals. Therefore, as Congress directed, access and adoption should be the priorities of the National Broadband Plan.

1. The Commission Should Take a Flexible and Evolving Approach To Defining Access to Broadband Internet Services.

In recognizing that the Recovery Act set forth the goal of ensuring that all Americans have access to "broadband capability," the *Notice* asks: "How should broadband capability be defined going forward, and what does it mean to have access to it?"[6] A number of states have addressed these questions and have generally defined "broadband" in terms of the speed of Internet access services needed to allow consumers to make use of the Internet content, applications, and services that they demand.[7] And "access" is generally defined in terms of

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[5] Moreover, many of these issues should be addressed through interagency cooperation, as described below.

[6] *Notice* ¶ 13.

[7] *See, e.g.*, Cal. Broadband Task Force, *The State of Connectivity: Building Innovation Through Broadband* 12, 50 (Jan. 2008) ("*California Broadband Report*"), *available at* http://www.calink.ca.gov/pdf/CBTF_FINAL_Report.pdf; Dept. of Res. & Econ. Dev. & Telecomm. Advisory Bd., State of N.H., *State of New Hampshire Broadband Action Plan* 10 (June 30, 2008) ("*New Hampshire Broadband Plan*"), *available at* http://www.nheconomy.com/uploads/Final-Report-082808.pdf; Ohio Broadband Council, *Policy Subcommittee Recommendation: Broadband Defined* (Sept. 16, 2008) ("*Ohio Broadband Plan*"), *available*

(footnote continued…)

whether broadband Internet service is available in a geographic area.[8] The National Broadband Plan should adopt a similar approach.

The *Notice* and the Recovery Act tend to use the term "broadband" imprecisely; at various points, the *Notice* refers to broadband capabilities,[9] broadband infrastructure,[10] broadband networks,[11] broadband Internet services,[12] and, sometimes, simply broadband.[13] It is important that the Plan be clear and consistent in its definition and use of these terms. As the *Notice* recognizes, *broadband networks* often serve as a platform for the delivery of a multiplicity of services, including *broadband Internet services*.[14] Both Congress and the President have recognized the importance of connecting Americans to the *Internet*, and that should be the focus of the Plan.

(…footnote continued)

at http://www.ohiobroadbandcouncil.org/council/docs/Define_Broadband.pdf; Or. Telecomm. Coordinating Council, *Oregon Broadband Policy Recommendations* 7-8 (Nov. 26, 2008) ("*Oregon Broadband Plan*"), *available at* http://www.ortcc.org/PDF/ORTCCOregonBroadbandPolicyRecommendations.pdf; Tenn. Broadband Task Force, *Tennessee Broadband Task Force Report & Recommendations* 10 (Jan. 10, 2007) ("*Tennessee Broadband Report*"), *available at* http://www.tennessee.gov/tra/bbtaskforce/Tenn.%20Broadband%20Task%20Force%20Report%20and%20Recommendations.pdf; *cf.* Comm'rs Robert M. Clayton III & Steve Gaw, Mo. PSC, *Commissioners' Report on Missouri Broadband Availability* 9-10 (Sept. 18, 2007) ("*Missouri Broadband Report*") (defining broadband to mean "a service that offers transmission speeds in excess of 200 kilobits per second in *both* directions" but stating that "minimum transmission speeds" should be reevaluated "in light of increasing requirements of new technologies and applications") (emphasis in original), *available at* http://www.psc.mo.gov/the-commissioners/robert-m-clayton-iii-documents/FINAL%20Broadband%20Report%20Sept%2018%20350pm.pdf.

[8] *See California Broadband Report* at 21; *Missouri Broadband Report* at 9 ("Access to high quality, high speed Internet service is absolutely necessary for a 21st Century Missouri economy and an important criterion for a high standard of living and high quality of life for our citizens."); N.Y. State Council for Universal Broadband, *New York State Universal Broadband Annual Report 2008*, at 2 (May 5, 2009) ("*New York 2008 Broadband Report*"), *available at* http://www.oft.state.ny.us/assets/documents/2008AnnualBroadbandReportFINAL.pdf.

[9] *See, e.g.*, *Notice* ¶ 23.

[10] *See, e.g.*, *id.* ¶ 86 (citing Recovery Act § 6001(k)(2)(D)).

[11] *See, e.g.*, *id.* ¶¶ 28, 55, 73.

[12] *See, e.g.*, *id.* ¶¶ 47, 59, 60, 65, 80.

[13] *See, e.g.*, *id.* ¶ 38 ("Should the [Plan] seek to bring broadband to 100 percent of the country?").

[14] *Id.* ¶ 16 (noting that "future broadband platforms will increasingly support 'high-speed Internet' as one of several offered services including voice, video, private data applications, and the like").

The Internet is the most vibrant marketplace of goods, ideas, content, applications, and services that the world has ever known. As early as the Telecommunications Act of 1996 (the "1996 Telecom Act"), Congress recognized how valuable a tool the Internet could be to many sectors of our society:

- "The rapidly developing array of Internet and other interactive computer services available to individual Americans represent an extraordinary advance in the availability of educational and informational resources to our citizens."
- "The Internet and other interactive computer services offer a forum for a true diversity of political discourse, unique opportunities for cultural development, and myriad avenues for intellectual activity."
- "Increasingly Americans are relying on interactive media for a variety of political, educational, cultural, and entertainment services."[15]

As the President's recently released budget makes clear, the Internet is vital to the U.S. economy and other sectors of our society:

> As a country, we have made significant public investments so that, regardless of economic status, Americans have access to telephone service and electricity. In this day and age, we must do the same for broadband. Like any network, the more people who are a part of it, the stronger we all are. *The more communities that have access to high-speed Internet connections, the more businesses can grow and jobs can be created.* When that happens, the entire Nation wins.[16]

As an overarching definition for purposes of the Plan, we propose the following: "access to broadband" refers to the presence of physical facilities, whether wired or wireless, enabling connections to high-speed Internet services that are capable of delivering speeds sufficient for the kinds of applications and services consumers, businesses, and institutions want to use.

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[15] Telecommunications Act of 1996, Pub. L. No. 104-104, § 509, 110 Stat. 56, 137 ("1996 Telecom Act") (codified at 47 U.S.C. § 230(a)).

[16] Office of Management & Budget, *A New Era of Responsibility: Renewing America's Promise* 20 (2009) (emphasis added), *available at* http://www.whitehouse.gov/omb/asset.aspx?AssetId=793.

a. The Commission Should Establish Definitions for Evolving Levels of Broadband Internet Service.

The speed and throughput of high-speed Internet services, and various other attributes (e.g., latency, reliability, etc.), are all important factors in determining the performance of broadband Internet services. Although one can have aspirational goals for broadband Internet speeds, investment in broadband networks (whether private or, where necessary and appropriate, public) should be based on marketplace demand, and consumers will tell the marketplace what speeds they want and what prices they are willing to pay. A government effort at second-guessing this marketplace would likely result in more harm than good.

As discussed in more detail below, Comcast and other cable operators have at every stage worked to anticipate what consumers will demand, and the industry is now moving to the next generation of broadband Internet services.[17] Accordingly, to reflect the continued progress of broadband, we suggest that the Commission adopt the following definitions for evolving levels of broadband Internet service as it assesses the marketplace:

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[17] *See, e.g.*, Press Release, Comcast Corp., *Comcast Unleashes New 50/5 Mbps Extreme High-Speed Internet Service Using DOCSIS 3.0 Technology in the Twin Cities* (Apr. 3, 2008), *available at* http://www.comcast.com/About/PressRelease/PressReleaseDetail.ashx?PRID=741&fss=high-speed.

DEFINING BROADBAND INTERNET SERVICE	
BROADBAND INTERNET SERVICE TIER	**DEFINITION**[18]
Basic	Provisioned speeds of at least 256 Kbps downstream and upstream. This would be faster than the Commission's current definition,[19] and consistent with the Organisation for Economic Co-operation and Development's ("OECD") current definition, of what constitutes broadband Internet service.[20]
Current Generation	Provisioned speeds of at least 600 Kbps downstream and 500 Kbps upstream.
Next Generation	Provisioned speeds of at least 12 Mbps downstream and 2 Mbps upstream.
Next Generation Advanced	Provisioned speeds of at least 50 Mbps downstream and 10 Mbps upstream.
Next Generation Commercial	Provisioned speeds of at least 100 Mbps service.

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[18] As discussed below, the "provisioned" speed is the speed that a customer's modem is configured (and the network is engineered) to deliver on a regular basis. Internet speeds are generally a best efforts service that are dependent on a number of variables, many of which are outside the control of the network operator. In general, speeds do not typically exceed a customer's provisioned speed. Comcast, however, invented a technology called PowerBoost™ that, for example, enables consumers to experience brief boosts above their "provisioned" speeds while they transfer large files over the Internet by utilizing excess capacity available in the network. *See* Comcast Corp., *Customers - FAQs: PowerBoost*, http://www.comcast.com/customers/faq/FaqCategory.ashx?CatId=377&INTCMP=ILC-SRCPROMOCOM0078&fss=powerboost (last visited June 7, 2009).

[19] *See, e.g.*, Indus. Analysis Div., Wireline Competition Bureau, FCC, *High-Speed Services for Internet Access: Status as of December 31, 2007*, at 1 n.1 (2008) ("*December 2007 FCC High-Speed Internet Report*"), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-287962A1.pdf. In March 2008, the FCC adopted eight new broadband reporting tiers for new Form 477, starting at "greater than 200 kbps but less than 768 kbps" and going up to "equal to or greater than 100 mbps." *In re Development of Nationwide Broadband Data To Evaluate Reasonable and Timely Deployment of Advanced Services to All Americans, Improvement of Wireless Broadband Subscribership Data, and Development of Data on Interconnected Voice over Internet Protocol (VoIP) Subscribership*, Report & Order & FNPRM, 23 FCC Rcd. 9691 ¶ 20 (2008).

[20] *See* Org. for Econ. Coop. & Dev., *OECD Broadband Subscriber Criteria*, http://www.oecd.org/document/46/0,3343,en_2649_34225_39575598_1_1_1_1,00.html (last visited June 7, 2009).

Basic Broadband Internet Service is faster than what the Commission has called "first generation" broadband "that at 200 Kbps, consumers can enjoy the most common applications, including web browsing and email, without the delay experienced by dial-up subscribers."[21] In Comcast's experience, we find that the speeds delivered by our versions of Current Generation Broadband Internet Service, which are higher than the minimum speeds for such service as defined above, allow the vast majority of consumers to access virtually any content, application, and service in the global marketplace today.[22] Speeds provided by "Next Generation" services enhance consumers' ability to access today's content, applications, and services (and in some cases improve the quality of applications and services) while at the same time enabling consumers to access richer content and innovative applications and services as they develop. These definitions also ensure that customers who may need greater speed for specialized uses – for example, small businesses, doctors offices, and home offices – will have options that meet their needs.[23] To account for the dynamic nature of this marketplace, the Commission should revisit these definitions every two years – largely coincident with the timeframe in Moore's

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[21] *In re Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps To Accelerate Such Deployment Pursuant to Section 706 of the Telecomm. Act of 1996*, Fifth Report, 23 FCC Rcd. 9615 ¶¶ 3, 5 (2008).

[22] *Cf.* CBG Communications, Inc., *Final Report: High-Speed Internet Deployment and Adoption Strategy Recommendations for the State of Washington* 7-8 (Dec. 1, 2008) ("*Washington State Broadband Report*"), *available at* http://www.dis.wa.gov/hiswg/docs/HSISWG%20-%20Final%20Report%20-%201Dec08.pdf.

[23] *See id.*

Law[24] – to examine whether the benchmarks in the definitions need to be revised to ensure that the United States remains advanced on a sustained basis.[25]

Of course, the end user's Internet experience is not solely a function of the speed of his or her Internet service. The *Notice* asks: "how should the speeds and other characteristics of services delivered to consumers be determined?"[26] As the Commission recognizes, the actual speed experienced by any particular consumer at any particular moment in time involves a number of factors, many of which are outside the control of the Internet service provider.[27] For example, the processing power of computers, as well as the number of users and applications vying for that processing power (including available processing and network capacity), will directly affect the user's experience. In addition, shared capacity is inherent in *all* networks at some point – whether it be a user's local area network, a service provider's last mile, the middle-mile, the backbone, points of network interconnection between networks, or within datacenters

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[24] Moore's Law, named after Intel co-founder Gordon Moore, "states that transistor density on integrated circuits doubles about every two years." Intel Corp., *Moore's Law: Raising the Bar* 1 (Feb. 2003), *available at* http://download.intel.com/museum/Moores_Law/Printed_Materials/Moores_Law_Backgrounder.pdf; Kevin Werbach, Office of Plans & Policy, FCC, *Digital Tornado: The Internet and Telecommunications Policy* 6 (Mar. 1997), *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp29.pdf.

[25] States generally agree that the definition of broadband Internet service should be revised from time to time: "the definition of broadband should be routinely reviewed and updated according to the current demand and application usage." *New Hampshire Broadband Plan* at 10; *see also Missouri Broadband Report* at 10 ("The FCC should reevaluate its minimum transmission speeds in light of increasing requirements of new technologies and applications."); *California Broadband Report* at 75 ("As education-related applications require increasing amounts of bandwidth, the state should raise [the minimum] speed periodically to reflect the evolving needs of educational institutions."). In reviewing its speed metrics, the Commission should also account for the growing efficiency of applications in utilizing the speeds and bandwidth available to consumers. For example, application and service providers have used a variety of enhancements to optimize their products to today's speeds and available bandwidth, and various forms of file transfers and streaming video have become vastly more bandwidth-efficient over the years.

[26] *Notice* ¶ 20.

[27] *Id.* (noting that "frequency bandwidth, the number of simultaneous users, and distance to the end user affect the data rates delivered" as well as "transmitter power, frequency re-use, and the distance between the end user and the base station" for wireless broadband Internet service).

where applications are hosted. This sharing is what makes networks – particularly IP-based networks – efficient, but it also affects throughput and, ultimately, the user's experience.[28]

In designing networks and determining the speeds an Internet service can deliver, network engineers cannot directly control variables outside the network that affect end-to-end Internet speeds. They do, however, provision bandwidth and resources in a manner designed to offset some of the variables, e.g., the potential for congestion in a particular area, in order to deliver the "provisioned," or marketed, Internet speeds on a regular basis. In the case of cable, engineers split nodes, move fiber deeper into the network, improve processing technologies (e.g., from DOCSIS 2.0 to DOCSIS 3.0), add capacity in the core network, and reallocate capacity in order to ensure consumers are getting the speeds they expect. In setting its "speed metrics," we suggest that the Commission use the "provisioned speeds" that broadband Internet service providers provide for each of their tiers of service.

b. The Commission Should Develop a Plan That Promotes Ubiquitous Access to Broadband Internet Service.

The *Notice* asks how to evaluate what "access" means in light of "basic consumer expectations."[29] The *Notice* looks at the question of whether consumers in a particular area have "access" to broadband Internet service from many angles, asking whether the Commission should consider, among other things, differences in broadband technologies, speed, issues of affordability, and the existence of multiple broadband options. Many of these questions really pertain to "adoption" – i.e., whether there are cost, relevance, literacy, policy, or other barriers to

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[28] *See* Comments of AT&T, Inc., WC Docket No. 07-52, at 6-7 (Feb. 13, 2008); Comments of Comcast Corp., WC Docket No. 07-52, at 11 (Feb. 12, 2008); Comments of CTIA - The Wireless Ass'n, WC Docket No. 07-52, at 6 (Feb. 13, 2008); Comments of Verizon & Verizon Wireless, WC Docket No. 07-52, at 32-33 (Feb. 13, 2008).

[29] *Notice* ¶ 24.

consumers subscribing to broadband Internet service – and not to "access" – i.e., whether such services are physically available in a place where a consumer wants to use them. The question of "access" is simple: Do the facilities exist such that a consumer reasonably has the ability, if she chooses, either at home, at work, or at some other location, to use the content, applications, and services made available on the Internet today?

The Plan should be technology-neutral in its assessment of whether there is "access" to broadband Internet service. The Commission's current description of broadband recognizes that broadband Internet service "is provided by a wide range of technologies, including digital subscriber line and fiber optic cable, coaxial cable, wireless technology, and satellite."[30] Deciding that "access" to a particular broadband technology should be assessed differently "depending on the technology used or whether it is fixed, nomadic, or mobile"[31] will not give a true picture of the broadband marketplace. At a minimum, access by every American, everywhere, to Basic Broadband Internet Service should be a top priority the Plan attempts to achieve.[32] Ensuring that there are no unwarranted government barriers to investment in deploying and improving broadband Internet services is equally important.

The Plan should consider both the wide range of technologies and the wide range of locations from which consumers choose to find their way onto the Internet. For many

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[30] FCC, *Broadband: Description*, http://www.fcc.gov/broadband/ (last visited June 7, 2009).

[31] *Notice* ¶ 23.

[32] For example, having "Basic Broadband Internet Service" allows consumers to use many popular online applications and services available today, such as surfing the web, searching for information, e-mailing, and shopping online. Using more bandwidth-intensive applications and services, however, is more difficult or, depending on the application or service, impossible.

consumers, that goes beyond the home.[33] Just as a growing number of consumers choose not to access the public switched telephone network using a wireline home phone service, so too many consumers choose not to access broadband Internet services from a wireline Internet connection at home. Many consumers choose to access the Internet from a variety of other places, including work, school, libraries, airports, and local coffee shops.

For example, in the first two quarters of 2009, 47 percent of adults used the Internet at work.[34] Frequently-cited reports about broadband Internet adoption may be overlooking a significant number of broadband connections: "Data from the Census Bureau and the Nielsen Company together suggest that both the OECD and the FCC [broadband Internet subscriber] counts miss approximately 72 million workplace connections."[35] Moreover, according to the Pew Internet & American Life Project ("Pew"), over one-third of all Internet users have connected to the Internet using Wi-Fi at some place *other than home or work*.[36] "Libraries, key community service entities and anchor tenants for broadband connectivity, play a vital role in providing access to online resources and opportunities, especially in rural communities. Each

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[33] Broadband users, as opposed to narrowband users, spend more time on the Internet while *at work*. *See* Leichtman Research Group, Inc., *Broadband Internet Access & Services in the Home 2009*, at 106 (1st-2d Quarter 2009) ("*2009 Leichtman Report*").

[34] *See id.* at 103. Work Internet users report a higher rate of subscription to broadband at home. *See id.* at 104.

[35] Scott Wallsten, Tech. Policy Inst., *Leveraging Communications: ICT as Economic Stimulus* 2 n.2 (2008) (attached as an appendix to Simon Wilkie, Aspen Institute, *ICT: The 21st Century Transitional Initiative – Report of the 23rd Annual Aspen Institute Conference on Communications Policy* (Jan. 7, 2009) ("*2009 Aspen Report*"), *available at* http://www.aspeninstitute.org/publications/ict-21st-century-transitional-initiative). The Census Bureau reports that nearly 84 million Americans had access to the Internet at work in 2007. Census Bureau, *Internet Access and Usage: 2007* (2008), *available at* http://www.census.gov/compendia/statab/tables/09s1120.pdf.

[36] *See* Pew Internet & Am. Life Project, *Home Broadband Adoption 2008*, at iv, 25 (July 2008) ("*Pew Home Broadband Adoption 2008*"), *available at* http://www.pewinternet.org/~/media//Files/Reports/2008/PIP_Broadband_2008.pdf. Eleven percent of people online with a laptop connect to the Internet outside their homes daily; 26 percent connect outside their homes at least once a week; and 54 percent connect outside their homes at least monthly. *See 2009 Leichtman Report*, *supra* note 33, at 124.

library supports job searches and career development, small business enterprise, technology training, educational programming, access to online education and E-government resources through their no-fee public access terminals."[37] The Census Bureau reports that over 16,000 libraries offer public access to broadband Internet service (with an average of 12 work stations in each library), and over 8,000 of those are in rural areas.[38] The Plan should fully account for these facts and preferences, and carefully consider the role that public and private institutional access can play in meeting the differing needs of users for "access."

2. Adoption of Broadband Internet Services Is Key to the Success of the Plan.

Despite the fact that some form of broadband Internet service is available to over 90 percent of U.S. households, only about 60 percent subscribe today. Closing this gap is an important national goal that should be a central focus of the National Broadband Plan.

The *Notice* asks about digital literacy,[39] computer ownership and affordability,[40] the existence of competing technologies,[41] and other aspects of broadband Internet service that are relevant to the question of why individual consumers do or do not choose to subscribe to broadband services. Studies by groups like Pew show that there are a great many factors in a consumer's decision about whether to subscribe. The most recent Pew report suggests that, for the majority of non-users, factors other than the price of broadband Internet service are at the

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[37] Comments of the Am. Library Ass'n, GN Docket No. 09-40, at 1 (Apr. 13, 2009) ("Broadband connections are one of the critical elements that allow libraries to provide these essential services to the public.").

[38] Census Bureau, *Public Library Use of the Internet: 2008, available at* http://www.census.gov/compendia/statab/tables/09s1117.pdf.

[39] *See Notice* ¶¶ 52, 55.

[40] *See id.* ¶¶ 27, 55.

[41] *See id.* ¶ 25.

heart of their decision not to subscribe to broadband. According to the report, 33 percent of non-Internet users say they simply are "not interested" in subscribing to broadband, while nine percent say it is "too difficult or frustrating," and seven percent say it is a "waste of time."[42] Only seven percent said "it is too expensive."[43] Fourteen percent of households surveyed by the Leichtman Research Group indicated that they do not even have a computer.[44] The Leichtman Research Group also found a high correlation between broadband subscribership and factors such as age, education, and income.[45]

Educating Americans about the Internet, how to use digital technology, and the relevance of broadband Internet service to their lives, and ensuring that government policies encourage (or, at least, do not discourage) adoption, should be an important part of the Plan. It is a fundamental tenet of networks that they become more valuable as they grow.[46] Getting more consumers to subscribe to broadband Internet service will increase the value of the network for everyone and stimulate even more demand.[47]

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[42] *Pew Home Broadband Adoption 2008*, *supra* note 36, at iii.

[43] *Id.*

[44] *2009 Leichtman Report*, *supra* note 33, at 8-9. Home computer penetration has increased from 74 percent in 2004 to 86 percent in 2009. *See id.* at 9.

[45] *See id.* at 6, 16-17, 35, 38-39, 41-42, 45. For example, those who use the Internet at work report an annual household income that is 60 percent higher than those who do not use the Internet at work. *See id.* at 103.

[46] *See* Office of Management & Budget, *supra* note 16, at 20 ("Like any network, the more people who are a part of it, the stronger we all are."). This is commonly referred to as the network effect, *see* Arun Sundararajan, *Network Effects*, http://oz.stern.nyu.edu/io/network.html (last visited June 3, 2009), and is attributed to the positive externalities created by the network. *See generally* Jeffrey Rohlfs, *A Theory of Interdependent Demand for a Communications Service*, 5 Bell J. of Econ. & Mgmt. Science 16 (Spring 1974).

[47] *See* Michael J. Copps, Acting Chairman, FCC, *Bringing Broadband to Rural America: Report on Rural Broadband Strategy* 51 ¶ 117 (May 22, 2009) ("*Rural Broadband Report*"), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-291012A1.pdf. The exact value-added of each additional user to the network is still a matter of debate. For example, Metcalfe's Law, named after 3Com co-founder Robert Metcalfe, states that the value of the network is proportional to the square of the number of users on the network. *See* Werbach, *Digital Tornado*, *supra* note 24, at 6 ("Metcalfe's Law says that the value of a network is equivalent to the square of the number of nodes. In other words, as networks grow, the utility of being connected to the

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B. The Plan Should Be Creative and Flexible, But Should "Do No Harm," in Pursuit of the Recovery Act's Goals.

With the twin goals of access and adoption firmly in mind, the Commission must consider its specific policy strategies to achieve the goals. The Commission should shape those policy strategies around several important tenets that President Obama has articulated. First, transparency and accountability must be central pillars of these strategies. Second, the Commission should embrace President Obama's mantra of "first, do no harm." Finally, the Commission should look for ways to leverage the expertise and resources of other governmental agencies at the federal, state, and local levels.

1. The Plan Should Embrace Transparency and Accountability.

As President Obama has made clear since his first day in office, transparency and accountability are essential elements of the compact between government and the citizenry. In his Memorandum on Transparency and Open Government, the President said, "Transparency promotes accountability and provides information for citizens about what their Government is doing."[48] Transparency and accountability are especially important in developing the Plan in light of the significance of this issue to the future economic strength of our country and the amount of dollars – including taxpayer dollars – that will likely be spent to support the programs and policies in the Plan. To that end, the Commission should undertake three important steps.

(…footnote continued)

network not only grows, but does so exponentially."). There is some argument, however, that Metcalfe's Law overstates the value of additional users to the network, and that adherence to Metcalfe's Law led to the glut of broadband facilities in the late 1990s. *See* Bob Briscoe et al., *Metcalfe's Law Is Wrong*, IEEE Spectrum Online, July 2006, *available at* http://www.spectrum.ieee.org/jul06/4109. Whatever the exact value-added, the idea that some value is added to the network as the number of users grows is uncontroversial.

[48] Memorandum from President Barack Obama on Transparency and Open Government to the Heads of Executive Departments and Agencies (Jan. 21, 2009), 74 Fed. Reg. 4685 (Jan. 26, 2009) ("*President's Transparency Memo*"), *available at* http://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/.

First, it should hold open meetings throughout the country to solicit input and ideas from various experts and stakeholders in the private sector, in academia, in non-profits, and in government. These meetings should ensure that a wide diversity of viewpoints is presented and fully debated. Participation should not be limited to those interested in "telecommunications policy," but should extend to the fields of health care, education, energy, and the environment. Panelists should also include representatives of the stakeholder agencies in those fields (e.g., the Departments of Energy, Health and Human Services, Veterans Affairs, and Education). Panelists should include experts on tax policy and intellectual property. The Commission should build an unparalleled record for this unparalleled proceeding. (And while an electronic record and citizen participation through the Commission's website and other means can add value, it cannot substitute for testing ideas in the crucible of face-to-face debate and discussion.)

Second, the Commission should release a draft of the National Broadband Plan and seek public comment well before it is submitted to Congress in February 2010.[49] As leading commentators have noted, very broad public notices like the one that initiated this proceeding can make it difficult for parties to understand where the Commission will focus its proposals and difficult to comment meaningfully, thereby denying the full benefit of public input.[50] A Plan as

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[49] *See* Philip J. Weiser, *FCC Reform and the Future of Telecommunications Policy* at 17, Presented at Silicon Flatirons Ctr. at Univ. of Colo. & Public Knowledge, Conference on Reforming the FCC (Jan. 5, 2009) ("If the FCC persists in opening proceedings with only a general description of the relevant issues, it has two options for providing sufficient notice and enabling effective deliberation. First, it could begin with a Notice of Inquiry, which is designed to elevate the agency's understanding of an issue and not to generate binding rules. Alternatively, if it does use an NPRM with limited disclosure of the issues that ultimately emerge as important, it should issue a Further Notice of Proposed Rulemaking."), *available at* http://fcc-reform.org/sites/fcc-reform.org/files/weiser-20090105.pdf.

[50] *See id.* at 16 ("The FCC's lack of transparency operates on a number of levels. First, when the agency announces a rulemaking, it rarely suggests specific rules and sometimes does not even ask specific questions for parties to address. Second, the FCC's notice-and-comment processes are often a meaningless precursor to the 'real' discussion that occurs during the so-called *ex parte* process, where parties file short statements that, at least often in practice, do not set out the full extent of oral discussions. . . . Finally, when the FCC announces its adoption of an

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important as this one should be reviewed in full by the public. A reasonable time for a final round of public comment will allow the Commission to benefit from direct feedback about the specific strategy proposals it intends to submit, so that it can provide Congress with a fully considered document.

Third, the Plan must detail the steps that federal and state governments will take to ensure that any monies appropriated or otherwise used for Plan-related programs are spent in an efficient and effective manner. Transparency, accountability, efficiency, and clear goals for returns to taxpayers should be hallmarks of the Plan.

2. Any Proposed Government Intervention Should Be Carefully Targeted.

The Recovery Act was designed to stimulate economic activity in sectors of the economy that have suffered significantly during this economic downtown. While Congress committed over $700 billion to restoring investment in areas of the economy where it had all but dried up, the $7.2 billion that it dedicated toward funding broadband Internet mapping, deployment, and adoption was a relative "drop in the bucket." In fact, based on Congress and the Administration's comparatively small investment in broadband – less than one percent of all stimulus funding – it seems clear that Congress and the Administration have very clear purposes in mind for how those limited federal dollars are to be spent and recognize the massive private sector investment in this area, and the need for that investment to continue.[51]

(…footnote continued)

order, it often does so without releasing the actual text, raising questions as to what the agency actually voted on and what happens between the so-called vote and the final issuance of the order - which can take place many months later.").

[51] As Christina D. Romer, Chair of the President's Council of Economic Advisors, recently explained,

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The Commission should avoid using the Plan as a vehicle for proposing extensive new regulations on providers of broadband Internet service. This is a dynamic industry, and intrusive government regulation risks impairing that dynamism by impeding innovation and investment.[52] This has been recognized for over 15 years, by both Democratic and Republican administrations.

To be clear, there is a terrifically important role for government in expanding both broadband deployment and adoption. But the policies should be based on specifically identified failures of government policy or of the marketplace.[53] Calls for regulatory changes that would turn back the clock on government policies that have worked should be rejected.

There is a widespread belief that the absence of adequate government oversight of the financial sector was an important factor that led to the current economic crisis. Some would extrapolate that into a need for deeper government intervention in all aspects of the economy.

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> While government actions will provide an important source of demand in the next few years, there is another factor that could also get us a temporary surge in spending: investment rebound and pent-up demand. . . . The result of these forces is that when the economy begins to recover, investment and purchases of durable goods grow rapidly, strengthening the recovery and further fueling growth in those sectors. The result is a virtuous circle that yields a period of rapid growth.

Christina D. Romer, Chair, Council of Econ. Advisors, *Growth Without Bubbles*, Speech before the Council on Foreign Relations (May 12, 2009), *available at* http://www.whitehouse.gov/administration/eop/cea/chair-remarks-05122009/.

[52] *See*, *e.g.*, Eli Noam, *Separating Telecoms*, Fin. Times, May 15, 2009 ("Today is a good time for policy makers and companies to shape alternative futures, and the American history can provide both positive and discouraging lessons. It suggests that structural solutions, while intellectually appealing, create major transaction costs and retard network evolution. There are better ways to protect users and competitors."), *available at* http://www.ft.com/cms/s/0/8b149b84-41a1-11de-bdb7-00144feabdc0.html; Philip Weiser, *The Future of Internet Regulation*, U.C. Davis L. Rev. (forthcoming 2009) (U. Colo. Legal Stud. Res. Paper Series, Working Paper No. 09-02, at 5 (Feb. 2, 2009)) ("[T]he traditional model of common carriage – premised on prescriptive rules, enforced by filings of tariffs, and often accompanied by rate regulation – is ill-suited to the Internet's dynamic and more competitive nature."), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1344757; William J. Baumol et al., AEI-Brookings Joint Ctr. for Reg. Studs., *Economists' Statement on Network Neutrality Policy* 1 (Mar. 2007) ("[I]ntroducing price regulation risks discouraging the healthy process of risk-taking innovation – which is especially important in telecommunications.").

[53] *See* Werbach, *Digital Tornado*, *supra* note 24, at 46 ("Wherever possible, market forces should be harnessed to take the place of direct regulatory intervention.").

The President has plainly rejected that notion. He has rejected that notion because the limitations of government in regulating, overseeing, or substituting its judgments for private industry are well accepted in this country. As the President recently told an audience at Georgetown University, "[W]e believe that preemptive government takeovers are likely to end up costing taxpayers even more in the end, and [are] more likely to undermine than to create confidence. Governments should practice the same principles as doctors: *first do no harm*."[54] Just a few weeks later, he told reporters, "I want to disabuse people of this notion that somehow we enjoy meddling in the private sector."[55]

As discussed below, with some exceptions, the broadband marketplace is functioning well. The success to date is attributable to decisions by this Commission and other government agencies, pursuant to an explicit Congressional directive, to adopt deregulatory policies wherever they would be appropriate.[56] As then-Chairman Kennard noted,

> So how do we get Americans broadband pipes? The answer lies in the history that I just laid out for you: by letting a competitive marketplace thrive. We need an intentional restraint born of humility. Humility that we can't predict where this market is going. Indeed, who among us could have predicted the incredible advances of the past few years? . . . In a market developing at these speeds, the FCC must follow a piece of advice as old as Western Civilization itself; *first, do no harm*. Call it a high-tech Hippocratic Oath.[57]

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[54] *Transcript: President Obama Delivers Remarks at Georgetown University*, CQ Transcripts Wire, Wash. Post, Apr. 14, 2009 (emphasis added), *available at* http://www.washingtonpost.com/wp-srv/politics/documents/Obama_Economy_Georgetown.html.

[55] *Transcript of Obama's 100th Day Press Conference*, Washington Wire, Wall St. J. Blogs, Apr. 30, 2009, http://blogs.wsj.com/washwire/2009/04/30/transcript-of-obamas-100th-day-press-conference/.

[56] *See* 47 U.S.C. § 230(b)(2); *see also* Werbach, *Digital Tornado*, *supra* note 24, at i ("Limited government intervention is a major reason why the Internet has grown so rapidly in the United States. The federal government's efforts to avoid burdening the Internet with regulation should be looked upon as a major success, and should be continued.").

[57] Remarks by FCC Chairman William E. Kennard Before the FCBA N. Cal. Chapter, San Francisco, CA, *The Unregulation of the Internet: Laying a Competitive Course for the Future* (July 20, 1999) (emphasis added), *available at* http://www.fcc.gov/Speeches/Kennard/spwek924.html; *see* Remarks by FCC Chairman William E.

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This proposition put forth by President Obama, and foreshadowed by Chairman Kennard in calling for a light regulatory approach for broadband, should be adopted here.

3. The Plan Should Be Comprehensive in Seeking Interagency Cooperation.

As President Obama said in his Memorandum on Transparency and Open Government, "Collaboration actively engages Americans in the work of their Government. Executive departments and agencies should use innovative tools, methods, and systems to cooperate among themselves, across all levels of Government, and with nonprofit organizations, businesses, and individuals in the private sector."[58] This is true of the National Broadband Plan, and it is inherent in Congress's charge to the Commission.[59] Acting Chairman Copps's recently released *Rural Broadband Report* clearly reflects the importance of interagency coordination.[60]

(…footnote continued)

Kennard Before the Summer 2000 Session of the NARUC, *Regulation 2000* (July 24, 2000) ("[P]erhaps the FCC's most important decision – we decided to leave the Internet unregulated."), *available at* http://www.fcc.gov/Speeches/Kennard/2000/spwek017.html.

[58] *President's Transparency Memo*, *supra* note 48. Collaboration with the private sector is particularly important. As the OECD recently noted,

> Investment in broadband communication platforms has been largely undertaken and led by the private sector and this should continue. Private operators have been investing heavily to upgrade existing infrastructure, expand capacity and enable a new wave of high-bandwidth services. The scale of this upgrade means that private telecommunications operators are among the largest private investors in their respective economies.

Working Party on Communication Infrastructures and Servs. Policy, Directorate for Science, Tech. and Indus., Comm. for Info., Computer & Communications Policy, OECD, *The Role of Communications Infrastructure Investment in Economic Recovery* 4 (May 19, 2009), *available at* http://www.oecd.org/dataoecd/4/43/42799709.pdf.

[59] *See* Recovery Act § 6001(k)(2)(D) ("The Plan shall also include . . . a plan for use of broadband infrastructure and services in advancing consumer welfare, civic participation, public safety and homeland security, community development, health care delivery, energy independence and efficiency, education, worker training, private sector investment, entrepreneurial activity, job creation and economic growth, and other national purposes.").

[60] *See Rural Broadband Report* at 5 ¶ 13 ("Increasing coordination . . . is a critical preliminary step towards ensuring that the various government programs accomplish their broadband goals and objectives in an efficient and effective way.").

Likewise, the Plan should be a true interagency effort, a holistic government policy approach to promote access to and adoption of broadband Internet services.

The *Notice* poses a number of important questions in areas such as online safety, consumer privacy, and cybersecurity. These are certainly relevant factors to consider, although primary authority over some of these areas rests with other government agencies. With respect to online safety, there is a wide variety of tools that Comcast and other broadband Internet service providers make available to parents.[61] Comcast also participates in multiple collaborative efforts to protect children online and educate parents about online safety. For example, Comcast is a member of the Family Online Safety Institute ("FOSI"), a non-profit organization dedicated to working to develop a safer Internet;[62] has a partnership with Internet Keep Safe Coalition ("iKeepSafe"), a coalition of numerous government and private associations that provides tools and guidelines to teach children the safe and healthy use of technology;[63] participates in the inter-industry coalition, PointSmart.ClickSafe, that is identifying "best practices" for online safety;[64] and is working with Common Sense Media to provide parents with valuable information about websites and other media.[65] In addition, Comcast provides free tools and software that enable its customers to protect their computers from intrusion or loss of digital assets.

With respect to privacy issues, the Commission should work with the Federal Trade Commission, the states, consumers, and the private sector to identify relevant privacy issues and

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61 *See* Comments of Comcast Corp., MB Docket No. 09-26, at 4-5 (Apr. 16, 2009).

62 *See generally* Family Online Safety Inst., http://www.fosi.org/cms/ (last visited June 7, 2009).

63 *See generally* iKeepSafe Coalition, http://www.ikeepsafe.org/ (last visited June 7, 2009).

64 *See generally* PointSmartClickSafe.org, http://www.pointsmartclicksafe.org/ (last visited June 7, 2009).

65 *See generally* Common Sense Media Inc., http://www.commonsensemedia.org/# (last visited June 7, 2009).

to find the right balance between ensuring appropriate levels of consumer privacy and trust, on the one hand, and capturing the immense value that online information has for helping to achieve important social and economic goals, on the other. It is important to make progress toward a coherent privacy framework that incorporates and balances the legitimate expectations of consumers with the needs of website and e-commerce content, application, and service providers and network operators to use information to deliver the online experiences that consumers demand. This framework should rely, to the maximum extent possible, on industry standards, best practices, and other norm-setting behaviors.[66] These are areas in which the Federal Trade Commission has been involved for years and remains in the forefront, and there should be deference to its efforts. In addition, Congress is actively reviewing existing statutes to ensure that they are appropriate for the rapidly evolving applications and services consumers use.

Cybersecurity is also an issue of immense importance, and the role of broadband Internet service providers in preserving the security of their customers deserves to be fully understood by the Commission. Network operators invest substantial resources to protect their customers and the integrity of their networks against spam, malware, and other cybersecurity threats. As the Obama Administration's recently released *Cyberspace Policy Review* notes, "The Federal government . . . must be careful not to create policy and regulation that inhibits innovation or results in inefficiencies or less security."[67] Each month, Comcast handles millions of customer reports about spam and phishing, and blocks an estimated 11.5 billion spam, virus, and phishing

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[66] *See generally* Weiser, *supra* note 52, at 35 (discussing the importance of social norms on the Internet and encouraging the Commission to serve as a "norm entrepreneur").

[67] *See generally* Nat'l Security Council, *Cyberspace Policy Review: Assuring a Trusted and Resilient Information and Communications Infrastructure* 31 (May 29, 2009), *available at* http://www.whitehouse.gov/asset.aspx?AssetId=1732.

messages – online activities that consume large amounts of bandwidth and pose serious threats to customer privacy and security, not to mention the impact to the user experience. Comcast is a leader in organizations such as the Messaging Anti-Abuse Working Group ("MAAWG"), the Anti-Phishing Working Group ("APWG"), the North American Network Operators Group ("NANOG"), and the Internet Engineering Task Force ("IETF") in addressing network security and related issues.[68]

The Commission appears ready to give cybersecurity issues substantial attention through its newly constituted Communications Security, Reliability, and Interoperability Council. A full understanding of the threats to cybersecurity will be essential to inform the Commission's regulatory policies on issues such as network management. The need to preserve cybersecurity, and ideas on how best to achieve those protections, should be components of the Plan.

C. The Plan Should Adopt Clear, Straightforward Metrics and Benchmarks for Measuring Progress Towards Achieving the Recovery Act's Goals.

The Recovery Act directs the Commission "to establish benchmarks" to measure progress toward the twin goals of ensuring ubiquitous deployment and increasing adoption and utilization. In doing so, the Commission should choose clear, straightforward, and relevant metrics. The Commission should recognize the shortcomings of existing international rankings and reports, and instead draw from them selectively to develop metrics of its own that are meaningful in the United States.

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[68] For example, Michael O'Reirdan, Comcast Distinguished Engineer, currently holds the chairmanship of MAAWG, while Susan Israel, Senior Counsel in Comcast Cable's legal department, is chair of MAAWG's public policy committee. MAAWG is an industry group committed to fighting messaging abuse.

Much can be learned from researching and analyzing other countries' approaches to ensuring ubiquitous deployment and widespread adoption.[69] But that does not mean that the United States should adopt international ranking methodologies that are flawed and of dubious relevance as measures of progress toward the twin goals of the Plan.

While policies should be data-driven, the data must be useful, reliable, and relevant in order to help the Commission understand the extent of broadband deployment and adoption in the United States. In many respects, the United States is leading the world in Internet connectivity, and that simply is not recognized in some of the metrics often cited by policymakers.[70] The international broadband and technology rankings and reports these policymakers rely on suffer from practical weaknesses that limit their usefulness in addressing the Commission's questions in this proceeding. The attached Appendix analyzes the leading international rankings and reports and demonstrates that policymakers should be cautious about relying too directly or heavily on them. The Appendix shows that a numerical ranking in a vacuum provides little direction or value in measuring the success of U.S. broadband policy. Notwithstanding the foregoing, a review of these different efforts, and their strengths and weaknesses, could prove useful as the Commission builds a stronger empirical basis for its policies.

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[69] *See* Krishna Jayakar & Harmeet Sawhney, Benton Found., *Universal Access in the Information Economy: Tracking Policy Innovations Abroad* (Apr. 19, 2007), *available at* http://www.benton.org/benton_files/Jayakar_Sawhney.doc.

[70] *See* OECD, *OECD Broadband Statistics: Total Number of Broadband Subscribers By Country* (Dec. 2008), *available at* http://www.oecd.org/dataoecd/22/15/39574806.xls.

Analysis of the frequently cited broadband rankings published by the OECD can provide practical lessons.[71] For example, the OECD's exclusion of wireless broadband and broadband service to businesses, colleges, and universities is a significant weakness. The Commission should identify all of the ways and all of the places in which consumers choose to access broadband Internet services. There are also issues of consistency in methodology and definitions used by member governments who report statistics to OECD. The Commission should develop a methodology and definitions that are meaningful to the goals stated by Congress and that reflect the diversity of technologies and user needs in the United States. The OECD report also illustrates the shortcomings of measuring broadband penetration on a per-capita basis rather than on a per-household basis, a methodology that favors nations with smaller average household sizes than the United States and skews international results.

Studies published by the Information Technology & Innovation Foundation ("ITIF") and the Phoenix Center offer additional insights into choosing relevant factors for measuring broadband success. Both organizations attempt to improve on OECD's analysis by seeking to understand the impact of "non-policy" factors, such as geography and national income levels, on broadband subscription rates. Because both studies ultimately rely on the data reported by OECD, with all of its flaws, the conclusions of these two studies have their own shortcomings. Nevertheless, the Commission should strongly consider adopting ITIF's and the Phoenix Center's use of non-policy factors in its analysis of broadband success if realistic goals are to be set for broadband adoption in the United States.

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[71] A more detailed analysis of each study, including a discussion of the lessons to be learned from each can be found in the attached appendix.

There are also more comprehensive studies that focus on international rankings in ICT, including the International Telecommunications Union's ("ITU's") ICT Development Index, the "Connectivity Scorecard" created by Professor Leonard Waverman, and the World Economic Forum's ("WEF's") Information Technology Report. These rankings properly make broadband a factor in assessing a nation's overall ICT effectiveness and provide important lessons. For example, as discussed in more detail in the appendix, the ITU's ICT Development Index is more effective than the OECD report in gathering quality data and matching that data with well-articulated goals.[72]

As the Commission begins a top-to-bottom review of U.S. broadband policy, it is encouraging that the agency is also seeking comment on the applicability of international rankings to this effort.[73] At a minimum, policymakers should cease relying on these flawed reports that do not accurately reflect the current state of U.S. broadband. More importantly, the Commission should recognize that, absent significant changes in methodology, future reports are likely to continue to inadequately measure improvements in U.S. broadband deployment and adoption.[74]

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[72] *See Analysis of International Broadband & Technology Rankings & Reports* app. at 12-20 (discussing "What is Useful for the NOI" in the ICT's Development Index, the ITU's Connectivity Scorecard, and the WEF's Information Technology Report).

[73] *Notice* ¶¶ 6, 8.

[74] *See* Robert M. McDowell, Commissioner, FCC, *Broadband Baloney*, Op-Ed, Wall St. J., July 24, 2007, at A15 ("The OECD's methodology is seriously flawed[.] According to an analysis by the Phoenix Center, if all OECD countries including the U.S. enjoyed 100 percent broadband penetration -- with all homes and businesses being connected -- our rank would fall to 20th."), *available at* http://online.wsj.com/article/SB118524094434875755.html; George S. Ford et al., Phoenix Ctr. for Advanced Legal & Econ. Pub. Policy Studies, *The Broadband Performance Index: A Policy-Relevant Method of Comparing Broadband Adoption Among Countries*, Phoenix Center Policy Paper No. 29, at 8 (July 2007), *available at* http://www.phoenix-center.org/pcpp/PCPP29Final.pdf.

In short, four principles should guide the Commission's approach in this proceeding: remain focused on the Recovery Act's goals of ubiquitous access and widespread adoption; take a holistic approach in examining the current situation and analyzing potential solutions for addressing the stated goals; promote targeted policies that "first, do no harm"; and adopt straightforward and clear benchmarks to measure progress. Following this approach will ensure that the Commission produces a Plan that is "focused, practical and achievable,"[75] and that has a constructive effect on our collective broadband future.

III. THE COMMISSION HAS AN IMPORTANT ROLE IN EFFICIENTLY AND EFFECTIVELY PROMOTING BROADBAND ACCESS IN UNSERVED AREAS AND PROMOTING ADOPTION BY ALL AMERICANS.

The foundational question of the *Notice* is how effective and efficient current mechanisms have been in ensuring that American consumers have access to and are adopting broadband Internet services. The short answer is that the marketplace has been remarkably successful in making broadband Internet service available and attractive to American households. In a largely deregulatory environment, hundreds of billions of dollars of private capital have been invested in competitive broadband networks; over 90 percent of Americans have access to broadband Internet service, usually from multiple competing providers; and consumer adoption has moved at a pace faster than that of practically any new communications product or service in history. As the Commission acknowledges (but, we submit, understates) in the *Notice*: "Market mechanisms have been successful in ensuring access to broadband in many areas of the country."[76]

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[75] *Notice* at 54 (Statement of Acting Chairman Michael Copps).

[76] *Id.* ¶ 37.

A. The Vast Majority of American Households Have Access to Competitive High-Speed and High-Quality Internet Services, but Government Should Do More To Promote Access in Unserved Areas.

The United States is one of a very few countries whose consumers have benefited from widespread deployment of multiple competitive broadband networks. In fact, with government having cleared the way for investment in cable, DSL, fiber, satellite, and wireless broadband Internet services, the United States has more facilities-based broadband Internet competitors than any other nation on earth. Moreover, "[t]he US is one of a limited number of countries that is seeing widespread fibre broadband deployment, and arguably the only country that is seeing this deployment take place on a purely commercial basis."[77] "Conventional wisdom holds that the broadband infrastructure in the U.S. lags far behind that in other advanced countries . . . . Conventional wisdom, however, is incorrect. In fact, broadband infrastructure in the U.S. compares quite favorably to that in other OECD countries and is improving rapidly."[78]

1. Comcast and the Cable Industry Have Deployed Broadband Networks Offering Broadband Internet Service to over 92 Percent of U.S. Households, and Competitors Have Responded.

The near-ubiquitous deployment of cable broadband Internet services is one of the most important American success stories of the past decade. The cable industry's deployment of broadband Internet service, even in the face of experts' initial doubts about the technology's viability, spurred significant investment from the telephone companies and others in their own networks.

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[77] LECG Ltd., *Connectivity Scorecard 2009: United States* 3 ¶ 2.4 (2009), *available at* http://www.connectivityscorecard.org/images/uploads/media/United_States.pdf.

[78] Wallsten, *supra* note 35, at 1.

a. For over a Decade, Comcast and the Cable Industry Have Deployed Broadband Internet Service Widely to the American People.

Comcast started offering its high-speed Internet service in 1996; today, it reaches more than 50 million homes.[79] In total, over 92 percent of American households have access to cable Internet service.[80] Across the nation, cable operators are offering consumers residential high-speed connections with download speeds of 20, 50, 60, and 100 Mbps or more.

Since 1996, the cable industry has invested more than $145 billion to build state-of-the-art broadband networks that provide high-speed Internet service and other advanced services that consumers demand.[81] This investment has been pure risk capital; not a dime of taxpayer funding (and, in almost all cases, no universal service funding) was used.

The cable industry faced many obstacles to success in its deployment of high-speed Internet service, including technical limitations, intense capital needs to upgrade the original coaxial cable plant, initial expectations of low consumer demand for such a product, and demands from some quarters for intrusive regulation. In the face of these potential obstacles, and in large part because policymakers opted for a light regulatory touch, the cable industry continued to pursue deployment of broadband Internet service and continues to invest heavily in cable infrastructure today.

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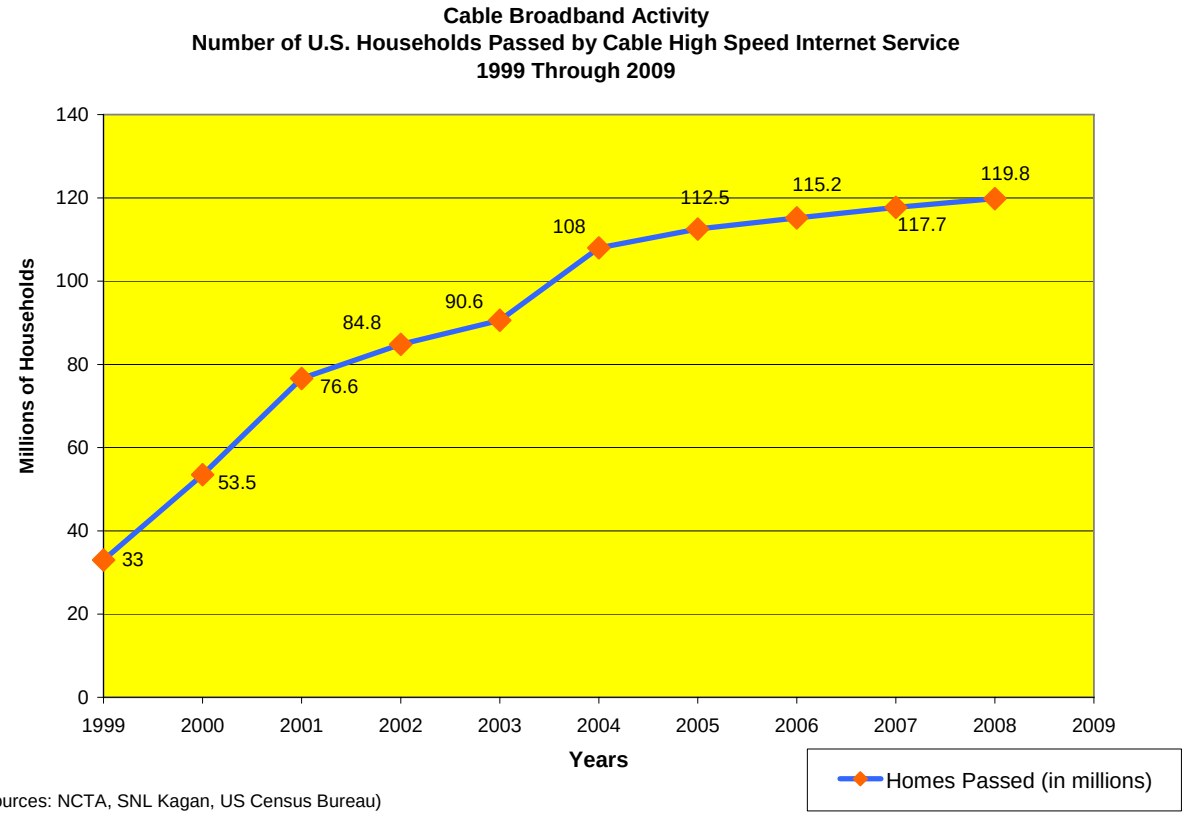
[79] Comcast Corp., *Pro Forma Cable Customer Metrics* (Apr. 30, 2009), *available at* http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9Mzg3NXxDaGlsZElEPS0xfFR5cGU9Mw==&t=1.

[80] *See* Nat'l Cable & Telecomm. Ass'n, *2008 Cable Industry Overview* 10 (2008), *available at* http://i.ncta.com/ncta_com/PDFs/NCTA_Annual_Report_05.16.08.pdf.

[81] *See* Nat'l Cable & Telecomm. Ass'n, *Cable Industry Capital Expenditure*, http://www.ncta.com/Stats/InfrastructureExpense.aspx (last visited June 8, 2009); Nat'l Cable & Telecomm. Ass'n, *Moving the Needle on Broadband: Stimulus Strategies to Spur Adoption and Extend Access Across America* 3 n.2 (Mar. 17, 2009) ("*Moving the Needle*"), *available at* http://www.ncta.com/DocumentBinary.aspx?id=794.

The fruits of these investments are apparent from the Commission's own statistics, which show a steady climb in the number of homes passed by cable's broadband Internet service. In 1998, the Commission reported that cable high-speed Internet service was available to 15 million homes.[82] By mid-1999, that number had risen to 32 million homes.[83] Today, cable high-speed Internet passes almost 120 million American homes.



(Sources: NCTA, SNL Kagan, US Census Bureau)

Comcast is now the largest provider of residential broadband Internet service in the nation. For over a decade, Comcast has continued to expand deployment of its HSI service and now reaches over 99.4 percent of the homes in its footprint.

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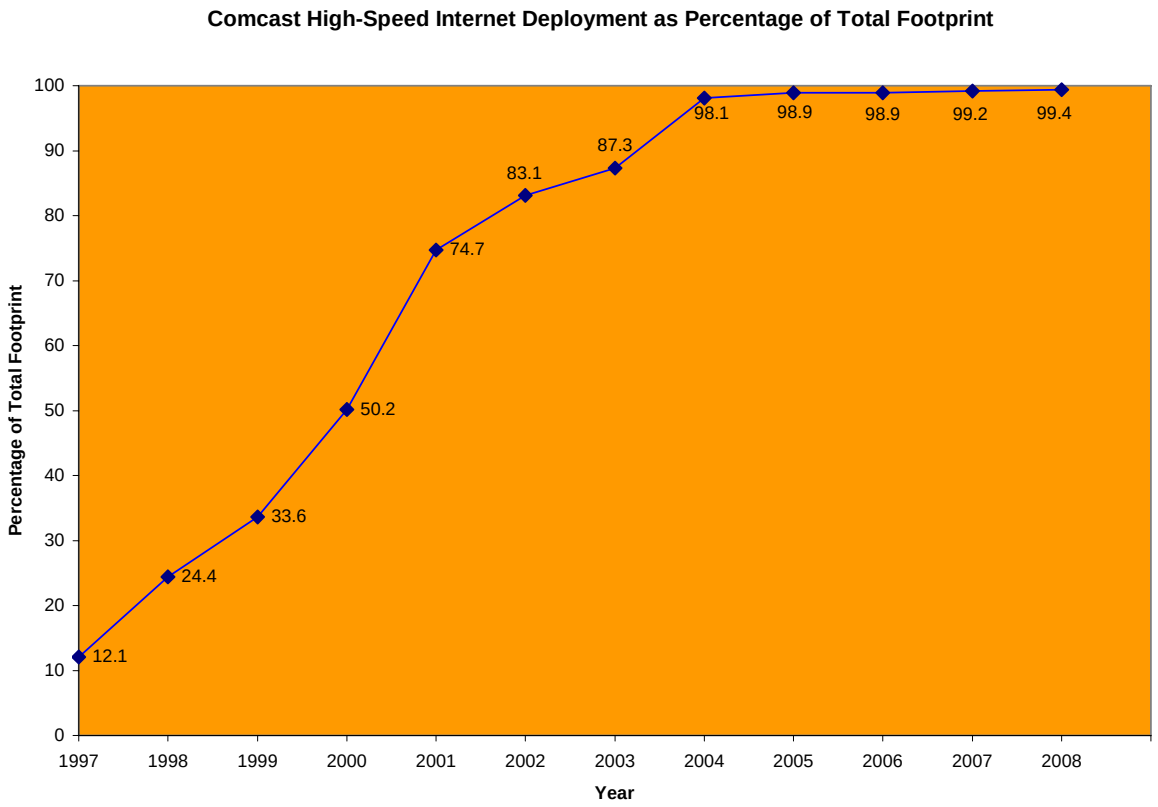
82 *See In re Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, Fifth Annual Report, 13 FCC Rcd. 24284 ¶ 55 (1998).

83 *See* Cable Servs. Bureau, FCC, *Broadband Today* 25 (1999), *available at* http://www.fcc.gov/Bureaus/Cable/Reports/broadbandtoday.pdf.



Since 1996, Comcast has invested tens of billions of dollars to deploy fiber and upgrade its cable systems to make its HSI service available to nearly every home its cable systems pass.[84] With these investments, Comcast has deployed a broadband network that not only meets consumers' demands today, but also can continue to grow as consumers demand more bandwidth and more speed in the future. Comcast's HSI network currently employs over 3,000 Cable Modem Termination Systems ("CMTSes"), servicing over 120,000 fiber nodes. As the demand for Internet bandwidth and faster speeds has increased, Comcast has "split" the nodes (dividing them into smaller and smaller segments) and upgraded its network, thereby ensuring that its

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[84] This includes investments made by companies Comcast has acquired since 1996, such as AT&T Broadband.

customers have the bandwidth and speeds they expect. Bandwidth is increasingly becoming more and more important as Internet traffic continues to grow. In the past year alone, for example, Internet traffic on Comcast's network increased by approximately 42 percent, which is in line with reports and estimates from competitors and industry sources.[85]

While the bulk of Comcast's network remains dedicated to delivering video services, the company is migrating most of its video channels to digital in order to free up additional bandwidth for the high-definition channels and faster Internet service that consumers are demanding. By year-end 2009, Comcast expects to have launched its "All-Digital Initiative" in 50 percent, and to have completed the migration in 30 percent, of its footprint.[86] In addition, Comcast has implemented a number of upgrades to offer faster speeds, such as deploying newer DOCSIS 3.0 CMTSes, adding downstream and upstream data ports, and incorporating PowerBoost™ technology throughout its network.

Comcast and other cable operators' aggressive rollout of broadband Internet service "spurred the [incumbent local exchange carriers ("ILECs")] to offer DSL or risk losing potential subscribers to cable."[87] In a matter of years, the ILECs made DSL available across the majority of their footprints. By 2002, the major ILECs reported almost 95 million DSL-capable lines, and

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[85] *See* Bob Diehl, *AT&T Teams To Test 114Gig*, Lightreading.com, May 11, 2009 (reporting a 45% annual increase of IP traffic on AT&T's network), *available at* http://www.lightreading.com/document.asp?doc_id=176565; Univ. of Minn., *Minnesota Internet Traffic Studies (MINTS)* (reporting an increase of 50-60% in U.S. Internet traffic), http://www.dtc.umn.edu/mints/home.php (last visited June 8, 2009); Cisco Sys., Inc, White Paper, *Cisco Visual Networking Index – Forecast and Methodology, 2007-2012*, at 1 (June 16, 2008) (reporting an estimated 51% increase of Internet traffic in 2008), *available at* http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360.pdf.

[86] *See* Comcast Corp., First Quarter 2009 Earnings Conference Call Transcript 11 (Apr. 30, 2009), *available at* http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9MjEzNzMxMnxDaGlsZElEPTMzNTEyNXxUeXBlPTI=&t=1.

[87] Cable Servs. Bureau, *supra* note 83, at 27.

by 2004, that number rose to almost 114 million.[88] Verizon offers DSL service to 20 million homes in 24 states and the District of Columbia, which represents 80 percent of its footprint.[89] As of December 31, 2007, the Commission estimated that high-speed DSL service was available to 82 percent of all households to which ILECs could provide telephone service.[90]

b. Comcast and Its Competitors Continue To Make Significant Improvements to the Internet Services Available to Americans.

The trend is clear: Comcast always has invested to meet consumer demand. In 2003, Comcast doubled its speed offerings to 3 Mbps.[91] In 2005, speeds were raised twice – from 3 Mbps to 4 Mbps,[92] and then, six months later, to 6 Mbps. As it explained to the Commission at that time, this marked "the third time Comcast has raised broadband speeds without raising the price."[93] Then, in 2008, Comcast nearly tripled the upload speed of its most popular tier, the Performance tier, and doubled the upload speed of its Performance Plus tier, again at no extra cost to its subscribers.[94] And with the deployment of the next generation of DOCSIS –

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88 SNL Kagan, Broadband Cable Financial Databook 67 (2005).

89 *See* Press Release, Verizon, *Verizon Widens Availability of Its Fastest, DSL-Enabled High Speed Internet Service* (May 20, 2009) ("Verizon High Speed Internet service is the company's most popular and most widely available broadband data service."), *available at* http://newscenter.verizon.com/press-releases/verizon/2009/verizon-widens-availability-1.html.

90 *December 2007 FCC High-Speed Internet Report*, *supra* note 19, at 3.

91 *See* Press Release, Comcast Corp., *Comcast To Double Downstream Speeds for Comcast High-Speed Internet Customers* (Oct. 2, 2003), *available at* http://www.comcast.com/About/PressRelease/PressReleaseDetail.ashx?PRID=284&fss=high-speed.

92 *See* Press Release, Comcast Corp., *Comcast Enhances Broadband Service with New Speeds and More Apps for 2005* (Jan. 18, 2005), *available at* http://www.comcast.com/About/PressRelease/PressReleaseDetail.ashx?PRID=175&fss=high-speed.

93 *See* Comcast Corp. Comments, MB Docket No. 05-255, at 53 (Sept. 19, 2005); Press Release, Comcast Corp., *Comcast Delivers New Ultra-Fast Speed Tiers - 8 Mbps and 6 Mbps* (July 12, 2005), *available at* http://www.comcast.com/about/pressrelease/pressreleasedetail.ashx?prid=137.

94 Press Release, Comcast Corp., *Comcast Increases Upstream Speeds for Its High-Speed Internet Customers for No Additional Charge* (June 12, 2008), *available at* http://www.comcast.com/About/PressRelease/PressReleaseDetail.ashx?PRID=765&fss=high-speed.

DOCSIS 3.0 – Comcast is increasing the provisioned speeds in those markets for its Performance customers to 12 Mbps downstream (15 Mbps with PowerBoost™) and 2 Mbps upstream and the provisioned speeds for its Blast! (and Performance Plus) tier customers to 16 Mbps downstream (20 Mbps with PowerBoost™) and 2 Mbps upstream, once again with no increase in price.[95]

Comcast is "engaged in a high-stakes nationwide race among Internet service providers."[96] For our part, Comcast is leading the deployment of the next generation of high-speed Internet services – what we call "wideband." With the introduction of DOCSIS 3.0, where multiple 6 MHz channels that were previously dedicated to cable video services are "bonded" to expand Internet capacity, wideband service offers the potential for speeds of 100 Mbps and more.[97]

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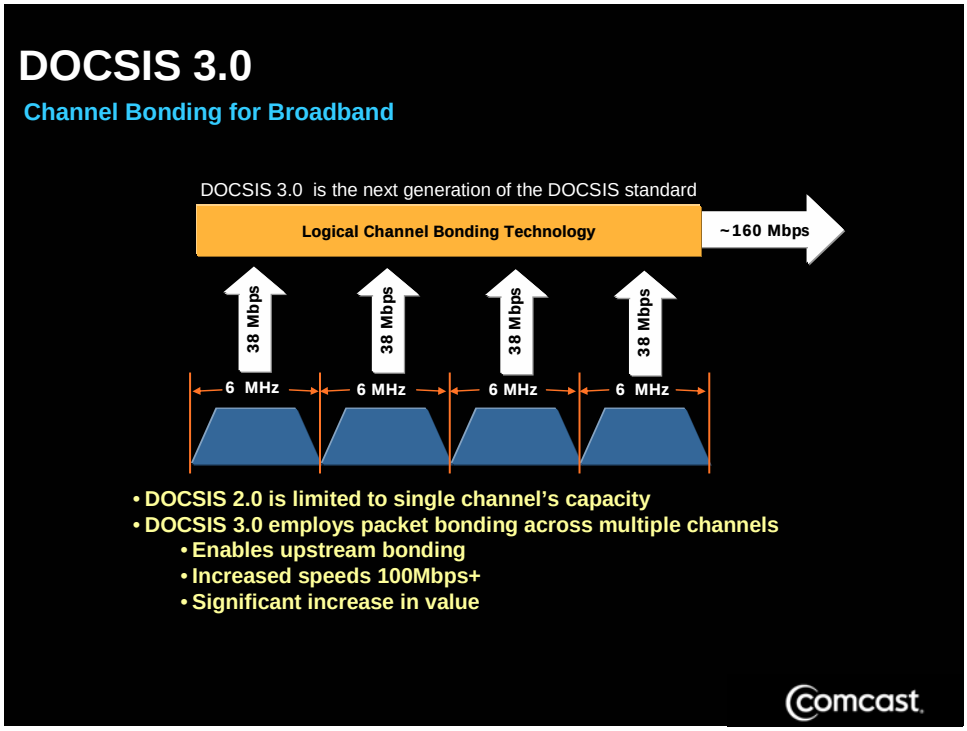
[95] *See* Press Release, Comcast Corp., *Comcast Puts the Pedal to the Metal: Announces New 65% Benchmark To Roll Out Wideband High-Speed Internet Services in 2009* (Feb. 19, 2009), *available at* http://www.comcast.com/About/PressRelease/PressReleaseDetail.ashx?PRID=838; Comcast Corp., *FAQs: What Are the New Internet Speeds That Comcast Will Offer with the Launch of DOCSIS 3.0?*, http://www.comcast.com/Customers/FAQ/FaqDetails.ashx?Id=4859&fss=performance%20plus (last visited June 7, 2009).

[96] Bill Toland, *Comcast Makes Web Links Faster*, Pittsburgh Post-Gazette, May 15, 2009, *available at* http://www.post-gazette.com/pg/09135/970282-96.stm.

[97] *See* Tim McElgunn, Pike & Fischer, *DOCSIS 3.0 Deployment Forecast* 3 (Mar. 2009), *available at* http://www.broadbandadvisoryservices.com/; John C. Hodulik, UBS Investment Research, *Cable Making Gains in Broadband* 5 (May 14, 2009) ("[C]able is ramping up the rollout of DOCSIS 3.0, which will give MSOs the ability to offer download speeds of 100 Mbps and above.").



Comcast began deploying DOCSIS 3.0 last year, and by the end of 2008 was able to offer "wideband" 50/10 Mbps speeds to over 20 percent of the homes in its footprint. As of the date of this filing, Comcast has deployed DOCSIS 3.0 to more than a third of the homes in its footprint, and intends to deploy DOCSIS 3.0 to 65 percent of homes in its footprint by the end of this year. By the end of 2010, Comcast expects to have near-ubiquitous wideband deployment throughout its footprint.

In addition to increasing the speed of existing tiers, the introduction of DOCSIS 3.0 allows residential Comcast customers to purchase new, faster tiers of service, including the Extreme 50 tier, offering up to 50 Mbps of downstream speed and up to 10 Mbps of upstream speed.[98] And customers can buy the Ultra tier, offering up to 22 Mbps of downstream speed (up

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[98] Because the Internet is an interdependent ecosystem, the deployment of next generation broadband Internet service and introduction of new applications and services necessarily require the rest of the ecosystem – the middle mile, the backbone, content-delivery infrastructure, etc. – to scale up as well.

to 30 Mbps with PowerBoost) and up to 5 Mbps of upstream speed.[99] Business customers can sign up for a Deluxe tier, with speeds of 50 Mbps downstream and 10 Mbps upstream, which includes a full suite of business features and support.[100] Existing business class customers will see the Starter tier speeds increase to 12 Mbps downstream and 2 Mbps upstream, and a new Premium Tier will be available that offers speeds of 22 Mbps downstream and 5 Mbps upstream.[101]

Besides increasing broadband Internet service speeds, DOCSIS 3.0 also improves cable operators' abilities to: (1) support Internet Protocol Version 6 ("IPv6");[102] (2) enhance security;[103] and (3) modify the ratio of upstream and downstream channels, which provides significant flexibility in terms of being able to expand additional upstream bandwidth only where and when it is needed.[104]

The increasing speeds offered by cable's high-speed Internet service have motivated the largest telephone companies to announce major investments in fiber to the home and fiber to the node network upgrades, such as Verizon's FiOS and AT&T's U-verse. These fiber networks

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99 *See Comcast Puts the Pedal to the Metal*, *supra* note 95.

100 *See id.*

101 *See id.*

102 John T. Chapman & Shalabh Goel, Cisco Sys., *The Road to DOCSIS 3.0: Another Take on Migration Strategy*, Communications Technology, Dec. 1, 2006, *available at* http://www.cable360.net/ct/sections/features/20942.html ("DOCSIS 3.0 also supports IPv6, which provides expanded IP address space, among other features, to encompass the millions of new network-addressable devices that are being created around the world and have been taxing current IP address limitations. The initial deployment phase allows the cable operator to set up an IPv6 control and management plane for managing the cable modems, set-top boxes, and multimedia terminal adapters (MTAs) with a cost-effective upgrade. In a subsequent deployment phase, cable operators can offer IPv6 directly to the home network. Many new devices are already IPv6 capable, and cable operators could soon be running the largest IPv6 networks in the world.").

103 *Id.* (noting that DOCSIS 3.0 includes a number of security features, "including advanced encryption standard (AES), [and] security provisioning and theft of service features").

104 *See* McElgunn, *supra* note 97, at 3.

operate at much faster speeds than previous DSL networks, with Verizon offering service at up to 50 Mbps downstream and 20 Mbps upstream.[105] Verizon has reported that it will invest $23 billion in its all-fiber FiOS network through 2010, and that its service will be available to 18 million homes.[106] AT&T is deploying its U-Verse system across its own footprint, reportedly reaching 17 million living units at the end of 2008, and marketing to 65 percent of those units.[107]

Although currently less robust than wireline broadband Internet services, other broadband technologies, including mobile wireless, satellite, and broadband over power-line, are also delivering broadband Internet services to consumers. These technologies continue to evolve to offer faster speeds and unique features. For example, AT&T recently announced that it will be upgrading its 3G wireless broadband service that potentially can deliver speeds of 7.2 Mbps,[108] confirming Wharton School of Business professor Kevin Werbach's observation that "wireless connections are the most effective vehicle for facilitating disruptive innovation in the broadband arena."[109]

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[105] *See Verizon Widens Availability of Its Fastest, DSL-Enabled High Speed Internet Service*, *supra* note 89.

[106] *See id.* Verizon recently announced that, if its transaction with Frontier Communications is approved, the number of homes in its service area that can be served by its FiOS service after the transaction will be 17 million. *See* Verizon Communications, Inc., *Investor Conference Final Transcript, Verizon To Discuss Plans To Divest Wireline Business in 14 States* 3, 6 (May 13, 2009) ("[W]hen we get finished with this [transaction], we are going to drive to get somewhere between 65% and 80% FiOS coverage [because], as technology shifts and changes and we get smarter about it and we can compress more work into the same amount of capital expenditures, we can find ourselves getting slightly more coverage."), *available at* http://investor.verizon.com/news/20090513/; *see also* Ed Gubbins, *Verizon: With Frontier Deal, FiOS Footprint Could Reach 80% Coverage*, Tel. Online, May 13, 2009, *available at* http://telephonyonline.com/independent/news/verizon-frontier-communications-deal-0513/.

[107] AT&T Inc., *Form 10-K*, at 2 (Feb. 29, 2009), *available at* http://ccbn.10kwizard.com/xml/download.php?repo=tenk&ipage=6164430&format=PDF.

[108] Press Release, AT&T, Inc., *AT&T To Deliver 3G Mobile Broadband Speed Boost* (May 27, 2009), *available at* http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26835.

[109] Philip J. Weiser, Aspen Inst., *A Framework for a National Broadband Policy* 22 (2008) ("*2008 Aspen Report*") (quoting Professor Werbach), *available at* http://www.aspeninstitute.org/publications/framework-national-broadband-policy. "Bolstering this argument, one study conducted by industry veterans suggests that WiMAX, 'if deployed and marketed correctly, is a truly disruptive technology that could unseat the telco-cable duopoly and

(footnote continued…)

Consumers' increasing appetite for mobility has resulted in significant deployment of wireless broadband technology. CTIA reports that 3G technology is widely available, reaching 92 percent of Americans.[110] Verizon's 3G network provides download speeds between 600 Kbps and 1.4 Mbps and upload speeds between 500 and 800 Kbps, and is now available to over 281 million people.[111] As the industry starts its transition from 3G to 4G networks, more mobile devices will be able to benefit from "broadband to the person."[112] Verizon, AT&T, and Sprint have indicated that they will soon be deploying faster 4G networks.[113] In fact, earlier this year, Sprint announced the launch of its 4G WiMAX service, which reportedly delivers peak speeds of 12 Mbps downstream and 2 to 4 Mbps upstream.[114] Clearwire already has launched its Mobile WiMAX service offering speeds up to 6 Mbps on residential modems and up to 4 Mbps for mobile service in Baltimore and Portland, and it intends to expand to other markets later this year.[115] Although Verizon has not stated what speeds its new LTE network might deliver

(…footnote continued)

provide consumer choice in broadband services.'" *Id.* (quoting Carol Wilson, *WiMAX Truly Disruptive if Marketed Well, Study Says*, Telephony Online, July 23, 2007, *available at* http://telephonyonline.com/wimax/technology/wimax_disruptive_study_072307).

[110] CTIA, *CTIA Advocacy: Broadband* (citing a study by CostQuest Associates, Inc.), http://www.ctia.org/advocacy/policy_topics/topic.cfm/TID/37 (last visited June 8, 2009).

[111] Verizon Inc., *Q1 Investor Quarterly 2009*, at 7 (Apr. 27, 2009), *available at* http://investor.verizon.com/financial/quarterly/vz/1Q2009/1Q09Bulletin.pdf?t=633780659285962561.

[112] Ex Parte Letter of Christopher Guttman-McCabe, CTIA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 09-51, at 15 (May 12, 2009).

[113] *See* Verizon Wireless Public Interest Statement, WTB Docket No. 08-95, at 13-14 (June 13, 2008); AT&T Inc. Public Interest Statement, WT Docket No. 08-246, at i (Nov. 21, 2008); Sprint Nextel Corp. Public Interest Statement, WT Docket No. 08-94, at 24 (June 6, 2008).

[114] Press Release, Sprint Nextel, *Sprint Extends 4G Leadership by Announcing Next U.S. Markets To Experience Sprint 4G* (Mar. 25, 2009), *available at* http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1269807&highlight=.

[115] *See* Press Release, Clearwire Corp., *Clearwire Introduces Clear ™ 4G Mobile Internet Service to Portland* (Jan. 6, 2009), *available at* http://newsroom.clearwire.com/phoenix.zhtml?c=214419&p=irol-newsArticle&ID=1240894&highlight=.

commercially, it has confirmed that field trials demonstrated peak download speeds of 50 to 60 Mbps (although the service is expected to be made available, at least initially, at much lower speeds).[116]

Wi-Fi hotspots that enable computers and smartphones to establish mobile connections to the Internet in public areas such as airports, libraries, and coffee shops are also important sources of consumer connections to broadband Internet service. According to one registry, the number of public Wi-Fi hotspots in the United States is currently nearly 70,000, or 150 percent more than any other country in the world.[117] AT&T alone offers consumers access to over 20,000 Wi-Fi hotspots throughout the United States.[118] Wireless providers are increasingly offering free Wi-Fi connectivity to customers who subscribe to wireless plans and home broadband Internet plans.[119] According to a recent ABI Research study, demand for Wi-Fi-enabled smartphones is also increasing.[120] Verizon and Sprint both announced that they will market and sell "MiFi" devices, which will allow users to connect multiple devices to a 3G network by creating a Wi-Fi

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[116] Press Release, Verizon Wireless, *Verizon Wireless Fosters Global LTE Ecosystem as Verizon CTO Dick Lynch Announces Deployment Plans* (Feb. 18, 2009), *at* http://news.vzw.com/news/2009/02/pr2009-02-18.html.

[117] JiWire, Inc., *Wi-Fi Finder* (reporting that the country with the next highest number of Wi-Fi hotspots is the United Kingdom with approximately 28,000), http://v4.jiwire.com/search-hotspot-locations.htm (last visited June 8, 2009).

[118] *See* Press Release, AT&T Corp., *AT&T Sees Surge in Wi-Fi Connections* (Apr. 23, 2009), *available at* http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26765.

[119] *See AT&T Reports Dramatic Growth in Wi-Fi Users and Connections*, Cell Phone Digest, Apr. 24, 2009, *available at* http://www.cellphonedigest.net/news/2009/04/att_reports_dramatic_growth_in.php; Vishesh Kumar, *Verizon To Offer Free Wi-Fi to Broadband Subscribers*, Wall St. J., May 1, 2009, *available at* http://blogs.wsj.com/digits/2009/05/01/verizon-to-offer-free-wi-fi-to-broadband-subscribers/.

[120] *See* Press Release, Wi-Fi Alliance, *Wi-Fi Is Now a Must-Have for Mobile Phones; User Affinity To Drive Annual Shipments to 300 Million in 2011* (Apr. 1, 2009), *available at* http://www.wi-fi.org/pressroom_overview.php?newsid=795.

hotspot.[121] Comcast recently announced that it will be trialing Comcast Wi-Fi "that allows Comcast High-Speed Internet customers to enjoy Wi-Fi Internet access in dozens of [commuter] locations throughout the New Jersey region."[122]

Satellite also plays an important role in the broadband marketplace, often delivering a baseline level of broadband Internet service to the most remote parts of the country. Although satellite-provided broadband Internet service has limitations, it can be cost-effective in reaching areas where the cost of other technologies is prohibitive.[123] Companies like HughesNet and WildBlue have positioned themselves as a nationwide alternative to cable and telco HSI.[124] WildBlue offers download speeds of up to 1.5 Mbps, and upload speeds of 256 Kbps, while HughesNet offers download speeds of 5 Mbps, and upload speeds of 300 Kbps to 1 Mbps.[125]

These extensive deployments are notable achievements. An independent study by the global consulting firm LECG Ltd. found that the United States has the best broadband "Business Infrastructure" and "Government Infrastructure" in the world.[126] It also found that, while

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[121] *See* Phil Goldstein, *Sprint Follows Verizon in MiFi Game*, Fierce Wireless, May 13, 2009, *available at* http://www.fiercewireless.com/story/sprint-follows-verizon-mifi-game/2009-05-13.

[122] Comcast Corp., *Comcast WiFi: When You're Here, So Is the Internet*, http://www.comcast.com/wifi/ (last visited June 8, 2009).

[123] Satellite broadband service today can offer almost all Americans speeds that qualify as Basic Broadband Internet Service, or "first generation" broadband as the Commission calls it, but its ability to achieve improved capabilities in the future is unknown. It is important to acknowledge that, regardless of whether satellite broadband technology improves, in certain extremely remote geographic areas, it will be the only viable broadband Internet option for some consumers.

[124] By partnering with other communications providers like DirecTV, AT&T, and the NRTC, WildBlue, which can provide its satellite Internet services nationwide, gains further marketing visibility. *See* Press Release, WildBlue Communications Inc., *WildBlue Signs Wholesale Distribution Agreements with DirecTV and EchoStar* (June 9, 2006), *available at* http://www.wildblue.com/company/doPressReleaseDetailsAction.do?pressReleaseID=31; *see also* AT&T Inc., *AT&T High Speed Internet via Satellite Is Here*, http://www.attwb.net/ (last visited June 2, 2009); NRTC, *WildBlue*, http://www.nrtc.coop/pub/us/wildblue/ (last visited June 2, 2009).

[125] HughesNet and WildBlue Inc. Notice of Ex Parte Communication, GN Docket No. 09-40, Attach. at 3 (Apr. 2, 2009).

[126] *Connectivity Scorecard 2009: United States*, *supra* note 77, at 1.

"Consumer Infrastructure" in the United States trails some other countries' – which in part is due to lower household penetration of personal computers – "Consumer Usage & Skills" in the United States is very high.[127] At the 2007 Aspen Institute Conference on Communications and Society, Stifel Nicholas Analyst Blair Levin "emphasiz[ed], and other participants agreed, that competition between two pipes is significant, and that countries with both upgraded cable and telephone infrastructure are far better off – in terms of enjoying the benefits of competition – than those with a broadband monopoly."[128]

In sum, with few exceptions, broadband Internet service and availability in this country are very good. "[T]he data show us that we are not falling behind other countries and can afford to take the time to carefully consider new policies that will affect this critical infrastructure."[129]

2. The Plan Should Develop a Strategy To Promote Deployment of Broadband Internet Service to Unserved Areas.

Despite the rapid pace of network deployment, it is widely acknowledged that parts of the country are still beyond the reach of broadband Internet service. The U.S. Government Accountability Office previously concluded that, based on Commission data in 2005-2006,

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127 *Id.*

128 *2008 Aspen Report*, *supra* note 109, at 21. In comparing whether facilities-based competition between cable operators and telephone companies in the United States fared better than facilities-based competition in the United Kingdom, "where cable providers have not made significant broadband rollouts" and where "the regulatory authority mandated that British Telecom (BT) separate its wholesale and retail arms requiring BT to treat retail suppliers the way they treat their own suppliers," the *2008 Aspen Report* notes that

> [i]n the UK, Ofcom's William Webb reported that 99.6 percent of all homes have access to broadband at 2 mbps, and a few homes get 4 mbps. Webb acknowledged that the wholesale/retail split does leave BT with a limited incentive to build out fiber, but he suggested that it is unclear whether people are truly interested in speeds beyond what is currently available.

Id. This comment reinforces what many commentators have noted – that in the absence of facilities-based competition, the incentives for incumbents to invest aggressively in next-generation speeds and capabilities is limited.

129 Wallsten, *supra* note 35, at 4.

"deployment of broadband networks has been extensive" while gaps remain in rural areas.[130] Some studies have estimated that 10 percent of the population does not have access to broadband,[131] although this is overstated given that cable broadband Internet service alone is available to 92 percent of U.S. households. An estimated 15 percent of rural households lack broadband Internet access.[132]

According to a report by the Commission's Chief Technologist Jon Peha, rural populations are relying on dial-up in greater numbers than their urban and suburban counterparts "because many of them are unable to switch to a faster connection due to the unavailability of broadband where they live."[133] This lack of service, according to Mr. Peha, is directly attributable to the high cost per household of providing broadband in rural areas.[134] Given that the majority of residential broadband Internet service is provided through wired services, like cable, fiber, and DSL, "the cost per potential subscriber increases with the distance from each customer to the nearest aggregation point."[135]

With this in mind, the first place for the Commission to focus its attention – and for NTIA and the Rural Utilities Service ("RUS") to focus stimulus dollars – is on connecting rural

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130 U.S. Gov't Accountability Office, *Broadband Deployment Is Extensive Throughout the United States, but It Is Difficult To Assess the Extent of Deployment Gaps in Rural Areas*, GAO-06-426, at 3 (May 2006), *available at* http://www.gao.gov/new.items/d06426.pdf.

131 *See Pew Home Broadband Adoption 2008*, *supra* note 36, at iii.

132 *See id.* While recognizing that this is a problem that needs to be addressed, it is also important to keep the magnitude of the problem in perspective. In 1935, some 40 years after the introduction of electricity into American homes, just over 10 percent of farm families were receiving central-station electricity to their homes. *See* Robert T. Beall, *Rural Electrification*; Yearbook United States Dep't of Agric. 790 (1940).

133 Jon M. Peha, The Hamilton Project, *Bringing Broadband to Unserved Communities* 9 (July 2008), *available at* http://www.brookings.edu/~/media/Files/rc/papers/2008/07_broadband_peha/07_broadband_peha.pdf.

134 *See id.*

135 *Id.* at 10.

communities where there are natural commercial limitations on providing broadband. "Providing incentives to build broadband infrastructure directly addresses the availability problem and could be of particular help to Americans living in rural areas, where 24% of dial-up users say they cannot get broadband because high-speed infrastructure doesn't reach their home."[136] In addition, the Commission should focus on ensuring that all schools, libraries, hospitals, and other public facilities have broadband Internet service.[137]

To develop a strategy "to ensure that all people of the United States have access to broadband capability" and "to establish benchmarks for meeting that goal," the Commission must first identify those areas where access is currently not available. Once it identifies those areas, in conjunction with other government agencies, especially NTIA and RUS, and state governments, it should propose specific steps beyond the stimulus funding already allotted that Congress should take to facilitate deployment to those unserved areas.

a. Measuring Progress to Date Means Acknowledging Both What We Know and What We Don't Know, Including Limitations of Existing Data.

As emphasized in these comments, it is critical to the success of the Plan that the Commission work with accurate, useful data. The broadband data collection effort that the Commission is currently engaged in, and any mapping project generated through NTIA stimulus

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[136] John B. Horrigan, Pew Internet & Am. Life Project, *Obama's Online Opportunities II: If You Build It, Will They Log On* 2 (Jan. 21, 2009), *available at* http://www.pewinternet.org/Reports/2009/Stimulating-Broadband-If-Obama-builds-it-will-they-log-on.aspx.

[137] *See* Commonwealth Broadband Roundtable, Va., *Final Report: Commonwealth's Broadband Roundtable Presented to Governor Timothy M. Kaine* 16 (Sept. 9, 2008) ("*Virginia Broadband Report*") ("Priority should be given to un-served areas of the Commonwealth."), *available at* http://www.otpba.vi.virginia.gov/pdf/Governor_report.pdf.

funding, should strive to identify those areas of the country where American homes and businesses have no access to broadband Internet service.[138]

A number of states have already initiated their own data collection efforts that include both mapping and consumer surveys. For example, the California Broadband Task Force undertook an extensive mapping program to create maps illustrating current broadband availability throughout California.[139] Similarly, Connected Nation, a leading not-for-profit entity in broadband mapping and data collection, has worked with Kentucky, Minnesota, Ohio, South Carolina, and Tennessee to map broadband availability and adoption in those states.[140] Connected Nation is currently mapping broadband in North Carolina and soon will be initiating mapping efforts in Colorado, Kansas, and Illinois. Other states have initiated their own mapping and data collection efforts, although in some cases potentially without sufficient protections against disclosure of confidential information, and not necessarily in a consistent fashion among the states. The Commission should act as a clearinghouse for all such data and mapping efforts and ensure that the confidential data of providers are adequately protected. It is especially important for the Commission to further support broadband mapping efforts, ideally to be completed before any additional grants for broadband deployment to "unserved" areas are made.

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[138] The *Rural Broadband Report* recognized the importance of mapping projects. *See Rural Broadband Report* at 43-44 ¶¶ 101-104.

[139] *See California Broadband Report* at 30-33; *see also* Press Release, Office of the Governor, Commonwealth of Va., *Governor Kaine Releases Broadband Availability Map* (May 14, 2009) (announcing the release of Virginia's first broadband availability map, http://otpba.vi.virginia.gov/pdf/VA_Broadband_Coverage%205mb.pdf, "the only one in the nation developed at no cost to the state," that "is the product of a collaborative effort between the Center for Innovative Technology (CIT), [several state agencies], and the voluntary participation of more than 25 broadband providers"), *available at* http://www.governor.virginia.gov/mediarelations/newsreleases/viewRelease.cfm?id=946.

[140] *See* Connected Nation, *State Programs*, http://www.connectednation.org/state_programs/ (last visited June 8, 2009). Connected Nation also has undertaken extensive research and consumer surveys to develop national, Kentucky, Ohio, and Tennessee data. *See* Connected Nation, *Research*, http://www.connectednation.org/research/ (last visited June 8, 2009).

The National Broadband Plan should include benchmarks for the government to conduct similar surveys (either through the Census Bureau or another government entity). And, as part of its mapping and data collection efforts, the Commission should specifically focus on identifying those hospitals, schools, libraries, and other public facilities that do not currently have access to broadband. "These data would not only help identify communities with the greatest unmet demand for connections, but would also assist in the efficiency of eventually establishing those connections."[141]

b. The Commission Should Work with Other Agencies and State Governments To Establish Benchmarks To Deploy Broadband Internet Services to as Many Unserved Areas and Public Facilities as Economically Feasible.

Once the truly unserved areas and public facilities of the country are identified, the Plan should recommend that Congress adopt policies to ensure the deployment of broadband Internet services to those areas and facilities. "The priorities [should be] unserved areas and key facilities that require especially large amounts of bandwidth, namely local hospitals and governments."[142]

The Commission first should consider incentives that Congress and the states could use to stimulate private-sector investment to deploy broadband Internet service in unserved areas and to public facilities. For example, Congress and the states could create certain tax advantages for investment in broadband networks in those areas and facilities, if done in a technologically and competitively neutral fashion. As part of the Plan, the Commission should also consider how to "remove roadblocks to private parties providing the funding for ICT expansion through business

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141 *2009 Aspen Report*, *supra* note 35, at 21.

142 *Id.* at 18 (quoting Graham Richard, former Mayor of Fort Wayne, Ind.).

investment."[143] For example, the Commission should explore the removal of impediments to accessing public rights-of-way and erecting wireless towers,[144] and what steps could be taken to minimize burdens from permitting and licensing.[145]

In those areas where it is does not make business sense for the private sector to deploy broadband facilities but where there is sufficient identified demand to support, in large part, the ongoing costs of providing broadband service, the Commission could propose that Congress explore funding mechanisms for underwriting the capital costs of broadband facilities, either through direct grants or through loans.[146] Any such program should be done in an incremental approach with pilot programs as opposed to a costly sweeping subsidy; Congress could rely on the states as incubators and test beds for such pilot programs. The Plan also should support government funding for deployment of Next-Generation Broadband Internet Services capable of providing at least 50 Mbps to hospitals, schools, libraries, and other public facilities.

Many states have already begun looking at these questions. For example, in Virginia, the Commonwealth's Broadband Roundtable, led by Senator Mark Warner and Aneesh Chopra (now the nation's first Chief Technology Officer), presented to the Governor a report recommending a number of proposals "to complete the 'slate' of broadband resources and eliminate remaining deployment barriers [in] the Commonwealth," including:

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143 *Id.* at 22.

144 *See, e.g.*, *Broadband Conduit Deployment Act of 2009*, H.R. 2428, 111th Cong. (May 14, 2009) (introduced by Rep. Anna Eshoo (D-CA)) (proposing to require broadband conduit be installed in new highway construction).

145 *See* Illinois Broadband Deployment Council, *Broadband Deployment Council Subcommittee Reports* 17 (July 2008) ("*Illinois Broadband Report*") ("Illinois should take advantage of available Internet-based methods to reduce the resources required to design and implement communications infrastructure."), *available at* http://illinoisbroadbanddeployment.pbwiki.com/f/BDC_08_Committee_Reports.pdf.

146 "Underwriting the capital cost of facilities in areas without sufficient demand creates significant risk that the government funds may be diverted to the construction of facilities that ultimately must be abandoned because providers are unable to recoup the operating costs of providing the service." *Moving the Needle*, *supra* note 81, at 7.

- **Leverage existing assets:** Create incentives for state and local governments to allow placement of additional antennae on existing government-owned towers and other structures (e.g. buildings, water towers, etc.). Require that expenditure of public dollars in construction of towers and other broadband-related infrastructure consider potential use by private sector providers.

- **Create incentives to investment:** Establish incentive programs (exemptions, deductions, tax credits, application-centric grant programs) to help attract private infrastructure investment.

- **Work with federal agencies:** Revamp existing loan/grant and incentive programs to increase and prioritize aid into unserved areas.[147]

In Oregon, the Oregon Telecommunications Coordinating Council's recommendations focused on how deployment of broadband service to schools, libraries, hospitals, and public safety facilities will address broader policy goals:

- **Education.** "Establish goals for equal access that provide appropriate connectivity for every K-20 institution within Oregon. Explore improvements to access mechanisms to the Universal Service Fund programs to make them easier to use and more understandable for schools and libraries. . . . Support funding for development of new broadband resources and opportunities."[148]

- **Healthcare Networks.** "Support implementation of a sustainable statewide broadband telecommunications health network to improve quality of care across the state, recognizing that it will simultaneously increase demand for broadband services."[149]

- **Public Safety.** "Support a multi-organizational development of an appropriate 21st century public safety communications network. Support the concept of multi-purpose broadband networks. Encourage mobile broadband, not just fixed broadband, because mobile broadband could greatly improve public safety communications. Explore co-

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147 *Virginia Broadband Report* at 15-16.

148 *Oregon Broadband Plan* at 9. The ORTCC was authorized by the Oregon legislature to "study alternative approaches to providing coordinated statewide, regional and local telecommunications services, including providing services to unserved or underserved areas of the state." *Id.* at 5.

149 *Id.* at 11. The *California Broadband Report* recommends that California create a statewide e-health network: "a secure telecommunications environment linking multiple organizations and individuals to enable the provision of electronically delivered health services, research, and education." *California Broadband Report* at 71.

location of commercial wireless transceivers and public safety transceivers on shared communications towers."[150]

In New York, the legislature appropriated a total of $5 million, "$2,500,000 for increased physical access to broadband Internet services statewide, and another $2,500,000 to provide equal and universal access to broadband Internet services for underserved rural and urban areas, including schools and libraries."[151] The funds were administered through grants made by the Broadband Access Program Management Office based on recommendations from the New York State Council for Universal Broadband.[152] The grants ranged from $60,000 for a project to provide broadband service to the Newton Falls community; to $430,369 to provide wireless broadband Internet service for 90 percent of 600 households, four school districts, and a community college in the Town of Dryden; to nearly $1 million to deliver affordable broadband Internet service to 7,000 low-income households in New York City; to almost $1.5 million to develop a Broadband over Power Line solution for 12,600 households in Onondaga County.[153]

In North Carolina, the e-NC Authority has awarded $27,355,908 in grants since 2001 "primarily to incent deployment of high-speed Internet, to create applications that would encourage the use of the Internet, to provide digital literacy training and public access sites, and to establish and support Business & Technology Telecenters."[154] For 2009, the e-NC Authority sought an additional $12.5 million to award grants for deployment of broadband Internet service

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150 *Oregon Broadband Plan* at 12.

151 N.Y. Office of Chief Info. Officer, N.Y. Office of Tech., *Universal Broadband Strategy for the State of New York* 18 (Dec. 2007) (revised Mar. 25, 2009) ("*New York Broadband Plan*"), *available at* http://www.oft.state.ny.us/OFT/UniversalBroadband/Universal_Broadband_Strategy.pdf.

152 *See id.*; *see also New York 2008 Broadband Report*, *supra* note 8, at 16.

153 *New York 2008 Broadband Report*, *supra* note 8, at 16.

154 e-NC Authority, *Grants Awarded*, http://www.e-nc.org/GrantsAwarded.asp (last visited June 8, 2009).

in underserved communities; $1.5 million to directly subsidize consumers' purchase of broadband Internet service based on its views that "state investment toward digital inclusion allows market demand for broadband services to grow to levels that will compel natural deployment from telecommunications service providers"; and $1 million to build "Telecenters" – centers that provide broadband Internet service to the public – in two new rural communities.[155]

These approaches represent targeted and potentially cost-effective ways to promote broader deployment of broadband Internet service in unserved areas and to key public institutions. The Commission should explore them further to determine their applicability to the Plan, including by conducting a cost-benefit analysis for each.

c. The USF High-Cost Program Can Play an Important Role in Promoting Broadband Internet Access, but Only After Comprehensive Reform To Establish Sustainable Support Mechanisms.

The Plan should also establish a framework to completely reorient the Commission's USF High-Cost Program (the "High-Cost Program" or "Program") to support the deployment of broadband Internet service in rural areas. The High-Cost Program can play a key role in promoting ubiquitous deployment of broadband Internet service, but only after the Commission undertakes comprehensive reform to make it more efficient and control its ballooning costs.

Much of the current High-Cost Program is based on "outdated regulatory assumptions" that no longer apply in a world of broadband technology and increased competition.[156] The High-Cost Program, which accounts for more than 60 percent of total USF expenditures, is

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[155] e-NC Authority, *2009 Legislative Priorities*, http://www.e-nc.org/LegislativeAgenda.asp (last visited June 8, 2009).

[156] *High-Cost Universal Service Support*, Order on Remand and Report and Order and Further Notice of Proposed Rulemaking, WC Docket No. 05-337, FCC 08-262 ¶ 39 (Nov. 5, 2008).

currently designed for a narrowband world. Broadband Internet service is not an explicitly supported service under the High-Cost Program,[157] and the Program's support mechanisms ignore the efficiencies and additional revenues that broadband technologies and services make possible.

The Commission's priorities for the High-Cost Program should reflect the critical role that access to broadband Internet service plays in our economy and society. The Commission should therefore seek comment on redirecting the entirety of the High-Cost Program to supporting ubiquitous deployment of broadband Internet services. Although, as explained above, the marketplace has been successful in delivering affordable broadband access to the vast majority of Americans, there are rural areas where it is not economically feasible to deploy broadband without government support. Redirecting the High-Cost Program to support broadband Internet – with clear rules and policies to encourage efficient expenditure of capital and technology choices that will require *a minimum of ongoing subsidy* – will align the Program with the high priority the Administration, Congress, and the Commission have placed on universal, affordable access to broadband Internet service. It will also further the universal service principles established by Congress.[158]

Transitioning the High-Cost Program to support broadband Internet access will fail unless it includes comprehensive reform to control the costs to consumers and to promote more efficient, targeted distribution of funds. Both the Commission and the courts have recognized

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[157] Rural carriers, however, have used high-cost support for local telephone service to provide indirect support for the deployment of broadband infrastructure. *See Notice* ¶ 39.

[158] *See* 47 U.S.C. § 254(b)(2) ("Access to advanced telecommunications and information services should be provided in all regions of the Nation."); *id.* § 254(c)(1) ("Universal service is an evolving level of telecommunications service that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services.").

that USF subsidies are a burden on the consumers of those providers who contribute to the USF pool and have indicated that the Commission must take this burden into account in establishing its High-Cost Program support mechanism.[159] The burden on unsubsidized consumers has grown significantly in the past decade. By 2008, the High-Cost Program had risen to $ 4.4 billion,[160] a 15 percent increase from the 2005 level ($3.9 billion)[161] and a 126 percent increase from the 2000 level ($1.95 billion).[162] The contribution factor has tracked these increases, growing from 5.7 percent in 2000, to 10.2 percent in 2005, to 11.4 percent in 2008.[163] As the Commission has stated, the explosive growth of the High-Cost Program "places the federal universal service fund in dire jeopardy."[164] Modifying the Program to provide explicit support for broadband Internet access without fundamental reform of the Program's support mechanisms would only exacerbate the excessive burdens on consumers.

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159 *See Qwest Communications Int'l v. FCC*, 398 F.3d 1222, 1234 (10th Cir. 2005) ("*Qwest II*") (noting that "excessive subsidization arguably may affect the affordability of telecommunications services [for unsubsidized users], thus violating the principle in § 254(b)(1)"); *High-Cost Universal Service Support; Federal-State Joint Board on Universal Service*, Notice of Inquiry, 24 FCC Rcd. 4281 ¶ 20 (2009); *Federal-State Joint Board on Universal Service*, Seventh Report and Order, 14 FCC Rcd. 8078 ¶ 69 (1999) ("*Universal Service Seventh Report & Order*").

160 *See* FCC, *Universal Service Monitoring Report*, CC Docket No. 98-202 Table 1.10 (2008) (reporting program totals for the High Cost Program for the first through third quarters of 2008) ("*2008 Universal Service Monitoring Report*"), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-287688A1.pdf; Public Notice, *Proposed Fourth Quarter 2008 Universal Service Contribution Factor*, 23 FCC Rcd. 13446, at 2 (2008) (reporting total program collection for the High Cost Program for the fourth quarter of 2008).

161 FCC, *Universal Service Monitoring Report*, CC Docket No. 98-202, at 1-34, Table 1.10 (2006) ("*2006 Universal Service Monitoring Report*") (reporting data received through May 2006), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-269251A1.pdf.

162 FCC, *Universal Service Monitoring Report*, CC Docket No. 98-202, Table 1.2a (2001) (reporting data received through April 2001), *available at* http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/Monitor/ mrs01-0.pdf.

163 *Id.* at 1-6; *2006 Universal Service Monitoring Report* at 1-34; *2008 Universal Service Monitoring Report* at 1-35.

164 *High-Cost Universal Service Support*, Order, 23 FCC Rcd. 8834 ¶ 6 (2008) ("*2008 High-Cost Fund Order*").

President Obama has called for federal agencies to exercise fiscal discipline in the programs they administer:

> All across America, families are tightening their belts and making hard choices. Now, Washington must show that same sense of responsibility. . . . [W]e must . . . recognize that we cannot meet the challenges of today with old habits and stale thinking. So much of our government was built to deal with different challenges from a different era. Too often, the result is wasteful spending, bloated programs, and inefficient results. It's time to fundamentally change the way that we do business in Washington. To help build a new foundation for the 21st century, we need to reform our government so that it is more efficient, more transparent, and more creative. That will demand new thinking and a new sense of responsibility for every dollar that is spent.[165]

The Commission should reflect the President's call for fiscal discipline and efficiency in its reform of the High-Cost Program to promote the deployment of broadband Internet access services based on the following principles.

i. The Program should be capped at 2008 levels.

The Commission should ensure that any additional costs created by transitioning the High-Cost Program to support broadband Internet access be offset by savings from reform of the Program. The Commission should accordingly impose a competitively and technologically neutral cap on the High-Cost Program at its 2008 level, which was $4.4 billion, pending implementation of comprehensive reform. The Commission has previously used caps to control segments of the Program,[166] and various parties have advocated an overall cap on the size of the

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[165] President Barack Obama, *President Obama Announces Steps To Reform Government and Promote Fiscal Discipline*, Weekly Address (Apr. 25, 2009), *available at* http://www.scribd.com/doc/14623610/President-Obamas-Weekly-Radio-Address-April-25-2009-Video-and-Transcript.

[166] *See, e.g., 2008 High-Cost Program Order*, 23 FCC Rcd. 8834 ¶ 5 (adopting interim cap on high-cost support for competitive eligible telecommunications carriers); 47 C.F.R. §§ 54.507, 54.623 (imposing annual cap on expenditures under the "E-rate" and rural health care USF programs); *see also Alenco Communications, Inc. v. FCC*, 201 F.3d 608, 620-21 (5th Cir. 2000) ("The agency's broad discretion to provide sufficient universal service funding includes the decision to impose cost controls to avoid excessive expenditures that will detract from universal service.").

Program as it is transitioned to a broadband support mechanism. Free Press, for example, recently testified that a USF reform policy should begin "with the assumption that the size of the high cost fund will be fixed at the 2008 level," and that "continued fund growth is politically unfeasible."[167] Indeed, it should be possible to lower the cap over time as the efficiencies created by reformed support mechanisms and new technologies lessen the need for subsidies.

ii. Support should be narrowly targeted to where it is needed.

High-Cost support should be limited to those rural areas that truly need it – areas that are unserved today and would remain unserved by broadband Internet service in the absence of USF subsidies. The Commission should also coordinate the distribution of High-Cost support with subsidies granted under the Recovery Act and other government programs to prevent the unjust enrichment that would result if providers were allowed to receive *both* subsidies under those programs *and* the High-Cost Program to deploy the same broadband facilities.[168]

iii. Support levels should take into account all revenues generated by subsidized facilities.

Consumers are increasingly subscribing to bundles of both local telephone service, for which they receive High-Cost support, and other services, including voice mail, Internet access, and video services.[169] ILECs provide these service bundles over the same network in rural areas,

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[167] *Universal Service: Reforming the High-Cost Fund: Hearing Before the Subcomm. on Communication, Tech., & the Internet of H. Comm. on Energy & Commerce*, 111th Cong. 7 (Mar. 12, 2009) ("*Free Press Testimony*") (testimony of S. Derek Turner, Research Director, Free Press), *available at* http://energycommerce.house.gov/Press_111/20090312/testimony_turner.pdf; *see also* Comments of Verizon & Verizon Wireless, WC Docket No. 05-337, at 24-26 (May 8, 2009) (proposing a $5 billion overall cap on the High-Cost Program while existing mechanisms are retargeted).

[168] *See* Recovery Act § 6001(h)(2)(D) (stating that Recovery Act grant programs should avoid "unjust enrichment as a result of support for non-recurring costs through another Federal program for service in the area").

[169] Nearly 60 percent of households subscribed to bundled communications services in 2008, representing a 13 percent increase since 2007, and a growth rate of 9 to 17 percent is predicted for 2009. *See* Phil Doriot & John

(footnote continued…)

yet the Commission's current support mechanisms are based on embedded costs or cost models that fail to allocate much, if any, of the common costs to the non-supported services. This approach has little do with how carriers operate and make investment decisions, and it ignores the dramatic growth of bundling and the substantial revenues carriers earn from *all* services delivered over a network receiving High-Cost support. As the Commission has recognized, "[r]evenues from [discretionary] services in addition to the supported services should, and do, contribute to the joint and common costs they share with the supported services. Moreover, the former services also use the same facilities as the supported services, and it is often impractical, if not impossible, to allocate the costs of facilities between the supported services and other services."[170] More than ten years ago, the Commission anticipated that competition and new technologies would "lead to the development of new services that will produce additional revenues per line and to reductions in the costs of providing the services generating those revenues."[171] The Commission's expectation has proven correct, as carriers in rural areas increasingly offer bundles of voice, broadband, and video services over USF-supported facilities. The revenues from *all* of these services should consequently be factored into determining the level of High-Cost support a carrier receives.[172]

(…footnote continued)

Gilbert, CFI Group, *2008 Telecom-Cable Industry Satisfaction Report* 6-7 (Sept. 2008), *available at* http://www.cfigroup.com/resources/whitepapers_register.asp?wp=22.

[170] *Federal-State Joint Board on Universal Service*, Report and Order, 12 FCC Rcd. 8776 ¶ 261 (1997) ("*Universal Service First Report and Order*").

[171] *Id.* ¶ 260.

[172] The Commission, in fact, incorporated a revenue-based benchmark in its initial decision implementing the High-Cost program, *see id.* ¶¶ 257-267, but subsequently replaced it with a cost-based benchmark. *Universal Service Seventh Report & Order*, 14 FCC Rcd. 8078 ¶ 61. Developments in recent years have shown that the Commission's initial decision was correct. The revenues earned by incumbent LECs from broadband and other discretionary services provided over their subsidized facilities should lessen their need for High-Cost support. A reformed High-Cost support mechanism should recognize this economic fact.

iv. Support levels should take into account new efficiencies and competition.

The legislative history of the 1996 Telecom Act states that "competition and new technologies will greatly reduce the actual cost of providing universal service over time, thus reducing or eliminating the need for universal service support mechanisms as actual costs drop to a level that is at or below the affordable rate for such service in an area."[173] But the Commission's USF program has not accounted for these substantial cost savings, and USF costs have ballooned since the passage of the 1996 Telecom Act. The Commission has failed to design a mechanism that fully accounts for the efficiencies and cost savings from new technologies and competition.

Although the non-rural carrier High-Cost mechanism is based on a forward-looking model, it has not been updated in over a decade. The rural carrier mechanism, which accounts for the majority of High-Cost Program subsidies, is still based on backward-looking costs more than ten years after the Commission stated that it would work with the Joint Board to develop a forward-looking economic cost mechanism for rural carriers.[174]

The telecommunications industry has long been viewed as consistently achieving greater annual productivity gains than the American economy as a whole, and the Commission factored in these gains in establishing its ILEC price cap system in 1990.[175] The development of broadband Internet service and other technologies since 1990 has only made the industry more productive and efficient in providing services to consumers. These developments should *lower*

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[173] S. Rep. No. 104-23, at 26 (1995).

[174] *See Universal Service First Report and Order* ¶ 26.

[175] *See Policy and Rules Concerning Rates for Dominant Carriers,* Second Report and Order, 5 FCC Rcd. 6786 ¶ 75 (1990).

any shortfall of revenues relative to the cost of providing the entire panoply of products and services available on broadband networks in High-Cost areas over time – yet by failing to account for these increases in productivity and efficiency, the Commission has permitted support levels to rise dramatically.

The current mechanism also ignores the growth of competition in areas receiving High-Cost support. Many cable operators, for example, are now providing voice, broadband Internet, and video services in many rural areas *without* receiving USF support. The existence of cable voice service in these areas – at prices sufficiently low to win customers away from subsidized ILECs – suggests that support for networks serving those areas is inefficient and competitively biased in favor of ILECs.

In reforming its High-Cost Program, the Commission should design a support mechanism that takes into account new technologies and efficiencies as well as competition from other providers. High-Cost support should not be treated as an entitlement for carriers, but as a means of giving *consumers* the benefit of ubiquitous deployment of broadband Internet service.[176] The Commission should conduct periodic reviews of the continuing need for High-Cost support in rural areas receiving support, and reduce or eliminate the support when it becomes apparent that marketplace forces are sufficient to achieve ubiquitous deployment in an area.

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[176] *Alenco Communs.,Inc.*, 201 F.3d at 620 ("The Act does *not* guarantee all local telephone service providers a sufficient return on investment; quite to the contrary, it is intended to introduce competition into the market. Competition necessarily brings the risk that some telephone service providers will be unable to compete. The Act only promises universal service, and that is a goal that requires sufficient funding of *customers*, not *providers*. So long as there is sufficient and competitively-neutral funding to enable all customers to receive basic telecommunications services, the FCC has satisfied the Act and is not further required to ensure sufficient funding of every local telephone provider as well." (emphasis in original)).

v. The Commission should adopt efficient, competitively neutral distribution and contribution mechanisms.

The Commission should adopt a more efficient and effective system for distributing High-Cost support to unserved areas. Support should be limited to one provider in an area; subsidizing multiple broadband infrastructures is unnecessary to achieve ubiquitous deployment and would impose excessive burdens on the service providers and customers who fund the Program. The Commission should, after developing a complete record, consider the use of *reverse auctions* to determine eligibility for funding. As Comcast has previously explained, a properly designed reverse auction would reward more efficient carriers and exert downward pressure on the High-Cost Program.[177] However, the Commission must design a reverse auction mechanism to be competitively and technologically neutral and to avoid conditions that create or solidify a single firm's dominant position in an individual geographic market that may be contestable.[178] Allowing incumbents to use a reverse auction to shield themselves from competition would distort the pro-competitive policies set forth in the Telecommunications Act of 1996 and in the Commission's policies.

The Commission should refrain from making broadband Internet services or users subject to USF contributions. Broadband Internet service has been and should remain exempt from USF contributions.[179] Moreover, imposing a contribution burden on the provision of broadband

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[177] Comments of Comcast Corp., WC Docket No. 05-337, at 4-5 (May 31, 2007).

[178] Comments of Comcast Corp., WC Docket No. 05-337, at 6-10 (Apr. 17, 2008).

[179] *Federal-State Joint Board on Universal Service*, Report to Congress, 13 FCC Rcd. 11501 ¶¶ 73-82 (1998).

Internet service would *discourage* overall broadband subscribership, directly contravening Congress's and the Commission's goals.[180]

The Commission should also take this opportunity to rethink the entire existing subsidy scheme, and should consider whether it can be replaced with a more efficient and less regressive mechanism – one that incentivizes more private sector investment, removes the costs of capital from the subsidy mechanism (leaving capital expenditures to be authorized by legislatures from general revenues), and demands greater accountability and efficiency in the provision of ongoing operating subsidies.

d. The National Broadband Plan Should Include Benchmarks for Achieving Widespread Deployment of Broadband Networks, as well as Specific Proposals for How Best To Meet Those Benchmarks.

In order to achieve Congress's goal of ubiquitous deployment, Comcast suggests that the National Broadband Plan include benchmarks for four categories of deployment:

- Deployment to the 100 largest cities in the U.S.
- Deployment to all other cities
- Deployment to rural and other unserved areas
- Deployment to schools, libraries, hospitals, and other public facilities.

These recommendations are based on the fact that a "one-for-all" model is not a logical or practical approach. Different applications need different speeds, and different users will use

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[180] *See Free Press Testimony, supra* note 167, at 2 ("Assessments on broadband could lead to a net decline in subscribership, undermining the goals of universal service.").

different applications.[181] For example, hospitals, schools, libraries, and other public facilities will likely use applications that require greater capabilities than the applications a typical person would use at home. Accordingly, these public institutions will need faster broadband connections, and need them sooner, than will the average residential broadband Internet user.

The first benchmark the Plan should establish is to ensure that, at a minimum, all Americans have access to Basic Broadband Internet Service by the end of 2011. Thereafter, the Plan's benchmarks should ensure that faster tiers of broadband Internet service are deployed on a timely basis throughout the United States. Because Basic and Current Generation Broadband Internet Services are widely available in most cities, the benchmarks the Plan establishes for bringing faster speeds to those cities can be accelerated as compared to rural and unserved areas. Benchmarks for deploying Next Generation Advanced and Commercial Broadband Internet Services to schools, libraries, hospitals, and other public facilities should also be accelerated since they offer benefits of broadband Internet service to the broader community and advance Congress's other policy goals. Comcast proposes that the Plan adopt the following benchmarks that will ensure that consumers continue to have the broadband Internet services they need:

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[181] *See generally Illinois Broadband Report* at 3-12 (describing various health, education, public safety, residential, business, agriculture, transportation, advanced research, community services, and energy and the environment programs that utilize broadband Internet and the speeds needed to deliver the programs' services).

100 LARGEST CITIES	
YEAR-END	**DEPLOYMENT GOAL**
2010	Basic Broadband Internet Service (256 Kbps downstream and upstream) to 100% of households and businesses.[182]
2011	Current Generation Broadband Internet Service (600 Kbps downstream/500 Kbps upstream) to 100% of households and businesses.
2012	Next Generation Broadband Internet Service (12 Mbps downstream and 2 Mbps upstream) to 100% of households and businesses.
2014	Next Generation Advanced Broadband Internet Service (50 Mbps downstream and 10 Mbps upstream) to 100% of households and businesses.

ALL OTHER CITIES	
YEAR-END	**DEPLOYMENT GOAL**
2010	Basic Broadband Internet Service (256 Kbps downstream and upstream) to 100% of households and businesses.
2011	Current Generation Broadband Internet Service (600 Kbps downstream/500 Kbps upstream) to 100% of households and businesses.
2013	Next Generation Broadband Internet Service (12 Mbps downstream and 2 Mbps upstream) to 100% of households and businesses.
2015	Next Generation Advanced Broadband Internet Service (50 Mbps downstream and 10 Mbps upstream) to 100% of households and businesses.

[182] As with telephone access, "universal service" is the proper goal, even though the reality may never quite measure up.

RURAL AND OTHER UNSERVED AREAS	
YEAR-END	**DEPLOYMENT GOAL**
2011	Basic Broadband Internet Service (256 Kbps downstream and upstream) to 100% of households and businesses.
2012	Current Generation Broadband Internet Service (600 Kbps downstream/500 Kbps upstream) to 100% of households and businesses.
2014	Next Generation Broadband Internet Service (12 Mbps downstream and 2 Mbps upstream) to 100% of households and businesses in areas where economically justified.
2016	Next Generation Advanced Broadband Internet Service (50 Mbps downstream and 10 Mbps upstream) to 100% of households and businesses in areas where economically justified.

REQUESTING SCHOOLS, LIBRARIES, HOSPITALS, AND OTHER PUBLIC FACILITIES	
YEAR-END	**DEPLOYMENT GOAL**
2012	Next Generation Advanced Broadband Internet Service (50 Mbps downstream and 10 Mbps upstream) to 100% of requesting schools, libraries, hospitals, and other public facilities.
2015	Next Generation Commercial Broadband Internet Service (100 Mbps symmetrical service) to 100% of requesting schools, libraries, hospitals, and other public facilities.[183]

In order to reach these benchmarks, the National Broadband Plan should adopt the following policy strategies:

Create Incentives to Investment. Urge Congress to create tax incentives that offer equivalent benefits to all broadband providers for investments in deploying Next Generation Advanced Broadband Internet service. Such incentives may include tax credits, deductions, accelerated depreciation, or other appropriate and technologically neutral offsets. The Plan should also urge Congress to consider establishing a loan

[183] *See supra* Section II.A.1.a. for a discussion of broadband Internet speeds.

program to ensure access to low interest-rate loans for deploying broadband Internet services to areas that are unserved or underserved, e.g., public housing units.

Remove Barriers to Deployment and Investment. Assess regulations and policies that may inhibit or slow private sector deployment and investment. For example, the Plan should examine access to rights-of-way, tower siting and pole attachment regulation, access to municipally-owned towers and structures, and permitting and licensing processes to determine whether and to what extent these operate as barriers to rapid deployment and, if so, what corrective actions should be taken.

Government Investment. Propose government funding for targeted grants designed to subsidize the initial costs of deploying Next Generation Advanced Broadband Internet Service and Next Generation Commercial Internet Service to schools, libraries, hospitals, and other public facilities. In addition, the Plan should propose government funding for grant programs targeted to subsidizing the initial costs of deploying Basic and Current Generation Broadband Internet Services to unserved areas.

Education Networks. The Commission should propose to Congress a method for ensuring that Next Generation Broadband Internet service is deployed to all schools.[184] As part of the proposal, the Commission should consider proposing revisions to the Schools and Libraries Fund to meet that objective.[185]

Healthcare Networks. The National Broadband Plan should recommend that Congress follow the lead of some states and support broadband health networks. For example, in 2007, the Commission awarded Oregon $20,182,625 from the Universal Service Fund "to pay for up to 85% of the costs of constructing and using the [Oregon Health Network] for a period of three years."[186] The Oregon Health Network proposed to create a "network of networks" to:

- Interconnect Oregon hospitals and clinics for the provision of telehealth services
- Interconnect to state and county public health and safety offices
- Interconnect educational institutions that provide training for health care professionals

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[184] *See* Broadband Opportunity Coalition, *Report from the First Broadband Opportunity Summit* 8, GN Docket No. 09-51 (June 5, 2009) ("*Summit Report*") ("We need to upgrade school broadband facilities to schools to ensure that the ultimate speed to the end-user is really broadband. Current school infrastructure can't support multiple simultaneous users.") (quoting Susan Patrick, President and CEO, Int'l Ass'n for K-12 Online Learning ("iNACOL")), *available at* http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6520219497.

[185] For example, the Commission should explore what it can do to assist "[s]mall schools [that] do not typically possess the expertise necessary to complete the required paperwork and/or would not obtain enough funding to warrant the time and energy associated with the E-Rate application." *California Broadband Plan* at 74.

[186] *See Oregon Broadband Plan* at 10.

- Interconnect health insurers and pharmacies
- Interconnect other authorized users such as on-call clinicians and home healthcare monitoring systems
- Interconnect with the Internet and Internet2[187]

The National Broadband Plan should also propose that Congress work with the Administration to create a nationwide e-health network that interconnects all state health networks as well as teaching facilities. The e-health network would facilitate "the provision of health services through the use of technologies such as real-time videoconferencing, store-and-forward-applications, electronic health records, remote disease monitoring, online education, and many other modalities that support access to health services and health information."[188]

In addition, the Commission should recommend that Congress and the Administration consider revising reimbursement policies and practices for Medicare and Medicaid that currently limit reimbursement for use of e-health. "For example, geographic designations based on the census disallow [e-health] use in rural areas with higher populations; and regardless of location, there are restrictions on specific medical specialties as well as the type of telehealth services that can be provided."[189]

Public Safety. The Commission should "[s]upport a multi-organizational development of an appropriate 21st century public safety communications network."[190] In furtherance of that goal, the Commission should support deployment of "multi-purpose broadband networks," "[e]ncourage mobile broadband," and "[e]xplore co-location of commercial wireless transceivers and public safety transceivers on shared communications towers."[191]

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187 *Id.*

188 *See California Broadband Plan* at 71.

189 *Id.* at 72; *see also Summit Report*, *supra* note 184, at 9 (reporting that Richard Manning, Senior Vice President, Strategic Projects & Services, WellMed Medical Group, noted the "inherent limitations associated with the medical reimbursement processes for Medicare patients"); *cf.* Alec Ross, *ICT & the Economy: Creating a Double Bottom-Line* 4 (July 2008) (attached to the *2009 Aspen Report*, *supra* note 35, at 55); Todd Park & Peter Basch, Center for Am. Progress, *A Historic Opportunity: Wedding Health Information Technology to Care Delivery Innovation and Provider Payment Reform* 1 (May 2009) ("Health IT-enabled care models . . . have very practical, doable, near-term applications, can generate significant benefits in terms of the quality and value of health care delivery, and are already being executed successfully today . . . . A major barrier to widespread implementation of these models, however, is our provider payment system."), *available at* http://www.americanprogress.org/issues/2009/05/pdf/health_it.pdf.

190 *Oregon Broadband Plan* at 12.

191 *Id.*

B. Although a Clear Majority of Consumers with Access to Broadband Internet Service Are Subscribing, a Significant Number Do Not Yet See the Value of Broadband to Their Lives.

When Congress passed the 1996 Telecom Act, there were fewer than 20 million American adults accessing the Internet, and the vast majority of them had to connect through dial-up service.[192] The deployment of broadband Internet service has greatly increased the value proposition for millions of Americans, and today there are more than 70 million households subscribing to some form of broadband Internet service. As with deployment, the marketplace has been remarkably successful in providing consumers and businesses with broadband Internet service options that they find valuable – yet there are still many consumers who, for various reasons, do not subscribe. The Plan can serve a constructive role by proposing policies that increase the value proposition for adopting broadband Internet service by increasing computer literacy, getting more valuable government services online, and promoting affordability. In formulating proposals, it is important that the Commission's goals, while aggressive, remain realistic. This includes both understanding how consumer adoption of broadband Internet services fits into the context of technology adoption generally, as well as assessing soberly what is known, and not yet known, about the drivers of broadband adoption.

1. In Less Time Than It Took 50 percent of Consumers To Get CD Players, Computers, or Even Electricity, Over 70 Million (more than 55 percent of) Consumers Have Adopted Broadband.

In its first report on "High-Speed Services for Internet Access," the Commission reported that, as of December 1999, there were approximately 1.8 million residential and small business

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[192] *See* Humphrey Taylor, *Internet Penetration at 66% of Adults (137 Million) Nationwide*, The Harris Poll #18, Apr. 17, 2002 (showing that only 16% of approximately 100 million U.S. residences were using the Internet in June 1996), *at* http://www.harrisinteractive.com/harris_poll/index.asp?PID=295.

high-speed (which it defined as over 200 Kbps in at least one direction) Internet connections, of which 1.4 million were provided by cable.[193] Based on the Commission's latest report, as of December 2007, there were more than 70 million residential high-speed Internet connections, 63.5 million of which were provided by technologies that provide speeds well in excess of 200 Kbps.[194] As *Rural Broadband Report* recognizes, "Broadband connections have grown at a remarkable rate."[195] Cable Internet service continues to be the most popular broadband Internet service.[196]

Comcast began offering high-speed Internet service in December 1996 and by the end of 1997 served about 9,700 customers.[197] In the next six years, over five million customers adopted Comcast HSI service.[198] Since 2003, Comcast HSI service has attracted nearly 10 million more customers, and over 30 percent of the homes that can access Comcast HSI service subscribe to it. Today, less than 13 years after Comcast began offering broadband Internet service, over 15

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[193] *See* Indus. Analysis Div., Common Carrier Bureau, FCC, *High-Speed Services for Internet Access: Subscribership as of June 30, 2000* Table 3 (Oct. 2000) ("*2000 FCC High-Speed Internet Report*"), *available at* http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1000.pdf.

[194] *See December 2007 FCC High-Speed Internet Report*, *supra* note 19, Table 3. The report found that there were over 121 million total high-speed Internet connections (including wireless) in the United States as of December 31, 2007, a drastic increase from the 2.8 million total high-speed lines as of December 1999. *Compare id.* Table 1, *with 2000 FCC High-Speed Internet Report* Table 1.

[195] *Rural Broadband Report* at 7 ¶ 14 n.20.

[196] *See* Ian Olgeirson & Mari Rondeli, SNL Kagan, *HSD Revenues Tilt Upward Despite Pricing Pressure*, Multichannel Market Trends, Apr. 27, 2009 (reporting that there were 38.12 million residential cable Internet subscribers at the end of 2008 and that Internet revenues continue to rise despite lower prices because more consumers are purchasing broadband Internet service).

[197] Comcast Holdings Corp., *Form 10-K*, at 3 (Mar. 3, 1998) ("*Comcast 1997 10-K*"), *available at* http://ccbn.10kwizard.com/xml/download.php?repo=tenk&ipage=679584&format=PDF.

[198] Press Release, Comcast Corp., *Comcast Full Year and Fourth Quarter Results Meet or Exceed All Operating and Financial Targets Setting Stage for Continued Growth in 2004* (Feb. 11, 2004), *available at* http://www.cmcsk.com/phoenix.zhtml?c=118591&p=irol-newsArticle&ID=493848&highlight=.

million consumers take advantage of the availability of Comcast HSI, making Comcast the number one residential broadband Internet service provider in the United States.[199]

COMCAST HIGH-SPEED INTERNET SUBSCRIBERS: 1997-1Q 2009[200]			
Quarter and Year	Homes Passed by HSI	HSI Customers	Percentage of Homes Passed Purchasing HSI
4th Quarter 1997	865,000	9,700	1.1%
4th Quarter 1998	1,800,000	51,000	2.8%
4th Quarter 1999	3,200,000	142,000	4.4%
4th Quarter 2000	6,360,000	400,000	6.3%
4th Quarter 2001	10,400,000	948,000	9.1%
4th Quarter 2002	30,072,000	3,620,000	12%
4th Quarter 2003	34,731,000	5,285,000	15.2%
4th Quarter 2004	40,010,000	6,992,000	17.5%
4th Quarter 2005	41,249,000	8,520,000	20.7%
4th Quarter 2006	46,902,000	11,487,000	24.5%
4th Quarter 2007	48,117,000	13,220,000	27.5%
4th Quarter 2008	50,283,000	14,929,000	29.7%
1st Quarter 2009	50,456,000	15,258,000	30.2%

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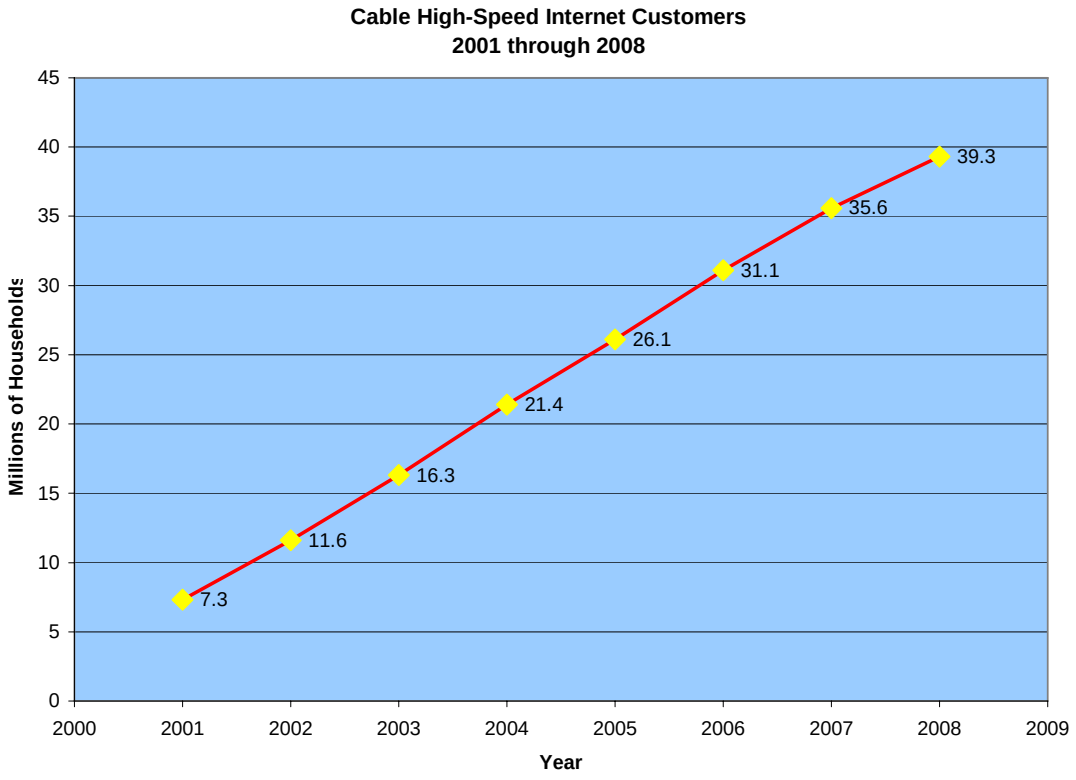
199 Comcast Corp., *Pro Forma Cable Customer Metrics* (Apr. 30, 2009), *available at* http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9Mzg3NXxDaGlsZElEPS0xfFR5cGU9Mw==&t=1.

200 *See Comcast 1997 10-K* at 3; Comcast Holdings Corp., *Form 10-K*, at 4 (Feb. 26, 1999); Comcast Holdings Corp., *Form 10-K*, at 3 (Mar. 1, 2000); Comcast Holdings Corp., *Form 10-K*, at 5 (Mar. 2, 2001); Comcast Holdings Corp., *Form 10-K*, at 6 (Mar. 29, 2002); Comcast Holdings Corp., *Form 10-K*, at 3 (Mar. 28, 2003); Comcast Corp., *Form 10-K*, at 6 (Mar. 12, 2004); Comcast Corp., *Form 10-K*, at 3 (Feb. 23, 2005); Comcast Corp., *Form 10-K*, at 21-22 (Feb. 22, 2006); Comcast Corp., *Form 10-K*, at 3 (Feb. 26, 2007); Comcast Corp., *Form 10-K*, at 2 (Feb. 20, 2008); Comcast Corp., *Form 10-K*, at 2 (Feb. 20, 2009).

And, as the following chart shows, the cable industry's total Internet subscribership has grown significantly over the past eight years.



(Source: SNL Kagan)

Total broadband Internet subscribership in the United States has followed a similar growth pattern. According to NTIA, as of 2001, more than 44 million U.S. households accessed the Internet through a dial-up connection, while only about 10 million used a broadband connection.[201] Between 2001 and 2003, the percentage of U.S. households subscribing to broadband Internet doubled from 9.1 percent to 19.9 percent (from 9.9 million households to 22.4 million households), while the percentage of households subscribing to dial-up declined

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[201] NTIA, *A Nation Online: Entering the Broadband Age* 5 (Sept. 2004), *available at* http://www.ntia.doc.gov/reports/anol/NationOnlineBroadband04.pdf.

from 40.7 percent to 34.3 percent (a loss of about 5.6 million households).[202] By the end of 2003, the total number of residential broadband subscribers in the United States approached the 25-million mark.[203] According to recent Census Bureau data, 82 percent of households that accessed the Internet in 2007 reported doing so using a broadband connection.[204]

Today, although estimates vary, the number of American households that subscribe to broadband Internet service is over 70 million. As noted above, in its latest high-speed Internet report, the Commission reported that, as of December 2007, there were more than 70 million residential high-speed Internet connections.[205] Based on the latest OECD data, as of June 2008 there were 80,071,074 broadband Internet subscribers in the United States, not including mobile wireless (3G, 4G, or Wi-Fi) customers.[206] According to SNL Kagan's latest estimates, only counting cable and telco high-speed Internet subscribers, there were 67.3 million total residential high-speed Internet subscribers at the end of 2008.[207] This number coincides with Leichtman

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202 *Id.* at 1-2.

203 *See* Press Release, Leichtman Research Group, *Broadband Internet Grows to 25 Million in the U.S.* (Mar. 8, 2004), *available at* http://www.leichtmanresearch.com/press/030804release.html. By 2003, cable Internet service passed over 70 percent of the U.S. population and served 15 million households. *See* Nat'l Cable & Telecomm. Ass'n, *2007 Industry Overview* 6 (2007), *available at* http://i.ncta.com/ncta_com/PDFs/NCTA_Annual_Report_04.24.07.pdf; Nat'l Cable & Telecomm. Ass'n, *2003 Year-End Industry Overview* 8 (2003) (stating that there were an estimated 15 million cable modem subscribers at the end of the third quarter of 2003), *available at* http://i.ncta.com/ncta_com/PDFs/CableYear-EndOverview03.pdf.

204 *See* Press Release, U.S. Census Bureau, *Internet Use Triples in Decade, Census Bureau Reports* (June 3, 2009), *available at* http://www.census.gov/Press-Release/www/releases/archives/communication_industries/013849.html.

205 *See December 2007 FCC High-Speed Internet Report*, *supra* note 19, Table 3.

206 OECD, *OECD Broadband Statistics: Total Number of Broadband Subscribers By Country* (Dec. 2008), *available at* http://www.oecd.org/dataoecd/22/15/39574806.xls.

207 *See* Olgeirson & Rondeli, *supra* note 196.

Research Group's estimate of 67.7 million subscribers to the "Top Broadband Internet Providers in the U.S."[208]

After cable broadband Internet service entered the marketplace, many consumers connected to the Internet via a DSL subscription as well. The ILECs amassed millions of customers in a very short time. According to SNL Kagan, there were about 6.5 million DSL subscribers in 2002, and this tripled to 19.2 million DSL subscribers by 2005.[209] Similarly, AT&T and Verizon continue to experience rapid growth in subscribers to their fiber broadband services. As of the first quarter 2009, AT&T and Verizon together served over three million broadband Internet subscribers with their fiber and hybrid fiber networks.[210] AT&T reported that, as of the first quarter 2009, it had 15.4 million residential and business broadband subscribers between DSL, U-verse, and satellite broadband services.[211] Verizon reported 8.9 million subscribers to its DSL and FiOS services.[212]

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[208] *See* Press Release, Leichtman Research Group, Inc., *5.4 Million Added Broadband from Top Cable and Telephone Companies in 2008* (Mar. 6, 2009), *available at* http://www.leichtmanresearch.com/press/030609release.html.

[209] Broadband Cable Financial Databook, *supra* note 88, at 65.

[210] AT&T added 284,000 subscribers in the first quarter 2009 to bring their total U-verse Internet subscriber total to 1.3 million. *See* Press Release, AT&T Inc., *AT&T's First-Quarter Results Highlighted by Wireless Gains, U-verse TV Growth, Double-Digit Increase* (Apr. 22, 2009) ("*AT&T 1st Quarter 2009 Press Release*"), *available at* http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26752; *AT&T U-verse Internet Subscribers*, IPTV Review, Apr. 26, 2009, *available at* http://reviewiptv.com/2009/04/26/att-u-verse-internet-subscribers/. Verizon likewise experienced growth in its fiber subscribers, adding 298,000 FiOS Internet subscribers in the first quarter 2009, for a total of 2.8 million subscribers. Press Release, Verizon Communications, Inc., *Verizon Communications Reports Revenue, Earnings and Cash Flow Growth in 1Q 2009* (Apr. 27, 2009) ("*Verizon 1st Quarter 2009 Press Release*"), *available at* http://newscenter.verizon.com/press-releases/verizon/2009/verizon-communications-1.html.

[211] *See AT&T 1st Quarter 2009 Press Release*, *supra* note 210; AT&T Inc., *Form 10-Q*, at 22 (May 7, 2009), *available at* http://ccbn.10kwizard.com/xml/download.php?repo=tenk&ipage=6308418&format=PDF.

[212] *See Verizon 1st Quarter 2009 Press Release*, *supra* note 210.

In the first quarter of 2009 alone, around 1.5 million more U.S. households adopted broadband.[213] Comcast added 329,000 HSI customers;[214] Verizon added 252,000 broadband customers;[215] Time Warner added 225,000 customers;[216] and AT&T added 359,000 customers.[217] Other providers, like Cox, Cablevision, Charter, Qwest, Embarq, and Windstream, added a combined 275,000 broadband Internet subscribers.[218]

The Commission's data on broadband Internet connections also indicates explosive growth in the number of high-speed wireless connections. Since the Commission started measuring mobile wireless usage in June 2005, high-speed connections (defined as at least 200 Kbps in one direction) over mobile wireless have increased 100-fold, from under 400,000 to almost 51 million in December 2007.[219] Mobile wireless connections delivering more than 200 Kbps in both directions grew from 21,000 in June 2005 to over 15 million as of December 2007, representing an astonishing *seventy thousand* percent growth in just 2½ years.[220] As of March 31, 2009, not including its customers who can use wireless broadband Internet through a

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213 *See* Hodulik, UBS Investment Research, *supra* note 97, at 1.

214 *See* Press Release, Comcast Corp., *Comcast Reports First Quarter 2009 Results* (Apr. 30, 2009), *available at* http://www.cmcsk.com/phoenix.zhtml?c=118591&p=irol-newsArticle&ID=1282445&highlight=.

215 *See Verizon 1st Quarter 2009 Press Release*, *supra* note 210.

216 *See* Press Release, Time Warner Cable, *Time Warner Cable 2009 Reports First-Quarter Earnings* (Apr. 29, 2009), *available at* http://ir.timewarnercable.com/releasedetail.cfm?ReleaseID=380384.

217 *See AT&T 1st Quarter 2009 Press Release*, *supra* note 210.

218 *See* Hodulik, UBS Investment Research, *supra* note 97, at 1.

219 *Compare* Indus. Analysis Div., Wireline Competition Bureau, FCC, *High-Speed Services for Internet Access: Status as of June 30, 2005*, Table 1 (Apr. 2006) ("*June 2005 FCC High-Speed Internet Report*"), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-264744A1.pdf, *with December 2007 FCC High-Speed Internet Report*, *supra* note 19, Table 1.

220 *Compare June 2005 FCC High-Speed Internet Report*, *supra* note 219, Table 2, *with December 2007 FCC High-Speed Internet Report*, *supra* note 19, Table 1.

smartphone or Personal Digital Assistant device, AT&T reported that it has 1.3 million "3G LaptopConnect Cards" offering 3G mobile wireless broadband connections.[221]

Millions of consumers are also accessing broadband connections using Wi-Fi access points. For example, iPass Mobile Broadband Index reported that between January 1, 2008 and June 30, 2008, over 1.2 million users accessed the Wi-Fi hotspots it tracks for its enterprise customers for an average of 93 minutes each session.[222] AT&T reported that, in the first quarter of 2009, 10.5 million users connected to one of its 20,000 U.S. hotspots; double the traffic from the fourth quarter 2008, and half of all of the traffic in 2008.[223] According to the latest Pew data, 14 percent of users who use wireless broadband Internet services (either through a wireless service provider or via Wi-Fi connections) do not subscribe to a broadband Internet service at home.[224]

Satellite providers also have experienced growth in adoption of their services. As one research group summarized: "Companies selling broadband satellite services as a whole had a very successful 2008 with solid revenue growth and sustained increases in . . . satellite broadband subscribers. Moving into 2009, many players report business activity as strong, if not

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[221] AT&T Corp., *AT&T Financial and Operational Results* 13 (Apr. 22, 2009), *available at* http://www.att.com/Investor/Growth_Profile/download/master_Q1_09.pdf.

[222] iPass Inc., *iPass Mobile Broadband Index Wi-Fi Hotspot Usage Analysis* 1 (Sept. 22, 2008), *available at* http://www.ipass.com/elqNow/elqRedir.htm?ref=http://www.ipass.com/pdfs/iPass_Mobile_Broadband_Index_1H_2008.pdf. iPass Inc. tracks broadband usage for more than 100,000 hotspots and 3G services and over 3,000 business customers. *See* iPass Inc., *iPass Mobile Broadband Index*, http://www.ipass.com/pressroom/pressroom_wifi.html#regions (last visited June 8, 2009).

[223] Calvin Azuri, *AT&T Reports Growth in WiFi Users*, *Connections*, TMC Net, Apr. 24, 2009, *available at* http://ivr.tmcnet.com/topics/ivr-voicexml/articles/54917-att-reports-growth-wifi-users-connections.htm.

[224] John B. Horrigan, Pew Internet & Am. Life Project, *Onramps to the Internet and News Consumption*, Presentation at 2009 Quello Communication Law & Policy Symposium slide 8 (May 19, 2009), *available at* http://www.quello.msu.edu/images/uploads/Horrigan.Quello_.pdf.

stronger, as a year ago."[225] WildBlue recently reported over 400,000 subscribers.[226] Hughes Network announced that during its first quarter 2009, it added a record gross 53,000 subscribers, and that it now has more than 400,000 subscribers.[227]

Broadband Internet adoption by businesses is also growing rapidly. According to SNL Kagan's estimates, at the end of 2008, there were 5.4 million cable and telco broadband Internet business subscribers.[228] In recent years, Comcast has focused increased attention on delivering Internet and voice options to small businesses, and this has been a source of rapid growth for Comcast and significant savings for businesses.[229] As Eli Noam explained at the 2008 Aspen Institute Conference, "If we're concerned about national economic activity, then we've got to focus on getting these small businesses connected to high-speed, robust networks."[230]

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[225] Press Release, NSR LLC, *Broadband Satellite Market To Escape Economic Malaise Largely Unscathed if Recovery Starts Prior to End of 2009* (Apr. 7, 2009), *available at* http://www.nsr.com/AboutUs/pr_04_07_09.html.

[226] Gary Kim, *WildBlue To Showcase 18 Mbps Satellite-to-Home Service*, TMCnet, Apr. 24, 2009, *available at* http://ivr.tmcnet.com/topics/ivr-voicexml/articles/54907-wildblue-showcase-18-mbps-satellite-to-home-service.htm.

[227] *See* Press Release, Hughes Communications Inc., *Hughes Communications Announces First Quarter 2009 Results* (May 7, 2009), *available at* http://www.hughes.com/HUGHES/Doc/0/VJK21UT6VPN4BF0ECSGAI0U95E/HCI_Q1_2009_Earnings_Release_Final_05-06-09.pdf; Press Release, Hughes Communications Inc., *Hughes Launches New Portal for HughesNet Subscribers* (Sept. 10, 2008), *available at* http://www.hughes.com/HUGHES/Doc/0/KTU2EF4H98CKT9B2E3RONDIQC9/09-10-08_Hughes_Launches_New_Portal_for_HughesNet_Subscribers.htm.

[228] *See* Olgeirson & Rondeli, *supra* note 196.

[229] *See* Kelly Riddell, *Comcast Targets Small Business, Boosts Sales Force*, Bloomberg, Apr. 29, 2009, *available at* http://www.bloomberg.com/apps/news?pid=20601204&sid=ankObYXoRgik (detailing investment in small business unit and use of competitive pricing and bundled discounts); Comcast Corp., *Q4 2008 Earnings Conference Call*, Transcript at 5 (Feb. 18, 2009) (saying that commercial revenues increased 41% to $558 million in 2008 (47% in the fourth quarter of 2008) at an annual run rate of $650 million), *available at* http://media.corporate-ir.net/media_files/irol/11/118591/CMCSA_Transcript/CMCSA-Transcript-2009-02-18T13_30.pdf; Mike Farrell, *Taking Care of Business*, Multichannel News, Mar. 28, 2009 (quoting Comcast's Chief Operating Officer, Steve Burke, as saying that "[b]usiness services is a real success story, with very high returns, and we're giving that group the capital they need to expand quickly'), *available at* http://www.multichannel.com/article/190830-Cover_Story_Taking_Care_of_Business.php.

[230] *2009 Aspen Report*, *supra* note 35, at 4.

However one accounts for broadband penetration over the last 13 years, it is clear that the pace of adoption is among the fastest of any communications technology introduced in the United States over the last 150 years. As the following slide shows, there are only three technologies – video cassette recorders, AM radio, and black and white television – that even compare to the speed with which broadband found its way into over half of American households within 10 years.[231]

Number of Years to Reach 50% Penetration of U.S. Households

Newspapers	100+
Telephone	70
Phonograph	55
Electricity	43
Cable Television	39
FM Radio	30
Color Television	17
Personal Computer	17
Compact Disk Player	15
VCR	10
AM Radio	9
Black & White Television	8

Source: John Carey, *B9201-028 Management of New Media: Course Presentation* slide 8 (1999) (citing data from the Electronic Industry Association, U.S. Department of Commerce, and Dataquest), *available at* http://www.columbia.edu/cu/business/courses/download/B9201-XX/carey/.

While there is still much work to do, the Commission cannot discount the success that has already been achieved by broadband competition in the private sector.

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[231] *See Onramps to the Internet and News Consumption*, *supra* note 224, at 3 (noting that broadband Internet penetration reached 50% of U.S. households in 2007).

2. The National Broadband Plan Should Develop Steps To Facilitate and Encourage Increased Broadband Adoption.

The Commission's challenge in this proceeding is to develop policies that facilitate and encourage increased broadband Internet adoption. The Commission's goals in this regard should be realistic: "While 100% adoption is unlikely to ever occur, narrowing that gap to only those who choose to remain offline is necessary to optimize the productivity gains afforded by network connectivity . . . ."[232] For the Commission to map out a strategy that leads to achievement of Congress's goal of "achieving affordability of [broadband] service and maximum utilization of broadband infrastructure and service by the public," the Plan must include particularized recommendations for analyzing the specific incentives and disincentives for consumer adoption of broadband Internet and what the government can do to increase incentives and decrease disincentives.

a. The Government Needs a Better Understanding of What Drives Broadband Adoption Decisions – Including Digital Literacy, Computer Ownership, Affordability, Value Proposition, Relevance, and Other Factors.

The Leichtman Research Group recently found that 57 percent of non-broadband Internet subscribers acknowledge that broadband is available in their area,[233] but they still choose not to subscribe. According to a Pew survey, 51 percent of non-broadband and non-Internet users say that broadband has no "relevance" to them, i.e., they are not interested in getting online, nothing

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[232] *2009 Aspen Report*, *supra* note 35, at 15-16. "[T]he United States is not yet in a position for all to benefit. Largely due to willingness and ability to pay, between 20-30% of the population does not currently connect to the broadband networks that allow for participation in the network of instantly available information." *Id.* at 2.

[233] *See 2009 Leichtman Report*, *supra* note 33, at 33; *see also* Press Release, Park Assocs., *One in Five U.S. Households Has Never Used E-mail* (May 13, 2008) (reporting that 21 percent of respondents to a survey stated that they have "never looked up a website on the Internet," "never sent or received e-mails from someone," and "never searched for information on the Internet"), *available at* http://newsroom.parksassociates.com/article_display.cfm?article_id=5067.

would convince them to switch from dial-up, they are too busy, or they have other unspecified reasons.[234] This could be due in large part to the fact that the Internet is likely known to many consumers primarily for entertainment and social applications and services, and that for many the Internet does not yet represent a tool that can truly improve their lives. It also could be because of a lack of education about what is available on the Internet and how broadband Internet service can be used for economic, social and political empowerment. Or it could be because some have broadband Internet access at work or rely on connections in places like coffee shops, and do not see a value to having it at home as well. As Alec Ross, former Executive Vice President at One Economy and now the Senior Adviser on Innovation to Secretary of State Clinton, noted at the 2008 Aspen Institute Conference on Communications and Society: "Of those people not online in this country, 40 percent choose not to be, either because they view the Internet as a threat, or because they don't think it has anything of value."[235]

Adoption numbers tend to be lowest in lower-income and minority households. Representatives of these communities are exploring the answers to low broadband penetration. In February 2009, the National Urban League, NCLR (National Council of La Raza), Asian American Justice Center, Joint Center for Political and Economic Studies, and Minority Media and Telecommunications Council ("MMTC") hosted the first "Broadband Opportunity Summit" (the "Summit") which brought together 30 leaders from diverse backgrounds and perspectives to discuss "how broadband policies can best advance the interests and needs of communities of color."[236] A significant portion of the Summit was dedicated to improving adoption, and, as the

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234 Horrigan, *Obama's Online Opportunities*, *supra* note 136, at 2.

235 *2009 Aspen Report*, *supra* note 35, at 18.

236 *Summit Report*, *supra* note 184, at 1.

Summit Report notes, "Most participants agreed that the importance of increasing broadband adoption rates in the Constituent Communities requires gathering better information on broadband adoption."[237] "Broadband mapping" of both availability and adoption "is a necessary prerequisite to increasing broadband adoption because, as one participant put it: 'you can't evaluate what you don't measure.'"[238] David Honig from MMTC "said it is important to collect data to determine which factors have the most impact on the demand side of broadband adoption in rural communities."[239]

If there is one thing on which almost all parties in the broadband policy discussions appear to agree, it is the need for more information – better data – about the precise reasons why some consumers who have access to broadband Internet service are not subscribing.[240] "It is not possible to make good policy without good data, and reliable data on broadband are scarce."[241] The National Broadband Plan should address proposals to improve data gathering on adoption rates and the reasons for adoption and non-adoption. There are a variety of proposals for how to gather these data, including recommendations that the question of broadband adoption be included as part of the Census, or that independent research should be conducted by non-profit

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237 *Id.* at 15.

238 *Id.* at 16.

239 *Id. 2009 Aspen Report*, *supra* note 35, at 21-22 ("These data would not only help identify communities with the greatest unmet demand for connections, but would also assist in the efficiency of eventually establishing those connections.").

240 As the *Rural Broadband Report* notes: "The Commission and other federal agencies have not collected the comprehensive and reliable data needed to" understand the current state of broadband in rural America. *Rural Broadband Report* at 12 ¶ 26.

241 Wallsten, *supra* note 35, at 5.

organizations.[242] Comcast urges the Commission to consider empanelling a group of survey experts to determine how it can best obtain good data about both how many consumers have adopted broadband and why they did so or, more importantly, why they did not.

b. The Plan Should Establish Specific Proposals for How the Government Can Increase Incentives To Adopt Broadband.

"The largest barrier [to broadband adoption] is arguably . . . a range of adoption hurdles that people cannot crisply articulate. When half of dial-up and non-users cite reasons such as 'not interested' or 'nothing could get me to switch,' it seems clear that networked digital resources do not play enough of a role in their lives to justify a broadband connection."[243] The majority of experts in the field – including most representatives from what would be considered "underserved" communities, i.e., those communities with low broadband adoption – agree that the most significant obstacle to widespread adoption is making broadband Internet relevant to people's lives.[244] Part of that obstacle includes lack of consumer education about the ways in which broadband can improve lives. The National Broadband Plan should propose specific recommendations for how the government and others can both make broadband Internet access more relevant to consumers and "'paint a vision' [for 'underserved' communities] of how life with broadband is essential to their ability to find employment, utilize customer service for most business enterprises, access e-government services, and to engage in meaningful civic participation."[245]

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[242] *See Summit Report*, *supra* note 184, at 16; *2009 Aspen Report*, *supra* note 35, at 21 (stating that Census Bureau "data are valuable because they can be linked to the socioeconomic and demographic data that the Census collects in the same survey"); Wallsten, *supra* note 35, at 1.

[243] Horrigan, *Obama's Online Opportunities*, *supra* note 136, at 3.

[244] *Summit Report*, *supra* note 184, at 14; *2009 Aspen Report*, *supra* note 35, at 18.

[245] *Summit Report*, *supra* note 184, at 14.

In order to speed the transition to being the most-connected nation in the world, the Commission should recommend that Congress requires federal departments and agencies to (1) digitize government service delivery and (2) incorporate policies that promote broadband Internet adoption and use into their existing programs.[246] As the California Broadband Task Force recommended, the government should

> [c]reate an E-government Access & Efficiency Program to spur Internet use among existing as well as new technology users; enhance efficiency in government operations; meet the needs of low-income residents in innovative and efficient ways; increase telecommuting . . . in recognition of its positive impact on quality of life and environment; and establish [the United States] as a leader in the world in the use of broadband.[247]

A number of proposals have been offered for what the government could do to stimulate broadband Internet demand by integrating the use of broadband Internet service into the delivery of government services and the implementation of government programs. The Commission should evaluate each proposal, in cooperation with key government departments and agencies, and consider incorporating those that will promote broadband Internet adoption into the National Broadband Plan.

Digitizing Government Services. One "demand-side driven adoption strategy is to eventually migrate certain government services (either aimed at the household or at the business) entirely online."[248] For example, certain states have successfully employed online automatic

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246 *2009 Aspen Report*, *supra* note 35, at 2-3.

247 *See California Broadband Report* at 68.

248 *2009 Aspen Report*, *supra* note 35, at 17. South Korea's experience in this area is instructive:

> Through its 'e-Government Initiatives,' the Korean government has aggressively invested in e-government and information technology. Government spending has had two results: first, local information technology firms have found a ready market for their products and services, allowing them to reach a critical mass quickly; second, the increased deployment of e-government services online has added value to broadband subscriptions and encouraged more users to join the network.

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license plate renewals and driver's license renewals, which has saved citizens countless hours standing in line at Department of Motor Vehicle offices. And the Internal Revenue Service's e-filing program has saved millions of hours processing tax returns, not to mention the lower carbon footprint generated from the paper saved.[249] The IRS's e-filing program also has made it substantially easier for low-income Americans to take advantage of the Earned Income Tax Credit, and organizations such as One Economy, United Way, and the Wal-Mart Foundation have worked together to assist those Americans with tax advice and filing.[250] Other government services, such as parking ticket adjudications, checking to confirm whether one needs to report for jury duty, and applying for government programs, should be digitized and made available online.[251] Every time a government service can be provided more efficiently, more quickly, at lower cost, and in a more consumer-friendly manner online, it increases the incentive for broadband adoption.

The government should also explore the extent to which it can make more political and voting-related activities available online, as well as how it can create useful tools for assistance with obtaining government services.[252] For example, "the Medicare administration could

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Jayakar & Sawhney, *supra* note 69, at 6.

[249] *See 2009 Aspen Report*, *supra* note 35, at 17.

[250] Press Release, One Economy Corp., *Wal-Mart Foundation Teams Up with United Way and One Economy To Provide Free Tax Preparation and Filing Services* (Feb. 10, 2009), *available at* http://www.one-economy.com/sites/all/files/EITCWalMart_nationalrelease_021009_0.pdf.

[251] *See California Broadband Report* at 70 ("Establish an online jury selection system (e-jury) that will streamline jury selection, saving time and money for citizens and for the courts.").

[252] *See id.* ("[T]he technology to implement secure, certified elections processes over the Internet exists today. The state of California should champion the use of online voting as a vital part of the democratic process in the 21st century."); *see also* Charles M. Davidson & Michael J. Santorelli, Advanced Communications Law & Policy Inst., N.Y. Law School, *The Impact of Broadband on Senior Citizens* 33 (Dec. 2008), *available at* http://www.uschamber.com/assets/env/broadbandseniors.pdf.

supplement its website with links to sites like BenefitsCheckup.org, a senior-friendly site that helps older adults identify benefits they qualify for and provides information on a wide range of government and private services."[253] In addition, the online government services currently available should be improved to meet the needs of their targeted audiences. For example, "government should reassess the ways it uses technology vis-à-vis senior citizens to ensure that its services are inviting and inclusive of the senior point of view" and are "more senior-friendly and inviting."[254]

"Electronically deliverable government services will save constituents time and will be available in convenient formats that ensure uniform, optimal quality of service. . . . [T]he presence of government online could drive the demand side of the market, encouraging increased adoption of broadband connections for both residences and small businesses, which lag behind residences in adoption."[255] The Commission should coordinate with the new federal Chief Technology Officer and Chief Information Officer to bring together officials from various agencies at the federal, state, and local levels, as well as representatives from the private sector with expertise in a wide range of areas, to develop "best practices" for digitizing government services. The Commission should also urge Congress to provide funds to the different agencies specifically and explicitly for the upgrade of their Internet presence. Finally, the Commission

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253 Davidson & Santorelli, *supra* note 252, at 33.

254 *Id.* at 32.

255 *2009 Aspen Report*, *supra* note 35, at 3-4. "Another major benefit will be significant savings due to an improvement in task-efficiency." *Id.*

should lead by example and bring its own Internet presence into the 21st Century, as recently suggested by both Acting Chairman Copps and Commissioner McDowell.[256]

Incorporating Broadband Policies into Implementation of Government Programs. In addition to making broadband more relevant to Americans by offering government services online, the National Broadband Plan should recommend that Congress and the President require all government agencies and departments to incorporate broadband policies into the programs they implement. The Plan could propose specific examples, such as:

- **Worker Retraining.** The Department of Labor should examine how it can use broadband Internet services to make its programs more effective in today's economy. For example, the Department could revise its Trade Adjustment Assistance Program to subsidize the costs of broadband adoption for unemployed workers and to incorporate broadband into retraining those workers in the ICT industry and how to utilize broadband Internet services to enhance their productivity and lives.[257] The Department also could change its Senior Community Service Employment Program ("SCSEP") to train low-income individuals 55 or older in the use of broadband and employment opportunities at home so that, as their mobility declines, they do not find themselves unemployed again because they cannot commute.[258]

- **Health Programs:** The Internet has fundamentally changed the way healthcare works in the United States. Millions of people every day can use the Internet to research symptoms, find out more about their doctors, and learn the strengths and weaknesses of proposed remedies. Doctors use the Internet for research themselves, and also to share

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[256] Letter from FCC Commissioner Robert M. McDowell to FCC Acting Chairman Michael J. Copps 2 (Jan. 27, 2009); Letter from FCC Acting Chairman Michael J. Copps to FCC Commissioner Robert M. McDowell 1 (Jan. 28, 2009).

[257] *See* Ross, *supra* note 189, at 3. The Trade Adjustment Assistance Program currently provides workers who lose their jobs with as much as $2500 in assistance for training and relocation expenses. "For the same $2500, that unemployed worker could get a computer, software, and home office equipment, as well as broadband at home for two years." *Id.*

[258] *See id.* at 5. Each year, the Department of Labor spends $433 million on the SCSEP, but the jobs seniors are trained for still require them to commute to work. *See id.* (citing Office of Management & Budget, U.S. White House, *Detailed Information on the Community Service Employment for Older Americans Assessment*, ExpectMore.gov, Jan. 29, 2008)). "A recent report issued by the Taskforce on the Aging of the American Workforce observed that the supply of seniors in the workforce will increase significantly over the next decade . . . rising by 74 percent between 2004 and 2014. As AARP concluded, broadband will play a major role in extending the careers of seniors. A key component of such is telecommuting." Davidson & Santorelli, *supra* note 252, at 19 (endnotes omitted).

information with other doctors. Hospitals use broadband facilities to monitor patients, both inside and outside the hospital. The Commission should work with and support efforts by the Department of Health and Human Services, the Center for Disease Control and Prevention, the National Institute of Health, and other federal, state, and local agencies to utilize broadband services to improve healthcare.

Specifically, in addition to facilitating the deployment of broadband Internet service to all hospitals, the Plan should include proposals for how to provide ongoing funding for an e-health network and how to promote additional use of the network to reduce medical costs and improve healthcare. The Commission should work with the Department of Health and Human Services on ways to incorporate broadband Internet services into its programs, including the electronic health records program mandated by the Recovery Act. For example, the Department should examine whether revisions to the Medicare program should be changed to support telemedicine initiatives similar to those currently employed by the Department of Veterans Affairs, which allow doctors to monitor systems and patients through broadband access so that "the patient need only visit the doctor for serious problems."[259]

As part of the Plan, the Commission should recommend that Congress and the Administration require the various agencies with healthcare-related programs to coordinate on how they can develop programs that utilize an e-health network. The agencies should hold forums with stakeholders such as hospitals, healthcare providers, insurers, etc. to develop applications and information that provide real value to consumers and providers.[260] "Examples include: Web-based messaging and appointment services, e-prescriptions, and telemedicine."[261]

- **Education Programs:** The *Notice* identified education as "the key to our future economic success" and recognized that broadband can play a role in "boosting the quality of American schools."[262] Already, "online learning" is helping schools and students across the country take advantage of resources that would not otherwise be available,[263]

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[259] Ross, *supra* note 189, at 4. Along the same lines, Dr. Scott Wallsten of Technology Policy Institute has proposed that the government encourage the development and deployment of dedicated, broadband-enabled home medical devices that allow "diabetics or other blood-test patients to monitor their blood levels at home, all while automatically transmitting that information to their doctor." *2009 Aspen Report*, *supra* note 35, at 17. One study estimates that Medicare "could prevent 1.7 million hospitalizations and produce net savings of over $30 billion" if it adopted such a program. Ross, *supra* note 189, at 4.

[260] *See California Broadband Report* at 72 ("The leadership of an e-health network can accelerate the development and deployment of [e-health] applications by convening forums with stakeholders.").

[261] *Id.*

[262] *Notice* ¶ 89.

[263] *See* Cathy Cavanaugh, Center for Am. Progress, *Getting Students More Learning Time Online* 2 (May 2009) ("The number of elementary and secondary students taking online courses increased tenfold between 2001 and 2007, from about 200,000 to almost 2 million . . . . As of 2008, 44 states have either significant supplemental online learning programs, which are designed to add courses to the offerings available to students in their face-to-

(footnote continued…)

especially small rural schools.[264] Online courses (or blended learning courses, i.e., face-to-face courses that also have an online component) are extremely important ways for schools to offer courses that would not otherwise be available at the school, including Advanced Placement and college-level courses, as well as to meet the needs of specific groups of students.[265] However, there continue to be a number of obstacles to broader use of online education programs.

The Plan should recommend that Congress and the Administration adopt policies and programs that utilize broadband Internet services to enhance educational programs at schools and at home. Specifically, the Plan should offer proposals for what the government can do to create and disseminate technology-enabled curricula to schools and educators, to develop technology literacy programs, to ensure that all students become proficient in 21st century skills, to build partnerships with community institutions that provide technology access and transition services to students with disabilities and foster youth, and to encourage participation in educational events from remote sites.[266] For example, the Plan should recommend that Congress and the Administration explore using federal funding from programs such as No Child Left Behind and the Recovery Act to expand online educational options and reach more kids in school and at home with broadband. "We also need to target technology dollars for online teaching and in-service training."[267]

The Commission can leverage its role as an expert agency to bring together officials from the Department of Education, as well as state and local education officials, to develop a strategy for further integrating broadband Internet services into education. For example, they could establish best practices for using broadband in the classroom, both from a technical (e.g., what equipment works best, how should schools be using their available

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face schools, significant full-time programs in which students take most or all of their courses online, or both."), *available at* http://www.americanprogress.org/issues/2009/05/pdf/distancelearning.pdf.

[264] *See* Anthony G. Picciano & Jeff Seaman, The Sloan Consortium, *K-12 Online Learning: A 2008 Follow-Up of the Survey of U.S. School District Administrators* 1 (Jan. 2009) ("Perhaps the voices heard most clearly in this survey were those of respondents representing small rural school districts. For them, the availability of online learning is a lifeline and enables them to provide students with course choices and in some cases, the basic courses that should be part of every curriculum."), *available at* http://www.sloanconsortium.org/publications/survey/pdf/k-12_online_learning_2008.pdf.

[265] *See id.* at 12 Figures 1A & 1B; Cavanaugh, *supra* note 263, at 3 ("Online courses increase equitable access to quality educational opportunities by bringing flexibility to the course calendar, expanding the course catalog, and offering individualized instruction.").

[266] *See California Broadband Plan* at 76.

[267] *Summit Report*, *supra* note 184, at 8 (quoting Susan Kirkpatrick, President and CEO of iNACOL). "Large-scale adoption of distance education courses in K-12 schools will also require support from state teacher credentialing agencies, school accrediting agencies, and colleges of education to ensure that large numbers of teachers are prepared to teach online and that schools with significant proportions of online learning time meet accreditation standards." Cavanaugh, *supra* note 263, at 11.

funds, etc.) and pedagogical (e.g., how can teachers get the most out of the technology, what curricula use the technology most effectively, etc.) standpoint. The Plan should recommend that Congress and the Administration consider removing any legal restrictions on the Department of Education's ability to explore national curriculum standards.[268]

Environmental and Energy Programs: The Plan should recommend that Congress and the Administration adopt a defined strategy for "upgrad[ing] the national energy grid in an effort to revitalize our core infrastructure enablers. . . . 'This is the biggest single thing the president could do to restore U.S. competitiveness.'"[269] The Recovery Act included billions of dollars to jump-start "Smart Grid" projects but, as with broadband, there is no plan for meeting Congress's goal. Congress and the Administration should consider adopting a National Energy Grid Plan, along with the National Broadband Plan, that includes goals and benchmarks for upgrading the energy infrastructure for the 21st Century. As part of the National Energy Grid Plan, Congress and the Administration should require the Department of Energy to work with the Commission and other federal, state, and local agencies to determine how broadband services can best be used to facilitate Smart Grid projects. Revamping the Nation's electrical grid will reduce dependence on foreign energy supplies and address environmental concerns about Greenhouse gases.[270]

Entrepreneurial Activity/Job Creation. The Plan should recommend to Congress that it direct the Small Business Administration ("SBA") to develop grant programs for small businesses so that they can afford to subscribe to the broadband Internet services they need to survive and grow. The Commission can also work with the SBA, as well as state and local agencies and private organizations, to provide information to small businesses

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[268] *See California Broadband Report* at 76; *see Summit Report*, *supra* note 184, at 6-7. According to some reports, state curriculum requirements are inconsistent and impede online learning. *See* Susan Patrick, *Future Issues in Online Learning*, Fall 2008, at 30 ("Currently, many online programs have teachers who need to be licensed in multiple states (in some cases, 20 or more different state teaching licenses). This makes it very difficult to scale online learning with highly qualified teachers."), *available at* http://www.ciconline.org/c/document_library/get_file?folderId=117&name=THFall08FutureIssuesinOnlineLearning.pdf.

[269] J.D. Lasica, Rapporteur, The Aspen Institute, *Identity in the Age of Cloud Computing: The Next-Generation Internet's Impact on Business, Governance and Social Interaction* 74 (2009) (quoting Arjun Gupta, Founder & Managing Partner, TeleSoft Partners), *available at* http://www.aspeninstitute.org/sites/default/files/content/docs/pubs/Identity_in_the_Age_of_Cloud_Computing.pdf.

[270] *See* Michael Katz, *An Essay Constituting One of the Many Reasons Why the U.S. Congress Would Not Solicit Advice from Michael Katz About Spending the Money* 3 (July 2008) (attached as an appendix to the *2009 Aspen Report*, *supra* note 35, at 61) (noting that incorporating broadband Internet technology into the electrical grid could "promot[e] buildings that use automation to reduce energy consumption, electric power grids that entail smaller transmission losses, and more fuel efficient automobile engines"). "ICT can also facilitate real-time power pricing and the use of intelligent agents that allow businesses and households to respond to economic signals about energy costs with resulting efficiency improvements." *Id.*

on how best to leverage the resources available on the Internet, as well as how to create their own Internet presence.

As these examples make clear, there are numerous ways the government might be able to stimulate adoption of broadband Internet service, and there are many others to be explored. At a minimum, the Plan should recommend that Congress and the Administration direct all federal agencies and departments to meaningfully integrate broadband Internet services into their respective programs.

c. The National Broadband Plan Must Establish a Strategy for How To Promote Digital Literacy and Education About the Benefits of Broadband Internet Services.

A novel is useless to someone who cannot read. So too, broadband Internet service and networking devices like personal computers are useless to someone who does not know how to use them or who does not understand their value. Thus, the Plan cannot simply focus on implementing programs that make broadband Internet service valuable to all Americans; it must also ensure that all Americans know about the benefits of broadband Internet service and have the technical abilities to utilize the service.

The Plan's first step with respect to education should be to "[*p*]*romote the availability and value of broadband services*. . . . Explore opportunities to promote the availability of broadband services where they exist, the applications they support and the value to users and communities."[271] As Former FCC Commissioner Gloria Tristani explained, "We need to paint a picture of the future, but we first need to paint a picture of NOW and why adoption is so critical to everyday life. Increasingly, you can only apply online for jobs. . . . Access to health benefits and government services is moving online. Broadband adoption is not a luxury item; it touches

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[271] *Oregon Broadband Plan* at 9.

everything we do."[272] This is especially the case for groups who are at risk of being left behind, such as seniors, many of whom neither know about the value of broadband nor have learned even the limited skills needed for basic uses.[273] As the *2009 Aspen Report* concludes, "If we can make a push to educate this segment of the population about getting medical information online, then they have an incentive to adopt the network. Also, they won't have to take the bus three times a week to go get a blood test at the clinic. That's how you get a 65-year-old with a fixed income who lives in subsidized housing to adopt."[274]

"Comprehensive education and outreach efforts by individual actors and by public-private collaborations are critical components to raising senior awareness of the many benefits associated with broadband."[275] The same is true for minorities and low-income Americans who tend to have below-average computer and broadband Internet adoption rates.[276]

The Plan should also offer specific proposals on "digital literacy" -- educating Americans on using the Internet and accessing devices such as personal computers. "Perhaps literacy, and numeracy for that matter, have never really been optional for fully functioning members of society. In our 21st century society – accelerated, media-saturated, and automated – a new literacy is required, one more broadly defined than the ability to read and write."[277]

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[272] *Summit Report*, *supra* note 184, at 14 (quoting Former FCC Commissioner Gloria Tristani).

[273] *See* Davidson & Santorelli, *supra* note 252, at 31 ("[A] number of older adults remain unaware or are skeptical of the practical benefits associated with [broadband]. . . . *[S]eniors of all ages are more likely to use broadband once they learn of its benefits and receive training on how to use it*." (emphasis in the original)).

[274] *2009 Aspen Report*, *supra* note 35, at 38.

[275] Davidson & Santorelli, *supra* note 252, at 31.

[276] *See Leichtman 2009 Report*, *supra* note 33, at 10-11 (finding that 38 percent of households with annual incomes under $30,000 and 26 percent of people over 55 do not have a computer at home).

[277] Barbara R. Jones-Kavalier & Suzanne L. Flannigan, *Connecting the Digital Dots: Literacy of the 21st Century* (Nov. 2006), *available at*

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In South Korea, for example, the Closing the Digital Divide Act enacted in 2002

> included a strong user training component. It set up the Korea Agency for Digital Opportunity and Promotion (KADO), as well as a Digital Divide Committee to administer a five-year Master Plan. As part of this project, half a million low income students were given extracurricular training in computer use. . . . Realizing that incremental usage can only come from the marginal consumer, the government devoted considerable attention to digital literacy training for groups such as the disabled, stay-at-home mothers, military personnel and even prisoners.[278]

The Plan should recommend collaboration with the Departments of Education and Labor, and with other federal, state, and local agencies and private organizations, to develop digital literacy and technology training programs for teachers and students, and other segments of society that are at risk of being left behind.[279]

In addition, the Plan should look to the private sector for guidance on how best to educate Americans about computers and the Internet.[280] One area of particular focus should be on training teachers to use computers and broadband service to educate students: "Every teacher will [need to] be trained to use digital content for instruction and to have strategies that increase the problem-solving, collaborative, and critical-thinking skills of students, while monitoring the progress of student academic growth and performance."[281]

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http://www.educause.edu/EDUCAUSE+Quarterly/EDUCAUSEQuarterlyMagazineVolum/ConnectingtheDigitalDotsLitera/157395.

[278] Jayakar & Sawhney, *supra* note 69, at 5.

[279] As part of these efforts, the agencies involved should consider exploring universal broadband digital literacy standards to be employed in training programs. *See New York 2008 Broadband Report* at 14.

[280] *See, e.g.*, Microsoft Corp., *Microsoft Digital Literacy* ("The goal of Digital Literacy is to teach and assess basic computer concepts and skills so that people can use computer technology in everyday life to develop new social and economic opportunities for themselves, their families, and their communities."), http://www.microsoft.com/about/corporatecitizenship/Citizenship/giving/programs/UP/digitalliteracy/default.mspx (last visited June 8, 2009).

[281] Patrick, *supra* note 268, at 31; *see The Future of Online Learning: A* Threshold *Forum*, Threshold, Fall 2008, at 22 ("I find it astounding that people can get through teacher-education programs in 2008 without knowing how to teach online." (quoting Barbara Stein, Board Member, Virtual High School, Inc. and National Council for

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d. To the Extent That Affordability of Broadband Internet Service Remains an Obstacle to Certain Families Who Are at or Below the Poverty Level, the Government Should Consider Adopting Targeted Subsidies.

Although price can be a barrier to adoption for some, the data do not indicate that it is as significant a barrier as the lack of demand-side incentives. Notably, at the Broadband Opportunity Summit, "[m]any participants expressed concern that members of their Constituent Communities were not subscribing to broadband *not because they lacked access to broadband lines or even because of affordability*; rather, participants reported that their constituents simply do not think that broadband provides anything of value to them."[282] In fact, "[c]ompared to other [OECD] nations, the United States performs better on pricing than on broadband take-up. The [ITIF] has calculated that the U.S. ranks seventh in price for broadband (measured as the monthly rate per advertised Mbps of the fastest service generally available), compared to 12th on take-up."[283]

According to May 2008 and December 2007 Pew surveys, only 18 percent of dial-up and non-online consumers mentioned price as the reason they do not subscribe to broadband Internet service.[284] And, a July 2008 Pew survey found that broadband prices have been falling for the

(…footnote continued)

Technology in Education and Training)), *available at* http://www.ciconline.org/c/document_library/get_file?folderId=117&name=THFall08FutureofOnlineLearning.pdf; Jones-Kavalier & Flannigan, *supra* note 277 ("We have found a common void in professional development for faculty-training needed to gain the requisite computer skills to integrate technology into the curriculum effectively.").

[282] *Summit Report*, *supra* note 184, at 13 (emphasis added).

[283] Robert Atkinson, Info. Tech. & Innovation Found., *Broadband Affordability* 1 (2008) (attached as an appendix to the *2008 Aspen Report*, *supra* note 109, at 37).

[284] Horrigan, *Obama's Online Opportunities*, *supra* note 136, at 2. As noted above, 14% of non-users said that broadband Internet service was not available to them.

past five years.[285] "Overall, home broadband users reported that their monthly payment for internet service was $34.50 – 4% less than the figure of $36 per month reported in December 2005."[286] Between February 2004 and December 2005, monthly broadband bills declined 8 percent; the Pew survey notes that "[o]ne possible reason that users' monthly broadband bills did not fall as fast from 2005 to 2008 as was the case in the 2004-05 interval is the existence of pricier premium service," to which 29 percent of survey respondents said they subscribe.[287] Interestingly, "[f]or dial-up users, . . . [t]heir monthly access bill [in July 2008] was $19.70 – 9% higher than the figure of $18 that dial-up users reported in December 2005."[288] In other words, for approximately $15 more per month, users can purchase a broadband Internet connection.

Despite this relatively small difference in price between dial-up and broadband, the affordability of broadband Internet service, even at $10 or $20 per month (for the slower services offered by some service providers), continues to be an obstacle to adoption in a small but significant percentage of households. For example, the 18 percent of dial-up and non-online consumers responding to the May 2008 and December 2007 Pew surveys said that price, either of the service itself or of a computer, was a disincentive and the reason they did not subscribe to broadband Internet service.[289] And millions of U.S. households still do not have a computer.[290] Therefore, in addition to stimulating demand for broadband Internet service, the National

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285 *Pew Home Broadband Adoption 2008*, *supra* note 36, at 7-8.

286 *Id.* at 7.

287 *Id.* at 8.

288 *Id.*

289 *See* Horrigan, *Obama's Online Opportunities*, *supra* note 136, at 2; *2009 Aspen Report*, *supra* note 35, at 18 (noting that "19% aren't online because of lack of access or affordability").

290 *See 2009 Leichtman Report*, *supra* note 33, at 8.

Broadband Plan should propose solutions for how to facilitate consumers' access to computers and how to make broadband Internet service more affordable for those consumers with limited means.[291]

Another option is to subsidize low-income and unemployed consumers for the cost of broadband Internet service to make it more affordable. The Commission should recommend that Congress directly subsidize broadband Internet service based on strict criteria of need. Although one option would involve extending the USF Lifeline and Link-Up Programs to reimburse service providers for providing low-income customers discounts on installation and subscription fees for broadband Internet service, such an approach is not without its drawbacks. Specifically, extending the existing Lifeline and Link-Up programs to support broadband Internet service would place significant burdens on providers contributing to the USF and their customers, threatening the sustainability of the fund. These burdens would also be inequitable, as they would single out customers of USF contributors, rather than taxpayers in general, in subsidizing broadband access for low-income households. Accordingly, the Plan should propose that Congress appropriate direct funding from the Treasury to create new programs to provide direct broadband subsidies targeted to low-income and unemployed Americans.[292] Not only would this

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[291] For example, the Plan could propose that Congress provide tax credits or subsidies for low-income households to purchase computers or bundles that include the computer and broadband Internet service. The Plan should consider proposing a program like that implemented in South Korea where "low-income students with good grades were provided with free personal computers and a five-year free Internet subscription." Jayakar & Sawhney, *supra* note 69, at 5.

[292] *Cf.* Letter from Kyle McSlarrow, President & CEO, Nat'l Cable & Telecomm. Ass'n, to Susan Crawford, Co-Lead, FCC Agency Review Team, Obama-Biden Transition Team 3 (Dec. 22, 2008) ("[W]e support the appropriation of funds for two new Lifeline and Link Up Programs to make broadband more affordable for low income households and unemployed adults. Expanding these existing low-income universal service programs that are specifically designed to subsidize connectivity for users who need the help would go a long way towards bringing the benefits of broadband to low-income consumers. Given the important social objectives served by expanding these programs to include broadband, funding should come directly from the government and not be

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ensure that broadband Internet service continues to be more affordable, it will provide accountability for taxing and spending at the ballot box.

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In 1996, Congress found that "[t]he Internet . . . offer[s] a forum for a true diversity of political discourse, unique opportunities for cultural development, and myriad avenues for intellectual activity," and that "[i]ncreasingly Americans are relying on interactive media for a variety of political, educational, cultural, and entertainment services."[293] Although Congress's findings were accurate, and the number of Americans who use the Internet has grown dramatically, those who have experienced the benefits of being connected to the Internet, especially through a broadband Internet service, may find it hard to fathom why, 13 years later, a third of Americans who can purchase the service have yet to do so. The simple fact is that, as many consumer surveys and experts in the field explain, tens of millions of Americans have not seen the value and relevancy of the Internet in their lives. The Plan can help change this. Only by making broadband Internet service more relevant to people's lives, and empowering people who cannot afford it with the ability to purchase it, will the vision of making the United States the most connected nation in the world be achieved.

IV. CONCLUSION

The foregoing comments present numerous ideas for the Commission's consideration, and countless additional ideas will undoubtedly be presented in comments filed by other stakeholders. This mass of detail must not be permitted to obscure core precepts or central goals.

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offset by an assessment on telecommunications providers or their subscribers."), *available at* http://www.ncta.com/DocumentBinary.aspx?id=778.

[293] 1996 Telecom Act, § 509, 110 Stat. at 138.

Private and largely unregulated investment has driven massive deployment of competing broadband networks and will continue to do so, and private and largely unregulated investment has produced services that tens of millions of households, businesses, and institutions find attractive and affordable. The Plan should drive broadband Internet service to places where existing providers cannot economically do so and it should devise measures that will induce additional households to participate in the new world of broadband. A clear-eyed and steady focus on these goals – and a recommitment to the policy of regulatory restraint that has led to enormous successes – can ensure that the Plan effectively sets the stage for making the United States the most connected nation in the world.

Respectfully submitted,

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APPENDIX

ANALYSIS OF INTERNATIONAL BROADBAND & TECHNOLOGY RANKINGS & REPORTS

I. Introduction and Summary.

The following is a description and critique of the most frequently cited international broadband and technology rankings and reports. The goal of this appendix is to help the Commission evaluate the usefulness and limits of these metrics as it develops the National Broadband Plan called for in the Recovery Act. These rankings and reports fall into two general categories: (1) broadband-specific metrics and (2) more general metrics covering a wider array of information and communications technologies ("ICT").

At least three organizations have developed broadband-specific international rankings: the Organisation for Economic Co-operation and Development ("OECD"), the Phoenix Center for Advanced Legal & Economic Public Policy Studies (the "Phoenix Center"), and the Information Technology & Innovation Foundation ("ITIF"). The reports of the latter two organizations, while focusing on broadband, also provide related analyses of demographic variables such as age and education, economic variables such as income inequality, and broadband-supply variables such as population density. Taken together, these broadband-specific assessments provide a useful starting point for understanding how U.S. broadband performance compares with that of other countries.

These analyses are subject to a number of limitations, however.[1] For example, the OECD rankings are compromised by several flaws related to data-collection efforts. The Phoenix Center and ITIF analyses improve on the OECD rankings to some extent, in part because they seek to evaluate and understand the impact of various factors on broadband subscription rates, such as demographic and other conditions. Both studies also clearly suggest that demand-side measures should be pursued in the United States (for example, measures to increase the availability and use of computers). Due to inconsistencies between the Phoenix Center and ITIF reports, and the limitations of both reports, however, the Commission would need to pursue further research before it could generate meaningful comparisons between countries and isolate more clearly the factors that drive broadband adoption in the United States. Additional research also is necessary to gain a better understanding of the impact of policies and other factors affecting broadband suppliers in the United States and abroad, particularly as commentators and policymakers increasingly cite international broadband rankings and experiences in other countries to advance certain policy objectives.

In contrast to the broadband-specific rankings described above, several other international measures rank nations on their development and use of information and communications technologies more generally. These include the International Telecommunications Union's ("ITU's") ICT Development Index, the "Connectivity Scorecard" created by Professor Leonard Waverman, and the World Economic Forum's ("WEF") Information Technology Report.

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[1] The Commission's recent request for additional data on broadband availability in other countries implicitly recognizes that currently available data is limited. *See The FCC Is Asking Other Countries To Supply Broadband Data*, Communications Daily, May 27, 2009, at 10.

These studies attempt to undertake a more holistic view of broadband and its effects on a country's economy and society. As a result, these studies may not appear directly applicable to the Commission's task as set forth in the Notice of Inquiry ("*Notice*"), although they can serve as useful examples of what the Commission can do if it takes a broad view of the task at hand.

For example, the ITU's ICT Development Index attempts to rank countries based on their "path towards becoming an information society." This index is not a pure analysis of broadband, but instead ranks countries using a complex formula that includes landline-telephone-access rates, mobile-phone-access rates, and non-telecommunications factors such as adult literacy and school enrollment. Similarly, although Professor Waverman's Connectivity Scorecard focuses on connectivity, it also purports to measure "useful connectivity," a factor in which the U.S. ranks first in the world. This study will prove useful to the Commission in the context of the *Notice* because it recognizes that connectivity is not a goal in itself, but the means to providing an economy with access to a powerful tool for increasing productivity and efficiency.[2] Finally, the WEF's Information Technology Report assesses countries on a wide variety of factors loosely related to information and communication technology. This report teaches a number of helpful lessons about the use of survey data.

This analysis of available broadband rankings and reports proves, at a minimum, that the Commission should be careful about relying too directly or heavily on existing broadband metrics. Rather, the Commission will need to exercise considerable judgment in drawing inferences from these metrics or in basing new policies on them.

More importantly, the limitations of existing broadband metrics underscore the importance of continuing the difficult work of laying a sound empirical foundation on which the Commission can build more effective broadband policies. This work should include (but not necessarily be limited to):

- Ensuring that broadband data (both within the U.S. and, to the extent relevant, internationally) are collected and analyzed in as consistent and statistically responsible a manner as possible.

- Making the Commission's own data collection encompass fully the many technologies and circumstances that permit broadband availability and adoption.

- Compensating for factors, such as measurements of per-capita versus per-household broadband use, that may distort the picture presented by existing broadband data.

- Recognizing the importance of demographic, economic and other factors beyond traditional communications policy (e.g., geography, income, access to computers) that may impact whether broadband services are available and are actually used.

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[2] *See also*, Susan Crawford, Remarks at Media Access Project Conference "Mapping Change" (Apr. 29, 2009) ("The linear direct story of economic growth is easy to understand, you have people digging trenches that can have new jobs who didn't have them before, but the story is not just linear. Basic communications infrastructure advances can lead to new ideas about how to lower costs and raise profits in all kinds of industries – in other words – increasing returns. Economic growth in part comes from better recipes, better ideas about how to use finite resources."), *available at* http://www.mediaaccess.org/mapping-change/susan-crawford.

- Leveraging the survey, statistical, and other technical expertise of other agencies (e.g., the Census Bureau), as well as independent experts in universities and elsewhere outside the Commission.

II. Broadband-Specific International Rankings.

A. The OECD Broadband Rankings.

i. What the OECD Broadband Rankings Measure.

The OECD broadband-penetration ranking is the most frequently cited international assessment. The OECD also measures other broadband attributes, such as speed and price,[3] but these other attributes generally are not those cited by policymakers when comparing broadband use in the United States relative to other nations. The OECD measures penetration on a per-capita basis, i.e., in terms of the number of subscribers per 100 inhabitants.[4] The OECD defines broadband as Internet connectivity that enables users to upload or download data (or both) at a rate of at least 256 Kbps.[5]

The technologies included in the OECD ranking include digital subscriber line ("DSL"), cable modems, optical fiber (both fiber-to-the-premises and fiber-to-the-building with in-building Ethernet), satellite, local multipoint distribution service ("LMDS"), multichannel multipoint distribution service ("MMDS"), fixed wireless (including WiMax), broadband over powerline ("BPL"), and leased lines with Internet connectivity.[6] The OECD penetration ranking does *not* currently measure 3G mobile wireless or WiFi,[7] except in those rare cases in which

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[3] The OECD measures broadband speed in many ways, one of which is in terms of the average "advertised" broadband download speed, i.e., the theoretical maximum for the employed technologies. On that basis, the United States ranks 19th among OECD nations, behind Japan, South Korea, France, Finland, Netherlands, Germany, Australia, Denmark, Portugal, Iceland, New Zealand, Norway, Sweden, Italy, United Kingdom, Czech Republic, Austria, and Luxembourg (in that order). *See* OECD, *Average Advertised Broadband Download Speed, by Country* (Sept. 2008), *available at* http://www.oecd.org/dataoecd/10/53/39575086.xls. The OECD measures broadband price in many ways, one of which is by average monthly price per advertised megabit of bandwidth per second (Mbps in U.S. Dollars). On that basis, the United States ranks 15th among OECD nations, behind South Korea, France, United Kingdom, Japan, Portugal, Italy, Germany, Czech Republic, Luxembourg, Denmark, Austria, Norway, Netherlands, and Finland. *See* OECD, *Average Broadband Monthly Price per Advertised Mbit/s, USD PPP* (Oct. 2008), *available at* http://www.oecd.org/dataoecd/22/45/39575011.xls. For a full listing of OECD statistics, *see* OECD, *Broadband Portal*, http://www.oecd.org/document/54/0,3343,en_2649_34225_38690102_1_1_1_1,00.html (last visited June 7, 2009).

[4] *See* OECD, *Broadband Subscribers per 100 Inhabitants* (Dec. 2008), *available at* http://www.oecd.org/document/54/0,3343,en_2649_34225_38690102_1_1_1_1,00.html.

[5] *See* OECD, *Broadband Subscriber Criteria*, http://www.oecd.org/document/46/0,3343,en_2649_34225_39575598_1_1_1_1,00.html (last visited June 7, 2009); Robert D. Atkinson, et al., Info. Tech. & Innovation Found., *Explaining International Broadband Leadership* 7 (May 2008) ("ITIF Report"), *available at* http://www.itif.org/files/ExplainingBBLeadership.pdf.

[6] *See* OECD Broadband Subscriber Criteria, *supra* note 5.

[7] The OECD has recently suggested that it will propose a new, separate indicator for wireless broadband connections now that 3G technology typically exceeds the speed threshold used by the OECD to define broadband. Further details on the metric to be used and the impact on the United States' overall OECD ranking are unclear at this time.

either technology is used by a fixed wireless provider.[8] The OECD methodology also has been criticized for not fully capturing Internet connectivity to specific types of users, including businesses and colleges and universities.[9]

ii. What the OECD Broadband Rankings Find.

In its most recent assessment, the OECD ranked the United States 15th in penetration among 30 OECD nations. The following 14 countries are listed in their order of appearance in the rankings: Denmark, the Netherlands, Iceland, Norway, Switzerland, Finland, South Korea, Sweden, Luxembourg, Canada, United Kingdom, Belgium, France, and Germany.[10] For 2008, the OECD ranked the United States 7th in terms of overall broadband penetration growth, behind the Slovak Republic, Greece, New Zealand, Norway, Germany, and France.[11]

iii. What Is Useful for the *Notice* in the OECD Broadband Rankings.

The OECD's broadband ranking (and changes in nations' ranks over time) highlight the importance of broadband and the need for ongoing dialogue regarding what government should (or should not) do to foster deployment and use of these technologies. However, the OECD ranking suffers from several limitations relating to data collection that compromise its usefulness as a relative measure of broadband penetration. As indicated above, for instance, the OECD ranking does not fully capture wireless technologies or service to businesses, colleges, and universities. Because the number of Americans who receive their broadband access through school or work is high, this omission may skew the OECD results.

Although the OECD provides little documentation of its methodology for collecting and analyzing the data underlying its rankings, it is clear that its data gathering and reporting methodologies are not internally consistent. In many cases, OECD obtains its data from the governments of its member countries rather than gathering data on its own. It often simply reports whatever broadband figures these governments provide and does not verify or standardize the data.[12] The governments themselves may have an interest in reporting high numbers of broadband users (e.g., where the government itself has an ownership interest in the reporting broadband provider). Governments often use differing methodologies, and even differing definitions of broadband, in collecting and reporting data to OECD. In other cases,

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[8] OECD penetration figures capture only broadband subscriptions connecting WiFi hotspots to the Internet, regardless of how many individuals use those hotspots. The OECD is currently working with member countries to develop a common method for separating 3G wireless connections used for Internet access from "standard 3G mobile subscriptions where subscribers have the capability to access the Internet but choose not to." *See* OECD, *Telecommunications and Internet Policy, OECD Broadband Statistics: Frequently Asked Questions (FAQ),* http://www.oecd.org/faq/0,3433,en_2649_34225_41541640_1_1_1_1,00.html (last visited June 7, 2009).

[9] *See* Scott Wallsten, Tech. Policy Inst., *Understanding International Broadband Comparisons* 3 (May 2008), *available at* http://www.techpolicyinstitute.org/files/wallsten_international_broadband_comparisons.pdf.

[10] *See* OECD, Broadband Subscribers per 100 Inhabitants, *supra* note 4.

[11] *See* OECD, *Press Release on OECD Broadband Statistics (Dec. 2008),* http://www.oecd.org/document/4/0,3343,en_2649_34225_42800196_1_1_1_1,00.html (last visited June 7, 2009).

[12] *See* OECD Broadband Subscriber Criteria, *supra* note 5 ("All data are supplied by member governments unless otherwise noted.").

OECD makes estimates based on data obtained from major Internet Service Providers.[13] In fact, one telecommunications-research firm has documented these differences extensively and has concluded that in many cases it is "unlikely that data could be accurately adjusted" to correct for these differences.[14] Thus, it is not clear how much the reported data reflect real differences in broadband deployment and adoption among countries, and to what extent they merely reflect real differences in data collection.

Nor do the OECD rankings account for distortions that derive from the manner in which data are collected. For instance, the OECD's data have been criticized for being reported on a per-capita basis when the more relevant measure is per household.[15] Home broadband access is typically purchased for an entire household, so a per-person measure is misleading. Calculating these numbers on a per-capita basis penalizes countries like the United States, whose average household is larger than those of many of the countries that top the OECD list. The OECD ranking may also exaggerate differences in broadband penetration. Some of these problems result from the fact that all rankings are ordinal, i.e., they reflect each country's position in an ordered series rather than the *degree* to which nations' broadband penetrations may differ.[16] The OECD itself attempts to mitigate this concern by suggesting that policymakers focus less on nations' precise rank and more on where, roughly, each nation falls in the overall ranking.[17]

There are a number of other practical limitations on the usefulness of the OECD rankings. With respect to price and speed, the OECD ranking "does not aggregate broadband penetration, speed, and price data into a composite indicator of national broadband performance."[18] The OECD ranking also does not assess the intensity and purpose of broadband use. Under the ranking, for example, checking e-mail once a week is treated the same as using broadband eight hours per day to run a home business. Thus, the ranking does not reflect the unique value of subscribers who use their service for job training, telehealth or as part of a classroom project.

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13 *See* OECD, Broadband Subscribers per 100 Inhabitants, *supra* note 4 (source column).

14 Market Clarity, *Broadband Wars: The OECD's International Broadband Arms Race* 22 (May 23, 2007), *available at* http://www.marketclarity.com.au/freebies/OECD-BB-Wars-23-May-2007.pdf.

15 *See* ITIF Report at 5. *But see Telecommunications and Internet Policy, OECD Broadband Statistics: Frequently Asked Questions (FAQ) 4* ("Expressing the number of subscriptions in terms of households would be misleading because some connections are to businesses."), http://www.oecd.org/faq/0,3433,en_2649_34225_41541640_1_1_1_1,00.html#41541249 (last visited June 7, 2009). The OECD's reasoning, however, assumes that business and residential subscribers would be placed in the same category once collected, an approach that others have criticized. *See, e.g.*, Wallsten, *supra* note 9, at 6 (explaining that combining residential and business lines is problematic because (1) counting broadband in this way misses most business connections, and (2) these counts capture different shares of business connections in each country due to differing ways firms connect in each country).

16 *See* George S. Ford, *Developing a "National Broadband Strategy": Understanding the OECD Data and Drivers of Broadband Adoption*, Remarks at the Rayburn House Office Building 11 (July 28, 2008), *available at* http://www.phoenix-center.org/PC_HlllEventJuly28_2008.pdf.

17 *See* OECD Broadband Subscriber Criteria, *supra* note 5 ("[C]omparisons should focus [on] why some countries are at the end, middle or near the top of one or more indicators.").

18 ITIF Report at 5.

Perhaps most importantly, the OECD ranking does not shed enough light on the nature and drivers of broadband penetration to permit informed policymaking. The OECD ranking does not encompass demographic and economic factors that appear to be correlated with broadband availability and use. For example, broadband availability may be affected by a country's geography, the percentage of the population living in densely populated cities, and other factors related to the costs of supplying broadband services. The OECD ranking also excludes several factors that appear to be closely correlated with broadband usage, such as income, age, access to computers, and education level.[19] Thus, the OECD ranking ignores the high likelihood that addressing the nation's broadband adoption challenges will require the government to consider creative approaches well beyond traditional communications policy.

B. The Phoenix Center's Broadband Efficiency Index.

i. What the Phoenix Center Measures.

Using an econometric technique called Stochastic Frontier Analysis, the Phoenix Center has estimated scores and rankings indicating the efficiency with which a country converts its economic and demographic "endowments" into broadband subscriptions.[20] In a previous study, the Phoenix Center used a regression analysis to calculate a predicted broadband subscription rate and compared this to the actual subscription rate to derive a "Broadband Performance Index" ("BPI"). In its more recent study, the Phoenix Center calculated a "Broadband Efficiency Index" ("BEI") to measure how far a country lies from the "frontier" of broadband subscription (i.e., the subscription rate observed under optimal efficiency).[21]

Drawing from data on broadband subscription rates and demographics in the *OECD Factbook* and the World Bank's *World Development Indicators 2006*, the Phoenix Center examined variables including GDP per capita, income inequality, education, population age, population density, the relative size of the country's largest city, household size, business size, telephone penetration, and the price of broadband services. Because these variables explain nearly all of the variations in subscription rates, according to the Phoenix Center, the impact of supplier-focused policies in the BEI was not assessed. For instance, the Phoenix Center Report suggests that "taxes" would be included as a variable in the BEI analysis, but the remainder of the report makes clear that this variable was not actually used in the BEI methodology.[22] As a

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[19] *See, e.g.*, S. Derek Turner, Free Press, *'Shooting the Messenger', Myth vs. Reality: U.S. Broadband Policy and International Broadband Rankings* 13 (July 2007) ("The fact is that geographic factors alone cannot explain why the United States lags behind. Factors like income, poverty, market competition and public policy play a far bigger role . . . ."); U.S. Gov't Accountability Office, *Broadband Deployment Is Extensive Throughout the United States, but It Is Difficult To Assess the Extent of Deployment Gaps in Rural Areas* 5, GAO-06-426 (May 2006) ("A variety of characteristics related to households and services influence whether consumers purchase (or adopt) broadband service.").

[20] George S. Ford, et al., *The Broadband Efficiency Index: What Really Drives Broadband Adoption Across the OECD?* 4, Phoenix Center Policy Paper Number 33 (May 2008) ("Phoenix Center Report"), *available at* http://www.phoenix-center.org/pcpp/PCPP33Final.pdf.

[21] While somewhat unclear, "optimal efficiency" in this context appears to mean that a country would be maximizing its broadband subscription rate given demographic or economic factors over which policymakers have little or no control.

[22] Phoenix Center Report at 11.

result, the Phoenix Center criticizes the potential utility of such supplier-focused policies but fails to assess the impact of those policies in their econometric analysis. An evaluation of the impact of broadband speed on take rates is also notably lacking from the report.

ii. What the Phoenix Center's Broadband Efficiency Index Finds.

According to the Phoenix Center analysis, the U.S. outpaces Japan and South Korea, but still ranks 13th overall.[23] Countries surpassing the United States under the BEI, in order of adoption efficiency, are: Iceland, Belgium, Portugal, Switzerland, Denmark, Finland, France, Norway, the United Kingdom, Canada, the Netherlands and Sweden.

The Phoenix Center found that each of the variables it examined – including GDP per capita, income inequality, education, population age, population density, the relative size of the country's largest city, household size, business size, telephone penetration, and the price of broadband services – is a statistically significant determinant of broadband subscription. Indeed, according to the Phoenix Center Report, these variables explain 91 percent of the differences in the broadband subscription rates for the 30 OECD countries.[24] Of these variables, the Phoenix Center found that telephone penetration is the primary driver of broadband subscription rates. The other key determinants of broadband subscription are income, price, age of the population, and historical telephone demand.[25] In the United States, income inequality plays a larger relative role in subscription rates, while population density plays a smaller, but not insignificant, role.

Under the BEI methodology, about two-thirds of OECD countries have an efficiency rate of 95 percent or higher. The efficiency index for the United States is 96.7 percent, which is slightly higher than that of Japan and South Korea.[26] While the United States is ahead of Japan and South Korea in terms of adoption efficiency, it is not clear whether (or how) the BEI methodology accounts for countries that were "early adopters." For example, from 2001 to 2007, the number of broadband subscribers per 100 inhabitants in South Korea nearly doubled. In the United States, during that same period, the number of subscribers quadrupled.

The Phoenix Center concludes that about two-thirds of the OECD countries – those which score 0.95 or better on the BEI – are performing "very well" in terms of converting endowments into broadband subscriptions. Because these endowments explain almost all of the variation in subscription rates, there is "little room for inefficiency explanations."[27]

According to the Phoenix Center, the BEI suggests that the United States is "improperly criticized for lagging behind its peers in broadband adoption."[28] Their study asserts that the OECD rankings lack the analytical rigor necessary to show that there are *policy-relevant*

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[23] *Id.* at Table 2. Under the Phoenix Center's previous study, which measured BPI, the United States ranked 15th.

[24] *Id.* at 5-6.

[25] *Id.* at 13.

[26] *Id.* at 1.

[27] *Id.* at 15.

[28] *Id.* at 4.

differences between OECD nations that explain those rankings,[29] and further criticizes the OECD's "normalization" of its data with respect to population and the OECD's ranking of broadband subscription counts in per-capita terms. Thus, the Phoenix Center concludes that citing raw OECD data (1) results in a misleading picture of broadband adoption and (2) provides a poor foundation for responsible public policy.[30] In fact, according to the Phoenix Center, a poor OECD nation can be a more "efficient" adopter of broadband than a rich country even if its per-capita subscription rate is lower.[31]

The Phoenix Center's BEI analysis suggests that broadband adoption is intimately tied to demand-side factors such as income inequality and education, and the Center concludes that policies which are directed at those factors may be more cost-effective than supplier subsidies and regulation. The Center recommends efforts to improve or mitigate the adverse effects of underlying economic or demographic conditions including targeted, demand-side programs to increase computer ownership and improve digital literacy. The Phoenix Center analysis also supports the notion that the most effective mix of policies will vary by country due to differing demographic and economic conditions.

iii. What Is Useful for the *Notice* in the Phoenix Center Methodology.

The Phoenix Center Report is useful for two reasons: First, it presents a strong case against the "per capita" approach of the OECD ranking system, and second, the BEI provides empirical support that "apples-to-apples" comparisons between OECD countries may be difficult to achieve due to varying economic and demographic conditions in each country.

The Phoenix Center methodology, however, has been criticized on the theory that the values used to construct the BEI index are highly sensitive to the design of the econometric model.[32] In other words, the BEI index may result in widely disparate outcomes if important variables are left out or inaccurate data are used. Free Press, for instance, has argued that the broadband penetration data used by the Phoenix Center were for the three OECD reporting periods between June 2005 and June 2006, while the price data the Phoenix Center used were collected nearly three years earlier, thereby leading to erroneous results.[33] And, as previously stated, the Phoenix Center Report does not account for supplier-focused policies such as taxes or subsidies. Despite leaving an assessment of these variables out of its BEI index, however, the Phoenix Center concludes that there is "little room" for "inefficiency explanations" (i.e., policy factors) in subscription rates and that these policies are inappropriate.

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[29] *Id.* at 17-18.

[30] *Id.* at 3.

[31] *Id.*

[32] *See* Turner, *supra* note 19, at 14; *see also* Rob Frieden, *Lies, Damn Lies and Statistics: Developing a Clearer Assessment of Market Penetration and Broadband Competition in the United States* 32 (SSRN working draft) (citing the Phoenix Center Report in support of the proposition that "incumbent carriers and their sponsored researchers have to take a more defensive posture that explains any deficit [in the international broadband rankings] in light of negative demographic [sic] and computer literacy"), *available at* http://works.bepress.com/cgi/viewcontent.cgi?article=1010&context=robert_frieden.

[33] *See* Turner, *supra* note 19, at 23.

On the other hand, the Phoenix Center appears to concede (albeit indirectly) that a "digital divide" exists between broadband haves and have-nots in the United States due to the significant negative impact of income inequality. Some observers will argue that policies such as universal-service subsidies are, in fact, the appropriate mechanism to deal with discrepancies in income.

C. The ITIF's Composite Rankings.

i. What the ITIF Measures.

The ITIF Report, *Explaining International Broadband Leadership*, explicitly builds on the analysis conducted by the Phoenix Center by performing two statistical analyses to better understand the relationships between several factors and broadband rankings among OECD countries.[34] The factors evaluated by the ITIF included demographic variables such as age and education, economic variables such as per-capita income, as well as variables such as urbanization and competition. The ITIF also performed in-depth case studies on 9 OECD nations in order to add a "policy" layer to its analysis.

In performing its assessment, the ITIF used data from a collection of OECD surveys to develop a composite measure of three indicators of broadband performance — household penetration (as opposed to per-capita penetration under the OECD rankings), average speed weighted by percentage of subscribership (in Mbps), and lowest available price per Mbps.[35] Although ITIF asserts that the role of government financial incentives has been underappreciated in the United States,[36] the ITIF Report (like the Phoenix Center Report) does not quantify the impact of such variables in its rankings. The ITIF report goes farther than the Phoenix Center, however, by providing case studies and anecdotal observations about the impact of broadband policies in other countries.

ii. What the ITIF's Composite Index Finds.

Overall, the United States is ranked 15th under the ITIF's composite rankings. The countries leading the United States in the ITIF composite index are, in order: South Korea, Japan, Finland, Netherlands, France, Sweden, Denmark, Iceland, Norway, Switzerland, Canada, Australia, United Kingdom, and Luxembourg.

On each of the three specific measures assessed by the ITIF — household penetration, speed, and price — the United States ranks at or near the middle of OECD countries. The ITIF acknowledged the objections to the use of per-capita data in the OECD rankings. But it noted that, even if the OECD rankings measured penetration on a household basis, the United States would still be ranked 12th.[37] With respect to speed, the ITIF ranked the United States 15th with

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[34] ITIF Report at 12.

[35] *Id.* at 5.

[36] *Id.* at 24.

[37] *Id.* at 5-6.

an average advertised broadband speed of 4.9 Mbps. Finally, with respect to price, the United States is 11th in OECD countries with a monthly price of $12.60 per advertised Mbps.

The ITIF found that several factors unrelated to regulatory policy account for roughly 75 percent of a nation's broadband performance. Under ITIF's first regression analysis, the variables with the strongest influence on household penetration were price and urbanicity, while per-capita income and "Internet users" were both statistically significant. On the other hand, market concentration, homeownership, climate, median age, education, and income inequality were *not* statistically significant under the ITIF analysis.[38] Using these findings, the ITIF concluded that, based on its first regression model, the United States appears to suffer from lower levels of digital literacy that limit computer ownership. The ITIF also observed that the education variable defied expectations and that the effect of education levels on a nation's broadband penetration rates remains unclear.

Under the ITIF's second regression analysis, which did *not* include price, the variables with the strongest influence on household penetration were median age, Internet users and urbanicity. Once again, market concentration, per-capita income, income inequality, and education were not statistically significant.

Based on these analyses, the ITIF concluded that a nation cannot earn a top ranking through effective government broadband policies alone due to the impact of factors unrelated to these policies on national broadband performance. However, based on ITIF's case studies and other research, broadband policies can and do have a positive influence on broadband performance. The ITIF recommended that nations should address both the supply and demand side of the broadband equation.

iii. What Is Useful for the *Notice* in the ITIF's Composite Index.

ITIF's results suggest that experiences of one country will not be easily transferred to other countries because of significant differences in economic, social, geographic, and political factors. Studies that do not recognize these differences (like the OECD study) are not likely to be useful to the Commission's analysis. The ITIF also emphasizes the importance of intermodal competition, noting that intramodal competition (i.e., unbundling mandates) is "not a panacea." In so doing, the ITIF states that a number of European Union nations with unbundling regimes rank below the United States in the OECD rankings.

On the other hand, because the statistical analyses in the ITIF Report rely on OECD data, the same criticisms of those data apply equally here. Further, although the ITIF finds that price is the most significant variable in broadband subscriptions, the Phoenix Center has pointed out that price is the most difficult variable to gauge, since there are many prices paid for broadband services in a given country — an issue made more complicated in markets like the United States,

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[38] It is difficult to square some of the findings of the ITIF report with those of the Phoenix Center Report. For instance, while the ITIF analyses suggested that education and age were not statistically significant variables, the Phoenix Center found, with respect to the United States, that education has a +8.4 percent relative impact and age has a +10.0 percent relative impact on subscription rates.

where broadband providers compete using "bundles" including Internet access, voice and video services.[39]

III. Comprehensive Assessments of ICT Performance.

A. The International Telecommunication Union's ICT Development Index.

i. What the ICT Development Index Measures.

The ITU's ICT Development Index ("Index") attempts to measure the "digital divide" among 154 countries over a five-year period.[40] It is not a broadband ranking. Instead the ITU bases its ranking on data that fall into three categories — access, use, and skills.

Forty percent of a country's score is comprised of ICT-access factors. These factors measure: (1) fixed telephone lines per 100 inhabitants; (2) mobile cellular telephone subscriptions per 100 inhabitants; (3) international Internet bandwidth (bit/s) per Internet user (normalized on a logarithmic scale); (4) the proportion of households with a computer; and (5) the proportion of households with Internet access at home.

Another 40 percent of each country's score relates to ICT use factors. These factors measure: (1) Internet users per 100 inhabitants; (2) fixed broadband Internet subscribers per 100 inhabitants; and (3) mobile broadband subscribers per 100 inhabitants.

The final 20 percent is due to ICT skills factors. These factors measure: (1) the adult literacy rate; (2) the secondary school gross enrollment ratio; and (3) the tertiary school gross enrollment ratio.[41]

In a separate chapter, the Index also includes national rankings based on the price of information technology compared to a country's income. In calculating these rankings, ITU includes the price of a fixed telephone line, the price of a mobile phone line, and the price of broadband.

ii. What the ICT Development Index Finds.

The Index found that the price of broadband in the U.S. is quite low compared with other countries. It ranks the United States first in the world for the price of "fixed broadband Internet" as a percentage of monthly gross national income per capita.[42] The United States also tied with Singapore for first in the world on the price of information and communications technology overall.[43]

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[39] Phoenix Center Report at 11.

[40] Int'l Telecomm. Union, *Measuring the Information Society, The ICT Development Index* 12 (2009) ("*ICT Index*"), *available at* http://www.itu.int/ITU-D/ict/publications/idi/2009/material/IDI2009_w5.pdf.

[41] *Id.* at 18.

[42] *Id.* at 66.

[43] *Id.* at 56.

But the ITU also found that Sweden and South Korea are farthest along the path to becoming information societies and that the United States ranks 17th.[44] The report states: "Although gaining on both the access and the usage sub-indices, the United States has not yet reached the same high ICT penetration levels as several European countries. For example, in the United States 62 per cent of households had Internet access in 2007, compared to 79 percent in Sweden."[45]

iii. What Is Useful for the *Notice* in the ICT Development Index.

Because the Index is not designed to measure broadband, its conclusions may not appear to be directly relevant to the questions posed in the *Notice*. Nevertheless, the ITU's strategy of combining multiple data points into a single index may provide useful ideas for the Commission, which should consider a similarly holistic approach in its efforts to promote broadband.

Overall, however, ITU's index suffers from a number of significant problems that limit its usefulness for the Commission. For example, the ITU acknowledges that the relative position of top countries (which include the United States and others in the top-33) may be influenced by anomalies in its calculation process and that the rankings for these countries are less reliable than the rankings of lower-ranked countries. These anomalies exist, in part, because the rankings of countries in the top-33 are contingent on: (1) ITU's "selection of individual indicators" to be included over other indicators that were excluded, (2) "the imputation of missing values," and (3) decisions about how to weight the indicators that were included.[46] The ITU therefore cautions that "conclusions based on the ranking of these countries should be made with caution."[47]

Unfortunately, the data underlying the rankings may also prove not to be useful to the Commission because of methodological flaws. Like many of the studies already discussed, the ITU's data-collection methods are problematic because the organization collects data directly from governments through an "annual questionnaire that is sent to the government agency in charge of telecommunications/ICT."[48] As already explained, this system potentially creates numerous problems. To list just a few, although the ITU provides precise definitions of broadband (and the other variables for which it solicits data), the governments it relies on often collect data using different definitions. Compounding the problem, some governments do not respond to the questionnaire, forcing ITU to make estimates based on data collected from "government web sites and operators' annual reports."[49] Therefore, much of the data included in the ITU's index (including data about broadband in the United States) are based only on ITU estimates — in some cases using data from different years.[50] Moreover, because the data are

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44 *Id.* at 22.

45 *Id.* at 32.

46 *Id.* at 82.

47 *Id.*

48 *See* ITU, *ICT Statistics Database*, http://www.itu.int/ITU-D/ICTEYE/Indicators/Indicators.aspx (last visited June 7, 2009).

49 *See id.*

50 *See id.* at Country Data by Region (numbers in italics are based on estimates or data from other years).

collected from telecommunications ministries, which are often evaluated based on their performance in international rankings, some countries may have an incentive to report overly optimistic numbers.

Adding to the Index's data-collection problems is a further challenge: differences in rankings are often driven by numbers that have little real-world meaning. The problem is most apparent in the ITU's "skills" rankings, where the United States is ranked 11th — far behind countries like Greece (1), Finland (2), South Korea (3), and Slovenia (4). This ranking is comprised of three variables: adult-literacy rate, secondary "gross enrollment ratio," and tertiary gross enrollment ratio. The disparity between the U.S. and top-performing countries is not driven by adult literacy: the U.S. ties with the countries at the top of the "skills list," reporting 99 percent adult literacy. Instead, the difference in rankings is driven by the "gross enrollment ratios," defined as the ratio of students enrolled in school to the number legally eligible to attend. It is not clear, of course, that school attendance (particularly "tertiary" or college attendance) is a good measure of ICT skills at all. ITU selects this data largely because data about actual skills simply are not available. But even if school attendance were a reasonable measure of ICT skills, *gross enrollment ratio* is not a good measure of school attendance because it is affected greatly by a country's laws about who is eligible to attend school. In many cases, countries score highly on ICT skills simply because they enroll large numbers of students who are legally ineligible to attend. Greece, for example, ranks number 1 in skills after reporting a secondary-school gross enrollment ratio of 103.1 percent for 2007. Put another way, Greece ranked highly in ICT skills because its schools enroll more students than are legally eligible to attend. Similarly, Sweden (ranked number 1 in the overall index) reports a secondary-school gross-enrollment ratio of 144.3 percent for 2002, and these figures are not anomalies.[51] In short, ITU's conclusions about "skills" simply are not meaningful because they are driven by arbitrary legal definitions of school eligibility, not by real-world data about ICT skills.

Similar problems plague many of the variables included elsewhere in the study. For example, countries like Sweden and Luxembourg rank highly for ICT access, in part, because they report 113.7 and 129.5 mobile-phone subscriptions per 100 inhabitants.[52] But it is not clear that a country is better off when its citizens own multiple cell phones per person. Indeed, the multiple-ownership phenomenon may suggest underlying problems. Citizens may need to own multiple cell phones because service is unreliable[53] or because phones are not compatible while traveling. Similarly, like the OECD rankings, many of the ITU's numbers are reported on a per-capita basis, which penalizes countries like the United States whose average household is larger than many of the countries that top the ITU list.

Another issue is the ITU's failure to report important statistical tools like margins of error and statistical-significance tests. These tests are particularly important because many of the

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[51] *See ICT Index* at 96, Annex 4.

[52] *See id.* at 92, Annex 4.

[53] James G. Lakely, *Flaws Exposed in U.N. Technology Report*, Info Tech & Telecom News, May 2009, *available at* http://www.heartland.org/article/25027/Flaws_Exposed_in_UN_Technology_Report.html.

disparities between countries are small.[54] For example, on ICT "use," the United States (ranked 16) trails South Korea (ranked 1) only slightly on two of three factors. South Korea reports that 76.3 percent of its population uses the Internet, while the United States reports 72.5 percent; South Korea reports 30.5 fixed broadband subscriptions per capita versus the United States' 24 subscriptions per capita. The only clear disparity between the United States and South Korea relates to mobile broadband subscriptions per capita. But the fine print reveals that these figures are not reliable. As the ITU explains: "The main problem is that only very few (and mainly developed) countries have started collecting data for mobile broadband subscriptions and that definitions often vary between countries."[55] For some countries, the ITU was forced to use data collected by a firm called Wireless Intelligence, which collected data directly from carriers. Moreover, these sets of data do not even properly measure use. As the ITU explains, they "do not refer to active subscriptions and they do not indicate how many people are actually using" mobile broadband.[56] Rather, they refer to phone subscriptions that theoretically have access to the Internet at greater than 256k.

B. The Connectivity Scorecard.

i. What the Connectivity Scorecard Measures.

Like the ITU's ICT Development Index, the Connectivity Scorecard (or "Scorecard") does not rank countries based on broadband per se. Rather, it attempts to measure "useful connectivity,"[57] which it defines as "the impact of Information and Communications Technology on economic growth."[58] As the authors explain, the goal is to "broaden the regularly used definition of connectivity from the number of lines, or the number of subscriptions, to include the tools required to make Telecommunications and ICT truly productivity enhancing."[59]

Toward this goal, the Scorecard ranks consumers, businesses, and government in two categories: infrastructure and usage skills. It ranks consumer infrastructure by measuring: (1) the number of 3G subscribers per 100 inhabitants; (2) average teledensity; (3) broadband household penetration; (4) the fastest advertised broadband available; and (5) fiber-delivered broadband per 100 inhabitants. The Scorecard ranks consumer usage by measuring: (1) Internet usage per 100 inhabitants; (2) Internet banking as a percentage of population; (3) PSTN, mobile, and VoIP minutes of use per capita; (4) monthly SMS messages per capita; and (5) adjusted software spending by consumers.

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[54] ITU appears to acknowledge a similar problem in its discussion of "sensitivity," where it states that the relative positions of top countries are less reliable than those for lower-ranked countries, so "conclusions based on the ranking of these countries should be made with caution." *ICT Index* at 82.

[55] *Id.* at 79.

[56] *Id.*

[57] Leonard Waverman, et al., LECG Ltd., *Connectivity Scorecard 2009*, at 6 (2009) ("*Connectivity Scorecard*"), *available at* http://www.connectivityscorecard.org/images/uploads/media/TheConnectivityReport2009.pdf.

[58] *Id.* at 2.

[59] *Id.* at 3.

The Scorecard ranks business infrastructure far differently, measuring: (1) the number of personal computers per 100 inhabitants; (2) the number of application-secure Internet servers per million inhabitants; (3) the adjusted business software and hardware spending per capita; and (4) enterprise access lines per 1,000 inhabitants. It ranks business usage by measuring: (1) Internet selling as a percentage of businesses with 10 or more employees; (2) Internet buying as a percentage of businesses with 10 or more employees; (3) the percentage of persons employed with ICT user skills; (4) the ratio of corporate data revenue to switched access revenue; (5) the share of IP and Ethernet revenue in corporate data revenue; (6) the share of mobile enterprise messaging revenue in corporate data revenue; (7) the share of mobile enterprise messaging in corporate data revenue; and (8) the mobile enterprise messaging business-to-business ARPU.

Finally, the Scorecard treats governments differently from either consumers or businesses, ranking government infrastructure by measuring: (1) each country's e-government ranking; (2) the percentage of schools with broadband access; and (3) adjusted government software and hardware spending per capita. It ranks government usage by measuring: (1) adjusted computer services spending by government on a per-capita basis; (2) the percentage of the population using e-government services; and (3) the percentage of enterprises using e-government services.[60]

The Scorecard's most notable feature is its system for "weighting" the data associated with government, business, and consumers. In different economies, economic growth is fueled to different degrees by contributions from businesses, the government, and consumers. For each country, the Scorecard attempts to calculate the relative importance of each sector, and it weights each sector's connectivity scores accordingly. Thus, in a country where government contributions are a larger part of productivity, the government's connectivity score is weighted more heavily.

ii. What the Connectivity Scorecard Finds.

The Connectivity Scorecard reports two sets of rankings – one set for "innovation-driven" economies and one set for "efficiency-driven" economies.[61] The methodology for each set is different, so countries in one category cannot be compared to countries in another.[62] The United States tops the "innovation-driven" economies, followed by Sweden (2), Denmark (3), and the Netherlands (4). Importantly, while the United States lags behind the world's leading broadband performers, it "leads more categories than any other nation on the 2009 Connectivity

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[60] *Id.* at 38, Table 4.

[61] The Connectivity Scorecard borrows the concepts of "innovation-driven" and "efficiency-driven" economies from the World Economic Forum's *Global Competitiveness Report*. *See* LECG Ltd., *Connectivity Scorecard, Methodology*, http://www.connectivityscorecard.org/methodology/ (last visited June 7, 2009). The World Economic Forum divides economies into three stages of development: factor-driven, efficiency-driven, and innovation-driven. Although each of these stages is associated with a number of characteristics, WEF ultimately categorizes countries by GDP. A factor-driven economy has a per capita GDP of less than $2,000 (U.S.); an efficiency-driven economy has a per capita GDP of $3,000-$9,000 (U.S.); and an innovation-driven economy has a per-capita GDP of more than $17,000 (U.S.). Economies in between are considered "in transition." *See* World Economic Forum, *Global Competitiveness Report 2008-2009*, Ch. 1.1 at 8-9 (2008), *available at* http://www.weforum.org/pdf/GCR08/Chapter%201.1.pdf.

[62] *See Connectivity Scorecard* at 17.

Scorecard."[63] Also interesting is the comparison to the ITU study: some countries that do well on ITU rankings, like South Korea, did not perform as well on the Scorecard because they invest more in residential than business technology.[64] South Korea ranks first in the ITU Index but tenth on the Scorecard. For "efficiency-driven economies," Malaysia tops the list, followed by Russia, Mexico, and Brazil.

iii. What Is Useful for the *Notice* in the Connectivity Scorecard.

Like the ICT Development Index, the Connectivity Scorecard does not purport to measure broadband deployment or usage. Moreover, it would not be useful to attempt to borrow data from the Scorecard because the study does not collect original data of its own; rather, it uses data collected by other organizations, including the OECD and the ITU. The shortcomings of those data discussed above apply equally here, particularly to the study's conclusions about broadband.

Nevertheless, two features of the Scorecard are worthy of the Commission's attention. First, unlike the studies discussed above, the Connectivity Scorecard recognizes that its results may not be statistically significant and attempts to use "cluster analysis" to show that some reported differences may not reflect actual differences among countries.[65] This attention to statistical methods is important. Too many other studies simply assume that differences in final scores among countries reflect real differences. The Commission should, as does the Scorecard, adopt appropriate techniques to test the significance of any purported differences it finds.

Second, the Scorecard's weighting system is noteworthy because it recognizes that studies that focus solely on "'count' information (e.g. number of lines, pc's, phones etc)" may not adequately capture the real contributions made by broadband in a particular country.[66] More important than the number of broadband subscriptions is access – how available broadband is – and how that access betters people's lives. The Scorecard captures this insight better than any other study, and while its methodology does not directly address some of the questions posed in the *Notice*, the Commission should recognize the importance of measuring more than the number of broadband subscriptions.

C. The World Economic Forum's Information Technology Report.

i. What the Information Technology Report Measures.

The Information Technology Report's ("IT Report's") Networked Readiness Index states that its goal is to "assess countries' preparedness to leverage ICT advances for increased

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[63] LECG Ltd., *United States Takes Top Spot on the 2009 Connectivity Scorecard*, http://www.connectivityscorecard.org/countries/united_states_of_america (last visited June 7, 2009).

[64] *Connectivity Scorecard* at 52.

[65] *Id.* at 23-24.

[66] LECG Ltd., *Frequently Asked Questions* (Question No. 3), http://www.connectivityscorecard.org/faq/ (last visited June 7, 2009).

competitiveness and development."[67] The IT Report contains 68 total variables[68] that are divided into three broad topics – environment, readiness, and usage – which each contain three sub-topics. The IT Report describes the resulting nine factors that form the basis of its inquiry as its "nine pillars." These nine pillars are: (1) the market environment; (2) the political and regulatory environment; (3) the infrastructure environment; (4) individual readiness; (5) business readiness; (6) government readiness; (7) individual usage; (8) business usage; and (9) government usage.

The data on the 68 variables related to these 9 pillars comes in two forms. WEF uses "hard data" obtained from the ITU, World Bank, and other international organizations to measure 27 of the variables. It uses data derived from the WEF "Executive Opinion Survey" to measure the remaining 41 variables. To obtain the survey data, WEF partners with 150 institutions, including universities, research organizations, and businesses, to administer an annual survey in all measured countries.

ii. What the Information Technology Report Finds.

The WEF's results are remarkably similar to those of the Connectivity Scorecard. In fact, the top 3 countries are the same in each report. Denmark and Sweden are first and second, followed by United States in third place.[69]

iii. What Is Useful for the *Notice* in the Information Technology Report.

Like the ICT Development Index and the Connectivity Scorecard, the IT Report does not limit its study specifically to broadband. Its conclusions, therefore, are not directly relevant to some of the questions posed in the *Notice*.

While the IT Report's underlying data could be relevant to the Commission's inquiry, a number of flaws limit the usefulness of those data. First, much of the WEF's hard data are not original and instead are drawn from other flawed data sets, such as that of the ITU. For example, WEF's statistics on high-speed monthly broadband subscriptions and the cost of broadband are taken without improvement from the ITU.[70] The limitations of these data have already been discussed.

The WEF's survey data, amounting to 60 percent of each country's ranking, are problematic for other reasons. The primary difficulty with the survey data is that the survey questions typically solicit a general opinion about a country, rather than a more easily measured, reliable and confirmable response about a respondent's own behavior. For example, to determine how businesses use the Internet, the WEF did not ask business owners to quantify their Internet sales or to report whether their employees had Internet access at work. Rather, the survey asked respondents to agree or disagree with the following statement: "Companies in your

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67 World Economic Forum, *The Global Information Technology Report 2008-2009, Mobility in a Networked World*, at x (2009), *available at* http://www.insead.edu/v1/gitr/wef/main/fullreport/index.html.

68 *Id.* at 8.

69 *Id.* at xvii.

70 *See, e.g.*, *id.* at 332-34.

country use the Internet extensively for buying and selling goods, and for interacting with customers and suppliers (1=strongly disagree, 7=strongly agree)."[71]

Other questions, taken verbatim from the WEF survey, demonstrate this limitation further:

- "How effective is your national parliament/congress as a law-making institution? (1=very ineffective 7=very effective, among the best in the world)"[72]

- "Laws relating to the use of information and communication technologies (electronic commerce, digital signatures, consumer protection) are (1=nonexistent, 7=well developed and enforced)"[73]

- "In your country, the latest technologies are (1=not widely available and used, 7=widely available and used)"[74]

In short, survey questions like these transform the index into an international opinion poll. The questions are too vague and subjective to provide meaningful data, and the results simply do not say anything that the Commission can use to answer the *Notice*'s questions about broadband in the United States.

Despite these flaws, two important lessons can be learned from the WEF's IT Report. First, although surveys will be an important part of the Commission's analysis, it is important to ask questions with objective, quantifiable answers, preferably about the respondent's personal experience. The Commission may want to ask, for example, whether respondents have access to broadband, a question that can be answered definitively through surveys. The Commission should not, however, ask vague opinion questions with no quantifiable answer.

Second, the WEF's analysis teaches an important lesson about the use of survey and non-survey data within a single study. A number of other studies have made the mistake of attempting to compare survey results from one country to "hard data" collected in another country. As already explained, that practice is irresponsible. But the WEF does something different. It combines survey variables (the data for each country are based on survey responses) with hard data (data for each country are based on other factors). This method allows for meaningful comparisons because the data for each variable are collected in a consistent way. If the Commission decides to compare both hard data and survey data, it may wish to adopt a similar approach.

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71 *Id.* at 364.

72 *Id.* at 308.

73 *Id.* at 309.

74 *Id.* at 294.

IV. Conclusion and Recommendations.

As it begins to craft a National Broadband Plan, the Commission can draw several important lessons from evaluating existing broadband rankings and reports. Analysis of these efforts suggests that the Commission cannot rely directly on existing broadband metrics. The Commission instead will need to conduct independent research and account for the limitations and methodological challenges described in detail above.

As the Commission begins this process, and initiates the difficult work of building a sound empirical foundation on which it can develop the Plan, it should ensure that broadband data are collected and analyzed in as consistent and statistically responsible a manner as possible. More specifically, it should recognize that the broadband-specific rankings published by the OECD are based on statistics collected and reported by member governments using differing methodologies and definitions of broadband. The Commission can avoid this limitation by ensuring that the data sources on which it relies domestically use consistent methodologies and definitions. Additionally, the Commission should consider the value of studies that broadly measure information and communications technologies. Though not without their own flaws, these studies nonetheless provide important lessons for the Commission. For example, the ITU's ICT Development Index provides lessons on how to gather quality data and to match that data with well-understood goals. Professor Waverman's Connectivity Scorecard shows the importance of recognizing that connectivity is not a goal in itself, but the means to providing an economy with access to a powerful tool for increasing productivity and efficiency. And the WEF's Information Technology Report demonstrates the importance of designing survey questions that elicit objective, verifiable answers based on personal experience rather than subjective opinions.

Likewise, the Commission should make its data collection encompass fully the many technologies and circumstances that permit broadband availability and adoption. By contrast, the OECD's statistics exclude wireless broadband and broadband service to businesses, colleges, and universities. The Commission should be sure to cast a wide net in identifying sources of broadband for American consumers – certainly capturing these forms of broadband as it moves forward.

The Commission's efforts to lay an empirical foundation for the National Broadband Plan also should acknowledge and, to the extent possible, compensate for factors that may distort the picture presented by existing data. For example, the OECD data illustrates the danger of measuring broadband penetration on a per-capita basis rather than on a per household basis. This methodology unfairly penalizes countries like the United States with larger average household sizes than other countries, something the FCC should avoid.

In addition, in keeping with its critical task of spurring adoption, the Commission's efforts to build a sound basis for its plan should reflect the importance of demographic, economic and other factors beyond traditional communications policy (e.g., geography, income, access to computers) that may impact whether broadband services are available and are actually used. The OECD, for example, does little to incorporate these other factors into its analysis in a way that might be helpful in developing prudent policy responses. A more effective approach, which the Commission should emulate, is illustrated by studies published by the ITIF and the Phoenix

Center. Both organizations improve on OECD's analysis by seeking to understand the impact of these other factors on broadband subscription rates.

Finally, the Commission should leverage the survey, statistical and other technical expertise of other agencies (*e.g*,, the Census Bureau), as well as independent experts in universities and elsewhere outside the Commission. This is not a criticism of the Commission's capabilities but a recognition that the complexity of the task of building a stronger data set for broadband policymaking will require the dedication of numerous individuals with highly specialized expertise. By relying on outside experts, moreover, the Commission can ensure that its data gathering and analysis – which may raise many novel issues – benefit from a wide range of ideas and expert judgments.

The Commission will find few shortcuts as it tackles the challenge of developing a sound basis for future broadband policy. Nevertheless, by following these "lessons learned" from existing broadband metrics, the Commission can take important steps toward crafting a National Broadband Plan that rests on a solid foundation.