Public Knowledge

Testimony of Arthur Brodsky

Communications Director, Public Knowledge

Before the New York City Council Committee on Technology in Government

Hearing on Net Neutrality Principles and Resolution 712-A

November 20, 2009

Chairman Brewer and members of the Committee,

Thank you very much for the opportunity to testify before the Committee this morning. I am Art Brodsky, communications director for Public Knowledge, a public interest advocacy group in Washington that represents consumer rights in the digital age. We specialize in issues surrounding the Internet, broadband and intellectual property. I have been involved with telecommunications policy since just before the breakup of the old AT&T happened in 1984 as journalist, government official, non-profit advocate.

I am here this morning to encourage you in the strongest possible terms to adopt resolution 712-A in favor of a neutral, non-discriminatory Internet. This policy is important for the economy of the City of New York. It is important for the economy of the country. This Committee and the whole Council are important, crucial voices in the debate now going on in Washington and around the country. That debate will determine whether the Internet will be dominated and controlled by the companies which provide the access to the Internet or whether the Internet will continue to be the open, innovation-without-permission, entrepreneur-driven medium with which we're familiar.

All over this city, people are going online. They want to do research, send messages, check out museums, update their social networks, check out videos. Consumers make the choices of what service they want and how much they want to pay for it.

All over this city, people are going online for a different reason. They want to create a business. Whether it's a new blog, or new application or web site, every developer needs the certainty that he or she can reach an audience. The developers need the certainty that the customers make the decision to see their videos or hear their music, not that the telephone, cable or wireless company makes the decision for them by favoring one company over another with special deals. The developers, particularly those starting out, don't have the money to be forced into the so-called "managed" lanes that the carriers want to establish. They can't afford the protection money. An Internet governed by customer choice, not by carrier favoritism, gives everyone the shot to create a business.

From the beginning of today's online world, the behavior of the Internet has been largely governed by consumers and by information/services providers. The consumer asks for data to download, or to upload. The information or service providers send back or receive information from the consumer. That is how the Internet was structured, in engineering and in philosophy. This simple structure is called the "end-to-end" principle. In the middle, the network companies provide access to the Internet by routing the traffic in the most efficient manner possible.

Now, telephone, wireless and cable companies (and those are at times the same companies) want to disrupt that traditional relationship, one which has helped the Internet to grow and to flourish, creating billions of dollars in spending and untold thousands of jobs, from small software developers to equipment manufacturers to large online service companies. They want to cut special deals that take the fundamental equality out of the Internet.

They already make money from the use of the network. Everyone who uses the Internet, from one person at a laptop to multinational companies, pays for access. They want to charge extra fees so that the content from one company will be transmitted more quickly and efficiently than another.

If that happens, the Internet quickly changes from the one we know to one the telephone, cable and wireless companies control based on which company can afford the extra money. Let's look at some basic concepts.

What Net Neutrality Is and Isn't

• **The consumer is in control.** Consumers of any size can pay a lot, or they can pay a little, for their Internet access. There is no room in the middle for special deals based on source, ownership or destination of information. My movie company shouldn't download faster than yours because I paid extra money to the telephone, cable or wireless company.

• **Network companies manage their networks.** The telephone, wireless and cable companies make sure the traffic flows. They block spam for their email customers. They can respond to the needs of law enforcement. Nothing in proposed Net Neutrality rules, or in the concept, would prevent that.

• **Net Neutrality will not cost jobs or restrict investment.** There is absolutely no evidence anywhere that playing fair with Internet users will either restrict telephone company investment or result in a loss of jobs. To the contrary, having telephone, wireless and cable company control over what flows over the Internet will harm the vitality of the Internet. The evidence shows that companies invest according to general economic conditions and in response to demand.

In addition that idea doesn't take into account investment by the thousands of companies, large and small, which do business on the Internet.

• **Net Neutrality does not regulate 'the Internet.'** Net Neutrality is a concept that goes back to the beginnings of telecommunications law in the U.S. Net Neutrality deals with telephone, wireless and cable company networks, which are already regulated.

It deals with the very specific question of how companies that, in many cases are the only high-speed Internet choices for consumers, should play fair with their customers. AT&T already agreed, in its takeover of BellSouth, to merger conditions that stopped it from playing favorites based on "source, ownership or destination" of data traffic. AT&T and Verizon in other takeovers agreed to abide by FCC principles protecting consumers.

• **Net Neutrality is not the final answer.** Net Neutrality governs how traffic travels over one network. It guarantees fairness for all users, large and small. It is not a solution to the digital divide. It will not expand broadband deployment to unserved or underserved areas.

Thank you for your time today. I urge you to approve the resolution.

Public Knowledge

November 11, 2009

Net Neutrality's Impact on Low Income Communities: Equal Access for All

A Public Knowledge White Paper
by Craig Settles

On September 21, 2009, FCC Chairman Julius Genachowski calmly laid out the case for creating rules to ensure an open Internet. But similar to the eye of a hurricane, an incredible storm of protest, hype, fear, uncertainty and doubt threaten to bury the value propositions presented by the Chairman. This is particularly true in low-income urban and rural communities.

The threat by giant telecom companies that they will stop spending for networks in these communities, and increase prices where services currently exists, raises the fear level, stifles discussion and poisons community opinion towards the FCC's effort to preserve an open Internet. Low-income constituents are, in fact, among the primary beneficiaries of Net Neutrality rules that ensure those with the least continue to have equal footing on the Internet

This paper presents a case for open Internet rules in the context of their impact on low-income rural and urban communities. Though urban and rural are distinctly different constituencies, an open Internet offers both similar benefits and protections.

Presenting the case for Net Neutrality

The principles of Net Neutrality are simple in issues they address, and deliver logical benefits that protect the best interests of consumers and businesses. Let's examine these in context of their impact on rural and low-income urban areas.

1) **Consumers are entitled to access the lawful Internet content of their choice.** A service provider can't hinder or prevent you from accessing the National Rifle Association's Web site, blogs from third-party political groups, overseas business opportunities, speeches from the President or any other content.

As two constituent groups that are behind the rest of the country in Internet adoption (46% of rural homes and 35% of households with $20,000 or less in annual income have broadband in 2009[1]), it's important to accelerate the pace at which they maximize use of Internet resources once they get online. The Internet is a primary road to political, economic and educational advancement. Those who are worried that "facially neutral laws and regulations are not always applied neutrally" should therefore be equally concerned that information denied is advancement denied.

2) **Consumers are entitled to run the applications and services of their choice, subject to the needs of law enforcement.** If you want to use Google mail or run an online book swapping business, you can't be denied these because the Internet Service Provider has a competing e-mail, or cut a deal with a national book chain.

The Internet allows constituents such as the under-employed worker in Appalachia or retired grandmother in Harlem to be able to create and run Web-based businesses from their home, or to access distance learning courses. Open Internet rules prevent a small group of profiteers from limiting choices that limit opportunities.

3) **Consumers can connect to networks with the legal devices of their choice so long as they do not harm the networks.** People should not be prevented from using the mobile device they love because the wireless provider has an exclusive deal to sell another type of device. Why should those with limited income be forced to buy a new device because they move or become dissatisfied with their current providers? Furthermore, open Internet rules could facilitate an entrepreneurial company to offer a line of less expensive, connect-anywhere devices to compete in price sensitive markets against telco-approved products.

4) **Consumers are entitled to competition between networks, applications, services and content providers.** There should be more than one wireless and one wire-line service provider wherever possible. A duopoly of one dominant phone company and one cable company is not competition, but a huge barrier to low-income communities having the networks and services they need. Open Internet rules should facilitate greater competition among service providers that offer access to the Internet.

5) **Service providers are not allowed to discriminate between applications, services and content subject to reasonable network management.** An ISP cannot allow customers to access one content provider's application or service but block or degrade another's application or service for financial, competitive or any other reason.

Communities historically on the economic spectrum's low end, in remote sections of the geographic or political landscape or disconnected from the mainstream know better than most the sting of discriminatory business practices. One must believe these communities are united to prevent the primary vessel for advancement in the digital New World from being dragged down by Old World anchors of such practices.

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[1] JOHN HORRIGAN, HOME BROADBAND ADOPTION 2009 16-17. (Pew Internet and American Life Project) (2009), http://www.pewinternet.org/~/media//Files/Reports/2009/Home-Broadband-Adoption-2009.pdf

6) **Service providers must be transparent about the network management practices they use.** A provider can't slow down or stop subscribers' ability to send or receive data without subscribers' knowledge. There are many occasions in history, such as reforming the banking industry's redlining practices in the 1960's, when the march to reform started with shining a bright light onto questionable business practices.[2] The FCC proposes to head off the need for extensive government intervention later by requiring service providers to disclose upfront how they control subscribers' access to the Net.

Community support for Net Neutrality

As with the U.S in general, within low-income communities and the organizations that represent them there are many voices and differing opinions about the FCC's push for open Internet rules. At a grass roots level, one can find strong support stemming from a common belief that Net Neutrality is about equality, fairness in how all people and businesses are treated.

Davis Park, Director of Community Technology Programs for the Little Tokyo Service Center, believes that "if we in Little Tokyo have equal access to the Internet, that means equal opportunity for everyone. Suppose for example you are giving people online access to healthcare information and services, and that content is only available to a second or third tier of subscribers who pay an extra price. This is a matter of social injustice. The same is true for access to job opportunities and educational information that's supposed to be available for everyone."

Net Neutrality's emphasis on equal access to information directly impacts low-income people's ability to build up their communities, observes Genaro Rendon, Director of Southwest Workers Union, which works for community empowerment. "People not informed are people not participating. The Internet is how you reach decision makers who influence whether Spanish-speaking people are counted in the census so their communities are allocated proper resources and representation in the government. It's a means of fighting more effectively against companies that disproportionately pollute poor communities."

Park does not confuse paying different prices for the speed at which people access data, and discrimination as to what content a subscriber can reach. "If I'm going to pay for 756k speed, that's what I'll pay. But I want to have the same access to whatever content is on the Internet. There shouldn't be two different 'highways.'" In all of the noise and information distortion surrounding the debate, this point is often missed. However, it is a critical one for low-income communities.

A. Mustafa Al-Aziz, formerly a financial analyst and currently CEO of a growing WiMAX network company AuraWav, grew up in a low-income community. He knows

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[2] Encyclopaedia of Chicago, *Redlining,* (2005)
http://www.encyclopedia.chicagohistory.org/pages/1050.html

firsthand the disadvantages of dealing with un-level playing fields when trying to pull oneself out of poverty.

Al-Aziz concurs with Park that Net Neutrality is a battle for equality. "If a service provider imposes restrictions on who can get out to particular content and control what data comes into their network, they're not allowing people to touch all the resources they need. If my mom who lives in Battleboro, NC, were told she couldn't get to Skype to make calls that are free or cheap [because Skype competes with telcos' services], she wouldn't be able to afford to make long distance calls."

Increasing broadband adoption is a key challenge facing those who advocating for and building networks. It is also a great challenge for communities that have Internet access, yet 30% of their constituents are not subscribing to services. CEO for Philadelphia's Digital Impact Group (formerly Wireless Philadelphia), Greg Goldman has overseen his organization's success at moving hundreds of low-income residents onto the Internet.

"We've seen time and time again that the degree to which local nonprofits and content providers push information out to these communities, and the ease with how users gain access to local information, determines the success of broadband adoption," says Goldman. "Net Neutrality will make it easier for new adopters to continue to gain access." Digital Impact Group's Communication's Officer Ryan Nichols explains, "Corporate service providers' business models don't play to an open Internet. The kinds of services and information first-time Internet users need are not likely to be a high priority with providers should they decide to restrict network access."

The St. Anthony Foundation in San Francisco, CA is a nonprofit organization that runs technology training programs to help low-income individuals enter, re-enter and/or advance in the workplace. 100 people a day use their services. Karl Robillard, Manager of Employment Programs and the Tech Lab, likewise sees a threat down the road if Net Neutrality principles are not codified. "Right now the Internet is an open exchange of communication. But if it becomes so profit driven by service providers that you have to have money to get to specific content, then you cut out people trying to get a leg up in the world."

The Foundation surveys its members to determine how they use the Internet. 35% are either looking to find a job, maintain one they have or bolster their Web presence by creating blogs and personal Web sites, all of which increases members' self sufficiency. About 35% seek out supportive content such as community and government resources, while 30% reach out to family members, friends and other resources that make their lives better. "Our constituents' ability to access an open Internet is crucial," states Robillard. "If access becomes restricted, packaged and priced like cell phone service, this is an additional barrier for those using Internet resources."

While some national business organizations and corporations decry Net Neutrality as anti-business, anti-competition, the opposite is true. Except for the handful of companies that stand to financially benefit from a closed or restricted Internet, millions of small

businesses, home-based entrepreneurs and even major corporations will benefit from an Internet with guaranteed open access.

Rural residents of all ages, cultures and economic status receive creative and practical tools from Main Street Project in Minneapolis, MN that gives them the opportunity to participate more affectively in all aspects of community life. One of their programs is an economic development initiative known as the Rural Enterprise Center, which organizes local resources in rural communities to develop and train successful entrepreneurs.

"The danger we face in the future is the possibility of telcos showing preference to content that's in line with their commercial and political interests, " says Steven Renderos, Media Justice Organizer for Main Street. "For small businesses the Internet is crucial for expanding their markets in a tough economic climate. It would be impossible to compete against some of the larger poultry and agricultural corporations were it not for an open Internet. Subsequently, part of the business platform in our program includes a presence on the Internet."

As Al-Aziz sees things, the potential for large incumbent service providers to restrict or discriminate in allowing access to content, applications and services and even fight communities' attempts to build their own networks is infuriating. "The thing that burns me about the Net is that there are ideas, talent and creativity out there in most rural parts of America and in poor urban areas that is untapped. If these individuals have the way to go out on the Net and do things creatively, they could create their own businesses. I don't want to see anyone who is paying service not be able to go to and get the same content as everyone else."

A "false choice" on innovation

Those opposed to the FCC's open Internet rules raise two primary concerns:

1) incumbents' innovation and investment in new networks will cease or be severely restricted in low-come communities if FCC rules are passed, and
2) incumbents will raise prices if they have to conform to any regulations, a particular concern within these communities.

Public Knowledge believes that these fears are unfounded. The main questions to ask are: 1) will our communities be adversely affected as described, and 2) are there alternatives if incumbents actually carry out these threats?

Chairman Genachowski pointed out the "false choice between openness and innovation" that Net Neutrality critics are trying to sell to the American public. He believes the open nature of the Internet is directly responsible for this innovation, and open Internet rules will protect rather than stifle this innovation in the future.

Telcos and cable companies are less the Internet innovators than the enablers of innovative content and applications that are created, transported and accessed by anyone who can get reasonably fast Internet access. Incumbents reference the billions of dollars they spend every year, but has this really gone to innovation, or mostly for maintaining older core technology? Public Knowledge believes the latter.

In reality, major innovations on the Internet have come from thousands of startups, small businesses and people in their bedrooms creating Internet content, and dozens of leading software and hardware companies providing technology to move and receive this content. Investments in the billions came from venture capitalists who $28 billion in 2008 alone for Web and other IT technologies, financial institutions and large tech companies preferring the open plains of the Internet rather than walled gardens of service providers. These investors, more so than incumbents, will continue to drive innovation on the Net. And as the 2,200 organizations applying for broadband stimulus grants proved, there are quite a few willing to abide by open Internet rules for the privilege of bringing broadband to those underserved and unserved by the incumbents.

Pricing argument a red herring

It is highly unlikely that incumbents will raise their prices if they face competition mandated by open Internet rules. The reality of market forces weighs against them. There is ample evidence that increasing competition (open Internet principle #4) lowers prices for telecom services. The recent broadband adoption report from Pew Internet reveals that:

"Broadband users who say they have just one provider where they live report an average monthly bill of $44.70.

Among broadband users with more than one provider in their area, the average monthly broadband bill is $38.30.

A subset of home broadband users who say four or more broadband service providers serve their neighborhood reported an average monthly bill of $32.10."

For communities, getting affordable pricing depends a lot on their willingness to bring in or create a serious competitor. One way is by influencing legislation that prevents incumbents from using predatory anti-competitive business practices, hence support of the FCC rules. Another avenue is to work with various local government agencies, nonprofits and others to build a community network.

Though this is not easy, there are 57 successful fiber networks in the U.S. as of October 2009 run by local governments or public utilities. Expect more to come online by way of ARRA broadband stimulus grants. According to the Fiber to the Home Council's **Municipal Fiber to the Home Deployments** October 2009 report,[3] "not a single muni

[3] FTTH COUNCIL, MUNICIPAL FIBER TO THE HOME DEPLOYMENTS: NEXT GENERATION BROADBAND AS A

FTTH system has failed. Nationwide, the take rates for retail municipal systems after one to four years of operation averages 54 percent. This is much higher than larger incumbent service provider take rates, and is also well above the typical FTTH business plan. Deployments usually require a 30-40 percent take rate to 'break even' within planned payback periods."

While "building your own" is one of many avenues to address the issue of price, some communities can argue that the fear of incumbents' threats shouldn't become the tail that wags the dog. "Don't start this debate with 'Net Neutrality is going to raise prices, so our communities won't have access,' states Rendon. "It's unfortunate that organizations are putting out that kind of statement. This is a misplaced argument. Poor people already don't have access. Are we going to say access only comes if you have a lot of money? Let's agree that everyone should have access, and with this goal look at where we get the money because we can come up with a variety of options to address this."

Conclusion

The FCC's push for open Internet rules is creating a very lively debate nationwide. While this is good for consumers and businesses alike, the disproportionate influence of a few entities threatens to obscure good arguments for low-income communities.

As Renderos states, "to penalize low-income communities as to what they do on the Internet based on what they can afford in my mind creates a second class society of Internet users that mirrors our marginalized communities in the real world. The Internet needs to remain open and free of content discrimination. Regardless of income level, I want the opportunities to do what anyone else can do on the Internet."

MUNICIPAL UTILITY, 2 (OCOTBER 2009), http://www.ftthcouncil.org/sites/default/files/Municipal%20FTTH%20Systems%20October%202009%20Final%20Oct09_1.pdf

About The Author

Broadband business strategist, marketing expert, author and internationally renowned speaker, Craig Settles helps organizations use broadband technologies to improve government and stakeholders' operating efficiency, as well as local economic development.

Mr. Settles can be followed on Twitter and LinkedIn.

In 1999 Mr. Settles served as Dir. of Electronic Commerce for Metricom, which marketed Ricochet wireless Internet access service, the pre-cursor to today's municipal wireless networks. He authored Fighting the Good Fight for Municipal Wireless in 2005. This, together with his numerous in-depth analysis reports, established Mr. Settles as a prominent thought leader on appropriate business strategies for municipal broadband network deployments.

In recent years he has consulted with several cities on municipal broadband strategy. Technology vendors and service providers tap Mr. Settles' industry knowledge and marketing expertise to implement programs that generate sales leads.

Mr. Settles is frequently called upon as an municipal broadband expert for journalists at CNN, the Wall Street Journal, New York Times, Time Magazine and a host of business, technology and local media outlets. He has spoken and chaired various conferences, including MuniWireless, the Wireless & Digital Cities Congress and the N. American Wireless Cities Summit.

Fighting the Next Good Fight, Mr. Settles' latest blog, further showcases his expertise in this area.

For over 20 years Mr. Settles developed and executed innovative marketing campaigns for technology clients that include Microsoft, AT&T and Symantec. A staunch advocate of creative yet practical uses of technology to improve business operations, he keeps abreast of new developments, tactics and techniques that help organizations thrive in an increasingly competitive marketplace.

November 19, 2009

This is the print preview: Back to normal view »

Art Brodsky

communications dir., Public Knowledge

Posted: November 12, 2009 10:57 PM

Those Who Hate The Fairness Doctrine Should Love Net Neutrality

Nothing gets the right wing all riled up like a good phony fight. Think "death panels." Think of the coming "War on Christmas." Think of all the bile directed toward the extinct Fairness Doctrine, which the Federal Communications Commission (FCC) repealed in 1987.

The Obama administration has said it won't bring it back, but that didn't stop conservative legislators from introducing, and prodding their colleagues in Congress to pass, legislation to stop the Fairness Doctrine from being re-instituted -- and then claiming victory.

What would be even more gratifying than to ban an extinct policy would be if the people railing against it had a better idea of that policy against which they campaigned. Because if they truly understood the Fairness Doctrine, then they wouldn't go around using it as a justification for opposing Net Neutrality -- the idea that the companies which run the telecom networks to your house shouldn't play favorites. The two ideas are polar opposites.

The Fairness Doctrine is one of those hot-button issues sure to raise right-wing temperatures, from the most prominent broadcasting bloviator to the most rabid obscure web site. For the conservatives, the Fairness Doctrine is a government plot to curb right-wing radio. Glenn Beck told his audience that, "They are going to do everything they can to silence our voices." "They" of course are the Obama administration and Congressional allies, who have said they won't bring it back. Sen. Jim DeMint (R-SC), who introduced the legislation to ban the Fairness Doctrine, said, "Democrats want to impose an unfair doctrine that destroys talk radio and silences the voices of millions of Americans who disagree with their vision for America." As a general matter, it's a shame that "fairness" has become such a pejorative expression to conservatives and it's too bad that in their paranoia they view any discussion of bringing the views of progressives or liberals to the mass media as a plot to shut them up.

FCC Commissioner Robert McDowell was one of the first to suggest that Net Neutrality is a latter-day version of the Fairness Doctrine, thus combining one flash point with another in a speech in January when he said the Fairness Doctrine "could be intertwined into other communications policy initiatives that are more certain to move through the system, such as localism, diversity or net neutrality."

Rep. Marsha Blackburn (R-TN) picked up the theme more recently. Kim Hart reported in The Hill on Blackburn's October 20 speech in which Blackburn said, "Net neutrality, as I see it, is the fairness doctrine

for the Internet."

The Fairness Doctrine was an affirmative obligation given to broadcasters by the FCC. As then-U.S. Supreme Court Justice Byron White wrote in the 1969 Red Lion opinion upholding the Doctrine, "The Federal Communications Commission has for many years imposed on radio and television broadcasters the requirement that discussion of public issues be presented on broadcast stations, and that each side of those issues must be given fair coverage."

In its original 1949 order setting out the Fairness Doctrine, the FCC said that broadcasters needed to play a "conscious and positive role in bringing about balanced presentation of the opposing viewpoints."

Net Neutrality is different. Perhaps the best legal expression of Net Neutrality so far was the condition the Commission imposed in its 2007 order approving the AT&T takeover of BellSouth. The FCC said the new giant company had agreed "not to provide or to sell to Internet content, application, or service providers, including those affiliated with AT&T/BellSouth, any service that privileges, degrades or prioritizes any packet transmitted over AT&T/BellSouth's wireline broadband Internet access service based on its source, ownership or destination."

Another version is the legislation (HR 3458) introduced by Reps. Edward Markey (D-MA) and Anna Eshoo (D-CA). Their bill provides, in part that Internet Service Providers (ISPs) shall "not block, interfere with, discriminate against, impair, or degrade the ability of any person to use an Internet access service to access, use, send, post, receive, or offer any lawful content, application, or service through the Internet." ISPs also could not "provide or sell to any content, application, or service provider, including any affiliate provider or joint venture, any offering that prioritizes traffic over that of other such providers on an Internet access service."

Net Neutrality, then, is the polar opposite of the Fairness Doctrine. One, the Fairness Doctrine, requires active participation by a broadcaster in determining content. The other, Net Neutrality, requires the service provider to stay out of the way. Is that a "government mandate?" as some conservatives claim? Perhaps. But it's a mandate to let traffic flow without attempting to judge the worth of one person's traffic over another. They have no relation to one another. People who opposed, and oppose, the Fairness Doctrine should support Net Neutrality.

That said, however, what both ideas have in common is the notion, which goes back to the beginnings of our telecommunications law, that the interests of the public trump those of businesses or government. The idea that clear in the earliest days of broadcasting, just as it should be clear today. Herbert Hoover said in 1925 that there has to be a "public benefit" to broadcasting. U.S. Supreme Court Justice White in the Red Lion opinion also, said: "It is the right of the viewers and listeners, not the right of the broadcasters, which is paramount."

That's why when DeMint and his colleagues had it backwards when their legislation to prohibit the Fairness Doctrine is called the "Broadcaster Freedom Act of 2009." Under our system, the freedom of the public trumps the freedom of broadcasters. In the Internet age, we can do nothing less. The freedom of the public to hear what it wants to hear, to see what it wants to see, and to create what it wants to create should not be subject to the business plans of the telephone and cable companies. That's what our traditions and laws demand; that's what the public deserves. That's why Net Neutrality is so important.

Follow Art Brodsky on Twitter: www.twitter.com/artbrodsky

November 18th, 2009

Dear Speaker Quinn:

We write to express our support for the FCC's ongoing efforts to adopt rules to safeguard the open Internet and in favor of City Council Resolution 712A.

As business investors in technology companies, we have first-hand experience with the importance of a guaranteeing an open market for new applications and services on the Internet. Clear rules to protect and promote innovation at the edges of the Internet will reinforce the core principles that led to its extraordinary social and economic benefits. Open markets for Internet content will drive investment, entrepreneurship and innovation. For these reasons, Net Neutrality policy is pro-investment, pro-competition, and pro-consumer.

Permitting network operators to close network platforms or control the applications market by favoring certain kinds of content would endanger innovation and investment in an investment sector which represents many billions of dollars in economic activity. The FCC is absolutely correct to propose clear rules that require competition. The promise of permanently securing an open Internet will deliver consumers and innovators a perfect free market that drives investment, job creation, and consumer welfare. These principles should apply across all Internet access networks, wired or wireless.

Investment and innovation at the edge of the network will create not just jobs but also new tools and opportunities for communication, education, health care, business, and every other human endeavor.

We recommend the City Council petition the FCC in favor of clear rules to protect the open Internet, secure its future, and promote its continued growth.

Sincerely,

Brad Burnham, Union Square Ventures
Albert Wenger, Union Square Ventures
Fred Wilson, Union Square Ventures

Mr. Chairman and members of the committee,

Thanks for invitation to speak about the importance of involving the ethnic and community media in the discussion on the importance of net neutrality. My name is Jehangir Khattak. I am the Communications manager at the New York Community Media Alliance. NYCMA is a non-profit organization that works for the promotion of the ethnic and community media in New York and New Jersey. As you all know NYC is home to over 3.5 million immigrants, about 1.8 million of whom either have limited or no knowledge of English and thus their primary source of information is ethnic and community media in their own languages. This is one of the reasons for the mushroom growth of this media sector in this part of the country and today there are over 350 ethnic and community publications that come out of New York. These include 26 foreign-language dailies. Thus print and electronic media are also an integral part of their lives -- and in certain cases may be more important to them than to the average American, especially in case of those communities with low English literacy and no community media here and who have to access the internet to read news related to the countries of their origin.

We at the NYCMA are working very closely with this media sector to catch up with the emerging technology curve in the information sector. We have been organizing training sessions for more efficient use of web based tools for reporting and encouraging publications of this media sector to better organize their web presence. We believe that network neutrality demands open and free Internet that fosters competition and innovation; and gives people access to the content and services of their choice. However, even the bigger issue is awareness amongst the communities about the subject. The FCC and the advocacy groups have largely failed in connecting with these communities on the subject. The level of understanding about the issue of network neutrality amongst immigrant and minority communities is far below the mark. That's why, the subject has not been focus of much editorial debate in this media sector. There are social justice implications for these communities as well when they cannot connect the dots between their realities and access to the Internet. For example what does it mean if popular Skype is no longer available for low cost? And what does it mean for students who lack Internet

access and their academic success? Also what does it mean if news from the home country can only be accessed through the Internet and it is no longer available because it is no longer affordable to go online? These are not simple questions. These are possibilities which will adversely impact the communities if net neutrality vanishes. The media which these communities use as their news source is largely equally ignorant about the subject or is unknowingly failing to connect the dots that could lead to a broader understanding of the issue of network neutrality in their communities. Many of the media outlets might desire to highlight the issue but lack of understanding is one key hurdle in their way.

We at NYCMA have joined efforts to engage the ethnic press in critical discussions about the future of information and communications technology. We are working on organizing a one-day forum on media policy in March 2010. It will essentially focus on network neutrality as well. We are working closely with two leading media policy organizations, the People's Production House and Free Press in this connection. We held the first preparatory focus group meeting for the forum on October 15 which was attended by senior journalists from different ethnic and community publications and television channel. We found at this meeting that the level of understanding of the issue of net neutrality was very low amongst the participants. For example, participants from Asian newspapers estimated that 90% of their readership uses the internet, while others gave estimates of 50-60%. Though an overwhelming majority of the ethnic and community media has online presence, a majority has little idea of how net neutrality can benefit them and their communities. We feel that internet should offer a level field for usage to every body. Net Neutrality is the beginning of a larger conversation on the future of the Internet. The larger goal is affordable and open Internet access for everyone, everywhere. Net neutrality ensures the freedom of speech and creativity that have made the Internet such a powerful tool for democracy and innovation. Net neutrality recognizes that the Internet is an essential infrastructure for economic, social and political activity and not just a private commodity to be controlled by corporations. That's why we not just support the calls for new FCC regulations to break the monopoly of a few companies but also want more serious efforts to create greater understanding of the issue of net neutrality. We appreciate the City Council's resolution

calling for new FCC regulations for more open internet access. We support the Council's Res. No. 712 – A; which calls on the FCC to codify strong network neutrality principles in order to ensure that the Internet will continue to foster innovation, increase competition, and spur economic growth as well as making the Internet faster and more affordable for all. We feel that net neutrality is the benchmark for free flow of information and must be protected.

I thank you for your time and attention

NEW YORK COMMUNITY MEDIA ALLIANCE

VOICES THAT MUST BE HEARD

Edition 399 19 November 2009

Sharan Harper is the Multi-media Associate Editor of this issue.

SUBSCRIBE TO *VOICES THAT MUST BE HEARD*: THE GATEWAY TO ETHNIC MEDIA

NEWS

Hard times: Chinese-American unemployment rate soars

By **Zhang Jingyi, World Journal**, 8 November 2009. Translated from Chinese by **Austin Woerner.**

The rate of unemployment among Asian Americans, usually quite low, has doubled over the past year. This rate of increase is among the highest of all ethnic groups.

VIDEO :: A year after the collapse of Lehman Brothers, some Asian Americans and U.S.- educated Asians are considering opportunities outside the U.S. in China, India, and beyond. Nathan King of Voice of America reported from New York. MORE>

video

Attempt to reunite military families

By **Annie Correal, El Diario La Prensa**, 11 November 2009. Translated from Spanish by **Chris Brandt.**

National Immigration Forum Executive Director Ali Noorani stated that there could be thousands of military families who have an undocumented member – it is estimated that there are more than 114,000 immigrants in the Armed Forces.

VIDEO :: Michael Ferschke, Jr. served honorably in the Marines and gave his life for our country. His widow, Hota, now faces a new battle to live in the U.S. even though she is trying to honor Michael's wish to raise their son in his hometown. MORE>

video

Nightmare ends for tenants at

EDITORIALS

We're all losing this culture war

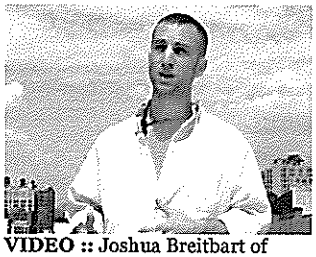
By **Tom Deignan, Irish Voice**, 11 November 2009.

The father of a 9/11 victim is protesting his town's decision to erect a memorial to his deceased son. What could possibly be the objection? MORE>

Why we need Internet neutrality

By **Joshua Breitbart, People's Production House**, 16 November 2009.

Verizon and AT&T have spent over $20 million on federal lobbying in this year alone trying to thwart The Internet Freedom Preservation Act of 2009, a bill in Congress that would enshrine net neutrality in law.



VIDEO :: Joshua Breitbart of People's Production House discusses empowering people with media literacy and the potential benefits of opening up the TV white spaces to Americans in urban areas.

AUDIO :: On October 22nd, NPR's Morning Edition reported on the Federal Communication Commission's vote on net neutrality. MORE>

video audio

AIDS has disappeared...

By **Bill Fletcher, Jr., Carib News**, 17 November 2009.

In 2007, two million people worldwide died of AIDS – that is 5,500 per day. In the United States, 1.1 million people were living with AIDS, with a startling 45 percent of all new cases found among African Americans. MORE>

BRIEFS

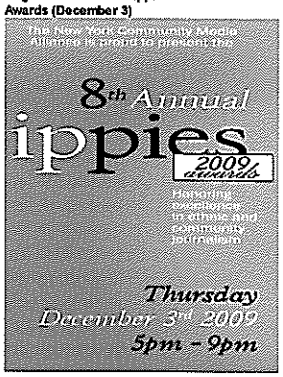
Korean parents confused about H1N1 vaccine

By **Chong-eun Lee, The Korea Times**, 12 November 2009. Translated from Korean by **Sun-Yong Reinish.**

Author reflects on his African

UPCOMING ACTIVITIES

▼ **Register for the 2009 Ippies Awards (December 3)**



See all calendar events

NYCMA ANNOUNCEMENTS

▼ **Health care briefing for ethnic media: Immigrants have a huge stake in reform**

New York Immigration Coalition Executive Director Chung-Wha Hong addressing members of ethnic media at the briefing. – Photo by Aleksandra Slabisz

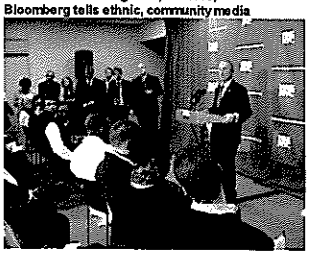
▷ **New York needs new direction, new leadership, says Bill Thompson**

Democratic candidate for Office of New York City Mayor, Comptroller Bill Thompson addressing New York's ethnic and community media at a press conference organized by New York Community Media Alliance on October 26. – Photo by Aleksandra Slabisz

▷ **Equal opportunity, equal protection to NYC's communities, Councilman Liu promises ethnic/community media**

John Liu addressing New York's ethnic and community media at a press conference organized by New York Community Media Alliance on October 27. – Photo by Aleksandra Slabisz

▷ **We need more immigrants, not less, Bloomberg tells ethnic, community media**



Mayor Michael Bloomberg addressing a press

NEW YORK COMMUNITY MEDIA ALLIANCE

About NYCMA:

Executive Summary

The New York Community Media Alliance (NYCMA) was originally founded in April 2000 as the Independent Press Association-New York. It continues to be the only member-driven nonprofit organization that works to strengthen the immigrant and community press in New York City, recognizing the critical role it plays in organizing, advocating and promoting civic engagement in the communities it serves. Although there are a myriad of grassroots advocacy organizations throughout the city, not all community members associate or access their services, while local newspapers reach into most homes. New York City, where immigrant communities represent 44% of the population, where close to 350 weeklies and 26 foreign-language dailies reach a readership of well over 3.5 million, and where over 140 languages are spoken in its public schools, was a logical and important place to launch this initiative.

With support from C. S. Mott Foundation, Rockefeller Brothers Fund, NY Community Trust, David and Katherine Moore Foundation, New York Foundation and the Ford Foundation, among others, NYCMA developed its Grassroots Media Project (GMP), a sophisticated cluster of programs to encourage informed public participation in communities that are not well served by the mainstream media: low-income and working-class communities, communities of color, and immigrant communities where English is not the primary language. Our programs seek to strengthen immigrant and community journalists' investigative reporting skills, and to project news and analyses from these communities beyond the confines of ethnicity and the boundaries of their neighborhoods. NYCMA advocates for access to government information, policymakers, powerbrokers and advocacy leaders. It promotes collaboration with progressive and mainstream media and actively seeks to foster relationships with the city's journalism schools. NYCMA fosters a geographically-based coalition that demands transparency and accountability from local and state government.

Our programs:

- ***The Independent Press Institute,*** which offers press briefings to ethnic and community journalists and technical workshops to editors and marketing staff. The briefings are key to expanding reporters' access to information.
- ***The Ethnic and Community Press Fellowship***, a 10-month program offering journalists training and other learning opportunities so they can strengthen investigative reporting skills, network with city and advocacy leaders for an in-depth understanding of issues, and expand their pool of resources.
- ***Voices That Must Be Heard***, a weekly online publication that culls and translates into English articles from NYC's ethnic and community press for 4200 direct subscribers, including mainstream journalists, advocacy groups, city and state agencies, and students.

- ***Ad Service***, which draws advertisers to the network of ethnic and community newspapers that are not always easily accessible in order to help the publications' bottom line.
- ***The Ippies,*** the only journalism awards in NYC to honor reporting in languages other than English.
- ***Many Voices, One City,*** an ethnic and community press directory for NYC and the metropolitan area.

The changing demographics of New York City make it imperative to build the capacity of this media sector and to forge strong ties between it and mainstream and progressive media. The Project's vertical and multifaceted model – rooted in the city's immigrant and low-income communities through the media that serve them – works.

Our impact has been recognized in many ways. Honors include the Municipal Arts Society of New York 2005 award and the Utne Journalism Awards 2005. In April 2007, Mayor Michael Bloomberg honored NYCMA executive director, Juana Ponce de León, for her contribution to bettering the lives of immigrant New Yorkers. Most recently she appeared on *Same News Different Views: Bridging the Gap Between Ethnic and Mainstream Media,* organized by The Center for New York City Affairs at The New School and WNYC. She has been invited to speak about the ethnic and community press.

Since June 2005, all press offices in city government agencies subscribe to NYCMA communications. State agencies, legislators, over 500 mainstream media outlets, hundreds of advocacy organizations and numerous journalism schools receive weekly communications from NYCMA and subscribe to Voices That Must Be Heard (VTMBH), which serves as a direct vehicle to community voices and to the rapid changes provoked by the growth of these communities. By encouraging collaboration among journalists across ethnicities and neighborhoods, GMP has helped forge a broader public identity as a media sector, increasingly recognized by candidates and legislators alike – from Governor Eliot Spitzer to City Council Speaker Christine Quinn – who speak at our press conferences, or by the Dept. of Health, Office of Emergency Management, HPD, Consumer Affairs or the Dept. of Education, which reach out to us to call on journalists to attend their briefings.

NYCMA's work is unique. It is the only organization in New York City that focuses on this media sector, an unrecognized and underutilized source of information and insights on the issues that impact all residents of New York City, and ultimately the whole country – a nation of immigrants.

OUR ONLINE PUBLICATION: *Voices That Must Be Heard*

Since launching in October 2001, a month after the September 11 attacks, Voices That Must Be Heard, the award-winning weekly online publication that culls articles from the ethnic and community press, has become a trusted and unique source of information by and from immigrant and low-income communities of color in New York City and beyond, for mainstream journalists, city and state government, advocacy groups and journalism schools. Back in 2001, the lack of reporting on the impact of the World Trade Center attacks on the city's Muslim communities necessitated the creation of Voices to surface the adverse consequences confronted by them. Within two months, Voices began coverage of a broad array of communities, having hit the nerve of the civic and social marginalization from mainstream society of an important portion of the city's residents. Voices was the pioneer online publication in the country to bring the perspective and analysis of immigrant and communities of color directly to a broader audience and continues to be the seminal model for other organizations seeking to access on-the-ground news from these constituencies. Voices set the standard for the diversification of online media, which continues in its infancy.

Voices, which is rooted geographically through the media that serves NYC's ethnic and communities of color, exemplifies what is best in giving localism a global perspective.

Voices promotes coalition building by translating into a common language – English – articles from many languages, including Russian, Polish, Urdu, Bangla, Arabic, Spanish, and Chinese, producing a place where journalists and editors from this media sector get to read and pick up each other's coverage, something that is often mentioned by them as important to help them keep abreast of what is taking place in other communities and identify issues affecting them all, thereby fostering a common identity as a media sector.

Voices serves as an echo chamber for communities' concerns, accessed by their constituencies' media, by mainstream and progressive media, policymakers and advocates and j-schools and serves as a bridge between the growing immigrant and communities of color and mainstream society.

Voices also served as an important venue for articles generated by the NYCMA's Ethnic and Community Press Elections Initiative 2008, which garnered national media attention from the New York Times to NPR; it will feature articles generated by the Ethnic and Community Press Fellows in 2008 and 2009 – Developing and Education Beat and help project nuanced coverage on a series of public education issues of concern to the communities, which often mirror issues faced by ethnic and communities of color across the country, which extends through 2009; also in 2009 Voices will disseminate coverage generated by the a Fellowship on Crime and Immigrant and Youth of Color, established in collaboration with media partner, Center on Media, Crime and Justice at John Jay College of Criminal Justice.

Because articles in Voices are not reinterpreted or repurposed, the journalists and editors responsible for working this media sector have a forum to make themselves heard and known. To this end, the new Voices site will offer total transparency by linking to journalists, editor, publishers and translators contact information and to the publications' websites.

The presence of Voices on the Internet represents at diversification of digital media, which already is dominated by English-language reporting, and contributes to the democratization of this new

media, and helps broaden the paradigms on critical issues, such as racism, the economy, immigration and immigrants.

As a formal associate organization of the Media Consortium, Voices is distributed to a list of 1.2 million readers and immigration articles are aggregated in its news ladders.

Prompted by the social unrest from ethnic communities in several European countries, Voices has drawn the attention of German and English media representatives, who have visited the NYCMA office in New York City to learn more about this publication model, which makes possible communication among ethnic groups, and research any consequent contribution to helping maintain social order in such extreme situation as the aftermath of 9/11. The US State Department sends to NYCMA representatives from foreign media, including Chinese, Indonesian and Philippine in recent months, to learn about the Voices program and other NYCMA work. As well, the United Nations press agencies have approached NYCMA to subscribe to Voices and for help to reach out to the local international media to attend their press briefings.

OUR FELLOWSHIP PROGRAMS:

September 19, 2008

NYCMA Kicks off the First-Ever "Education Reporting Fellowship" for 17 Ethnic Newspapers in N.Y.C.

18 ethnic and community reporters selected from N.Y.C.; total grants over $100,000;
first meeting with Education Department Chancellor Joe Klein next Friday

New York Community Media Alliance (NYCMA), a New York-based non-profit organization serving over 320 ethnic and community newspapers, launched the pioneer program – "Ethnic and Community Press Fellowship – Developing an Education Beat" – on September 12, 2008. Eighteen staff reporters from 17 selected ethnic and community newspapers, who will each receive a fellowship grant of $6,000 by participating in this 10-month long program, will meet the key players in the City's education system and develop an education beat for their news organization. This project is made possible by the support from the Bill and Melinda Gates Foundation.

"NYCMA is looking to develop an issue-oriented reporting model that can be replicated in other cities in New York State and ultimately across the country," says Executive Director Juana Ponce de Leon at the orientation last Friday.

A true reflection of New York City's proud diversity of immigrants, the Fellows include seasoned reporters from Chinese-, Haitian-, Polish-, Russian-, Pakistan-, Arabic-, Latino-, Irish-, Indian-, Bangladeshi- and African-American communities. Many of them, whose newspapers have long been struggling for resources, described the City's education system as "complicated," a "failure to address," and "baffling."

This unprecedented Fellowship, designed to cover the entire school year of 2008/09, aims to open the doors for reporters to gain an insider scoop of the education system by providing an exchange platform with public officials, experts and advocates, as well as site visits to some of the City's schools.

As a continuous effort to inform the ethnic communities about the most up-to-date issues in education, the Fellows will each produce a series of feature stories and publish in their newspapers in different languages throughout the school year. Together, more than half a million of immigrants in New York City who rely upon these 17 newspapers for news and information will be benefited by these reports and able to make an informed decision for their children's academic futures.

The 18 reporters selected for the Fellowship are: James Fergusson (Norwood News), Rong Xiaqong, Lotus Chau (Sing Tao Daily), Shuang Liu (World Journal), Darlie Gervais (Haitian Times), Yana Wasielewski (Novoye Russkaye Slovo), Aleksandra Slabiz (Nowy Dziennik / Polish Daily News), Mohsin Zaheer (Sada-e-Pakistan), Rachel Millard (Aramica), Ari Kagan (Vecherniy NY), Mary Alice Miller (Our Time Press), Virginia Alvarado (Diario de Mexico), Peter

McDermott (Irish Echo), Robert Waddell (Tiempo NY), Sujeet Rajan (Indian Express), Abu Taher (Bangla Patrika), Helen Zelon (City Limits), and Ansar Lovlu (Weekly Thikana).

JOHN JAY COLLEGE
THE CITY UNIVERSITY OF NEW YORK
OF CRIMINAL JUSTICE
CENTER ON MEDIA, CRIME & JUSTICE

NYCMA
NEW YORK COMMUNITY MEDIA ALLIANCE

12 NEW YORK AREA JOURNALISTS CHOSEN AS IMMIGRATION REPORTING FELLOWS AT JOHN JAY COLLEGE

New York (May 1, 2008) --- Twelve journalists from leading ethnic and community newspapers in the New York region have won Media Fellowships at the John Jay College of Criminal Justice (CUNY) to explore the impact of current immigration policies on the nation's criminal justice system.

They will participate in a special conference and fellowship program at John Jay College June 2-4, sponsored by John Jay's Center on Media, Crime and Justice and the New York Community Media Alliance.

In the first program of its type anywhere in the nation, the journalists will work on a wide range of reporting projects including the problems of youth violence in new immigrant communities, the impact of current policies on the children of deportees, immigration consulting scams, and the growing debate over whether local authorities should enforce federal immigration laws against undocumented migrants. The three best published stories arising from these projects will be awarded $1,000 stipends.

The New York conference, "Immigration, Crime and Justice: Where Do We Go from Here? (Reporting The Full Story)," represents the second half of a unique effort to provide access, training and research information to ethnic media journalists who are often ignored by mainstream policymakers. The first part of the program was organized by the Institute for Justice and Journalism (IJJ) at the University of Southern California Annenberg School for Communication, which selected a separate group of 12 ethnic media journalists from around the nation for a program on immigration and border security in Tucson, Arizona March 16-23.

Both sets of media fellows will come together in New York for a three-day conference featuring leading authorities, academics and policy makers, and a special field reporting visit to the city of White Plains, New York. Among those scheduled to address the conference are U.S. Rep. Silvestre Reyes, chairman of the House Intelligence Committee; and New Haven Mayor John DeStefano.

"The results of this program will be felt immediately, in stories and articles produced by the Fellows, and in years to come, through the increased expertise, confidence and knowledge that

journalists will be able to bring to this key national issue," said Stephen Handelman, Director of the Center on Media, Crime and Justice at John Jay College.

"Given the mission-driven and advocacy nature of many ethnic and community newspapers, providing the reporters with access to experts on law enforcement issues, both from the perspective of police and of the communities, promotes nuanced reporting into the communities affected, empowering them to advocate for their rights," commented Juana Ponce de León, executive director of New York Community Media Alliance. "This is what responsible media should be doing,"

The 12 New York-based Fellows reflect New York's vibrant ethnic community journalism. They include writers representing Polish, Bangladeshi, Chinese, Irish, Arabic and Latino publications.

The Center on Media, Crime & Justice at John Jay, founded in 2006 and managed by working journalists, operates programs, seminars and workshops aimed at raising the quality of criminal justice journalism around the nation and overseas. The New York Community Media Alliance (formerly known as IPA-NY) is the only association of ethnic and community publications in New York City, and provides technical assistance, training, networking opportunities, and advocacy for its members.

The New York conference is supported with a generous grant from the Open Society Institute.

OUR INITIATIVES:

New York Community Media Alliance
2008 Election Initiative

Project description:

The initiative was launched on February 7, when NYCMA sent 11 ethnic and community press journalists to the New Hampshire primary. For all the journalists involved, it was their first exposure to a presidential election primary, a surprising fact considering that there are close to 350 community and ethnic publications in New York City, including 26 foreign-language dailies, which reach 3.5 million readers. Despite this apparent lack of direct coverage of the elections by this media sector, according to exit polls conducted by Prof. Lorraine Minnite at Barnard College and the New York Immigration Coalition, for the past seven years most of the growth in voter participation was made up of first-time immigrant voters.

Besides generating close to 35 articles from New Hampshire and follow-up pieces that were published in the newspapers where the reporters are on staff or work as stringers here in New York City, the reporters were also interviewed on public radio in Manchester; interviewed for Feet in Two Worlds project at the Center for New York City Affairs at the New School; Brian Lehrer invited several of the reporters to his show on WNYC, CUNY TV; and a crew of student journalists from Hunter College accompanied the journalists and shot video footage of the reporters reporting, and blogged on their experiences from the primary events that was broadcast through a network of college Websites. Articles generated were sent to New America Media; U.S. Asian Wire and Global Information Network. This first step of our initiative proved to be extremely successful, helping project the journalists' stories nationally.

> *Ethnic papers are usually very understaffed and cannot afford to send reporters to cover political events that are happening in distant parts of the country. It was actually the first time in a 37-year old history of Nowy*
> *Dziennik that its reporter went to cover the New Hampshire primaries. Being able to grasp the atmosphere in the Granite State just before the primaries was the best lesson on American politics ever, because it was not based on the TV reports or articles read in mainstream papers but seen with my own eyes.*
> *-- Ewa Kern-Jedrychowska, Nowy Dziennik*

> *Having emigrated from England to the United States in November 2004, I'd never before had the opportunity to cover a primary. It was a fascinating experience - a real education in presidential politics. My readership - in the west central Bronx - is interested in and cares about politics. But with a small staff and even smaller budget, it's never easy to bring national issues to their attention. The trip -- which exceeded all my expectations – allowed my newspaper to bridge that gap.*
> *-- James Fergusson, Mounthope Monitor, Bronx, NY*

As follow-up, NYCMA designed a series of workshops to help broaden the framework from which ethnic and community journalists approach reporting on the candidates and their campaigns and to promote more election coverage from an immigrant and community perspective. As well, the workshops serve as preparation to sending the reporters to the national Democratic and Republican conventions in August and September, respectively, armed with knowledge of the process and with critical insight on the issues affecting their communities.

Our first workshop, "How to cover the elections" (Jan. 22), looked at the differences between caucuses and primaries in the electoral process; at the electoral process itself; what election issues should matter to immigrants; and why is it significant to inform immigrant readers about the U.S. presidential election. Our two speakers were: Ron Hayduk, professor at Manhattan Community College and co-director of the Immigrant Voting Rights Project. Hayduk is the author of *Democracy for All: Restoring Immigrant Voting Rights in the United States* (2006); and David Birdsell, Dean of the School of Public Affairs, Baruch College.

With presidential candidates running neck and neck, the campaigns now go beyond puzzling out strategies to secure the delegates necessary to win their party's nomination; increasingly, the debates are more issue oriented, as candidates try to highlight their differences for the voters. The workshop "Elections and Immigration" (Feb. 29), brought prominent immigrant rights advocates to speak on immigration issues not being debated by the candidates, what is not getting coverage and what the communities need to know. Aarti Shahani, director Families for Freedom; Margaret Fung, executive director of Asian American Legal Defense and Education Fund (AALDEF); and Omar Henriquez, director of the Latin American Immigrant Coalition spoke to 18 journalists and provoked a lively questions session.

A third workshop, "Labor, Elections and Immigration" (March 20), looks at organized labor, some of the largest voting blocks that will play a crucial role in the upcoming presidential election. Because many unions are conducting aggressive membership campaigns aimed at documented and undocumented immigrant workers alike, this workshop will focus on union strategies, why they endorse the candidate they do, and what implications this will have for immigrant union members. Our speakers include: Kate Ferrante, assistant communications director at SEIU-32BJ; Andrew Friedman, director of Make the Road by Walking; Sean Basinki, director of Street Vendors Project at Urban Justice Center; and Michael Yellin at National Labor Council.

NYCMA's participation in the Grassroots Media Conference (March 2) at Hunter College, was another element of the initiative, bringing immigrant issues to an audience of students and progressive media representatives. The panel, "2008 Presidential Elections Through the Lens of Ethnic Media," drew a large crowd. Four journalists, Lotus Chow, Abu Taher, Ka Chan, and Ewa Kern, moderated by Anthony Advincula focused on the importance of reporting broadly on language-access, quality healthcare, affordable housing, wider employment opportunities and protections for immigrants and workers of color, and the role this media sector plays to broaden policy discourse and public opinion.

A high point of the initiative includes the reporters' attendance and coverage of the national conventions, where we will again collaborate with public radio project of Feet in Two Worlds, Brian Lehrer, wire services and, in addition, work with Alliance for Community Media to access a network of public TV venues for the reporters. Additionally, NYCMA journalists will be hosted by Asian American Press in Minneapolis, a local Vietnamese newspaper who will connect NYC journalists to local ethnic media. For Denver, the African-American newspaper Urban Spectrum and La Voz Nueva will also host our journalists. As well, NYCMA will set up a speakers' bureau where journalists can be interviewed by other media on their perspectives on the election.

The experience of direct participation in the elections process will have long-term benefit for the participating journalists past the current election process. In depth scrutiny of the political machine at work and participation in the workshop series that helps broaden the reporters' framing of the issues, cross-platforming their coverage for radio and TV will inform their work right up to the next presidential election in 2012.

NYCMA Editorial Internship Program

New York Community Media Alliance (formerly known as IPA-NY) is the only association of ethnic and community publications in New York City. Since April of 2000, we have been providing technical assistance, training, networking opportunities, and advocacy for our members.

We are building a network of freestanding community and ethnic papers to strengthen each other through cooperative action. Currently there are 350 ethnic/community newspapers in New York City, which reach a readership of 3.5 million. Forty percent of the city's residents are immigrant.

We are currently offering a 12 to 24-week editorial internship program designed for college students who are aspiring to pursue a career in ethnic news media. Ideal candidates will be self-starters and detail oriented, with great multitasking and organizational skills with particular interest in ethnic journalism / reporting.

Responsibilities:

- Research, organize and pitch news articles from a variety of ethnic and community newspapers for inclusion in Voices That Must Be Heard, a weekly selection in new media format of translated ethnic news stories
- Proofread and edit translated articles for Voices
- Assist Communications Director to organize press conferences and editorial / business workshops and head up special projects when necessary;
- Perform light administrative tasks

Qualifications:

- College junior, senior or graduate student (students must still be enrolled in school during the time of the internships)
- Strong academic record
- Resume and cover letter
- Official approval for course credit
- Proper visa authorization for international students
- Knowledge of a second language is preferred but not required

Important information:
Internship application deadline is rolling. This program is unpaid and students from colleges or high schools are encouraged to receive academic credits.

For more information about NYCMA, please visit us at www.indypressny.org.

NEW YORK COMMUNITY MEDIA ALLIANCE

Current and Upcoming Events from NYCMA

June - July, 2009 **Ethnic Community Press Fellowship - Developing an Education Beat**

NYCMA selected 18 reporters from 17 different ethnic and community newspapers to participate in this 10-month program, including a lineup of workshops and panel discussions with experts and government agents in the education system. NYCMA sponsors each reporter with a monthly grant and publishes four articles written by the journalist over the course of the program. The second year of the Fellowship will concentrate on multi-media investigative reporting skills applied to this issue area

March, 2009 **The Reecent Launching of Our Re-designed Website: www.indypressny.org**

The very same website where you have been reading our award-winning online weekly publication, *Voices That Must Be Heard* - a selection of informative articles culled from NYC ethnic and community newspapers - has a whole new look and easy-to-use new functions. *Voices* is read by 20,000 people each week, including city government agencies, main stream media, advocacy groups, and journalism schools. Fast video streaming and RSS-enabled podcasting brings you up-to-the-minute news from vibrant immigrant communities and communities of color. Transparency and access are key features of our new site, with live links to all publication websites, journalists and translators.

May 30, 2009 **NYC Grassroots Media Conference**

The goal of the annual NYC Grassroots Media Conference is to create a space to build collaborative relationships, launch local initiatives, foment ongoing campaigns, serve as a resource for our diverse community and raise awareness of the importance of a just media system and the part we can all play in making this vision a reality. NYCMA organizes participation of ethnic and community media.

July - Aug, 2009 **IPPIES Awards 2009 open for submissions**

The IPPIES awards are the only journalism awards in NYC to honor excellence in reporting in languages other than English.

August, 2009 **Web 2.0**

Addressing the issue of digital divide, NYCMA will offer a two-day workshop that aims to enhance and monetize ethnic and community publications' online presence. More details to come.

September, 2009 **Social Justice Community Reporting Fellowship 2009**

Will examine the differences in access to the Internet: who has it, who doesn't, and how that impacts education, economic viability, and civic engagement

For more information, please visit our website at www.indypressny.org.

Media Contact: Jenhangir Khattak, 212-279-1442 or nycomm@indypressny.org

NYC M

NEW YORK COMMUNITY MEDIA ALLIANCE

TRANSLATORS NEEDED

The New York Community Media Alliance seek translators into English of news articles to include in ***Voices That Must Be Heard,*** a weekly online publication.

Albanian	Greek	Nepalese
Arabic	Hebrew	Portuguese
Armenian	Hindi	Serbian
Bosnian	Hungarian	Thai
Czech	Indonesian	Turkish
German	Japanese	Vietnamese

New York's immigrant and ethnic newspapers and magazines are a vital bridge for cross-cultural understanding in a city where close to 40 percent of its residents are foreign born. And there are 300 publications serving them! The ***Voices That Must Be Heard*** project works to overcome these language barriers, facilitating communication among immigrant communities and American society at large.

Be a part of the bridge!
Translate articles from community, ethnic, immigrant, and international publications into English.

** VOICES IS A WEEKLY ONLINE PUBLICATION**

New York Community Media Alliance Will
Pay **$25 per hour** for Translations

To be a part of this exciting team contact:
Jehangir Khattak at nycomm@indypressny.org

NYCMA

NEW YORK COMMUNITY MEDIA ALLIANCE

NYCMA Editorial Internship Program

New York Community Media Alliance (formerly known as IPA-NY) is the only association of ethnic and community publications in New York City. Since April of 2000, we have been providing technical assistance, training, networking opportunities, and advocacy for our members.

We are building a network of freestanding community and ethnic papers to strengthen each other through cooperative action. Currently there are 350 ethnic/community newspapers in New York City, which reach a readership of 3.5 million. Forty percent of the city's residents are immigrant.

We are currently offering a 12 to 24-week editorial internship program designed for college students who are aspiring to pursue a career in ethnic news media. Ideal candidates will be self-starters and detail oriented, with great multitasking and organizational skills with particular interest in ethnic journalism / reporting.

Responsibilities:

- Research, organize and pitch news articles from a variety of ethnic and community newspapers for inclusion in Voices That Must Be Heard, a weekly selection in new media format of translated ethnic news stories
- Proofread and edit translated articles for Voices
- Assist Communications Director to organize press conferences and editorial / business workshops and head up special projects when necessary;
- Perform light administrative tasks

Qualifications:

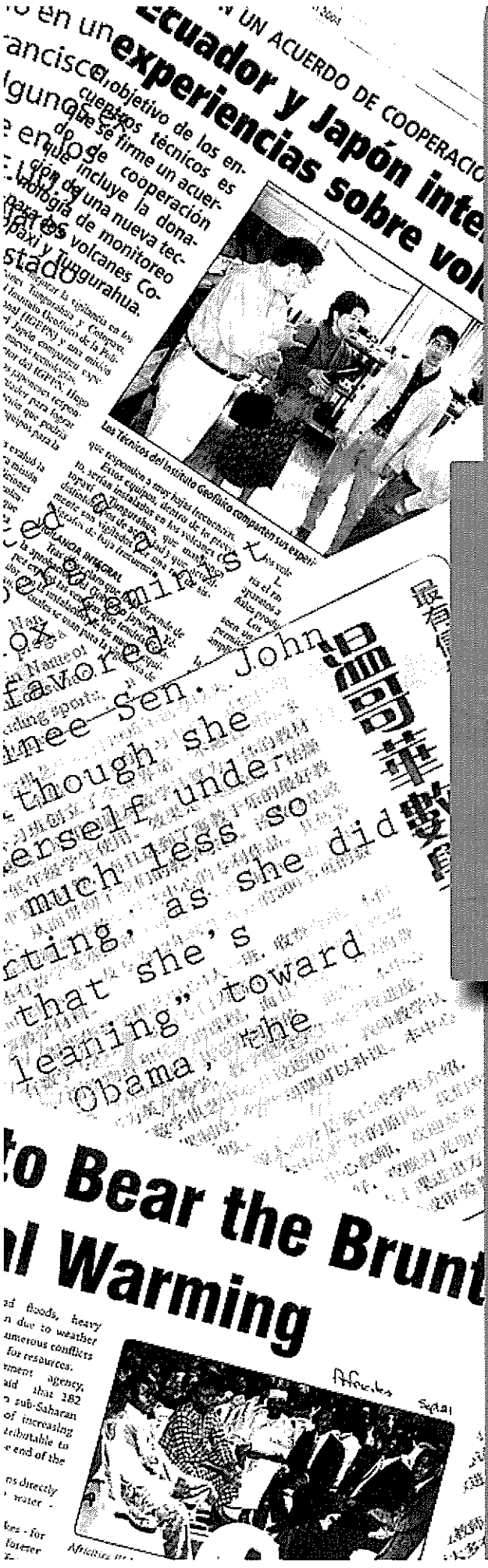
- College junior, senior or graduate student (students must still be enrolled in school during the time of the internships)
- Strong academic record
- Resume and cover letter
- Official approval for course credit
- Proper visa authorization for international students
- Knowledge of a second language is preferred but not required

Important information:

Internship application deadline is rolling. This program is unpaid and students from colleges or high schools are encouraged to receive academic credits.

Please email all inquiries, resumes and cover letters to nycomm@indypressny.org.

For more information about NYCMA, please visit us at www.indypressny.org.

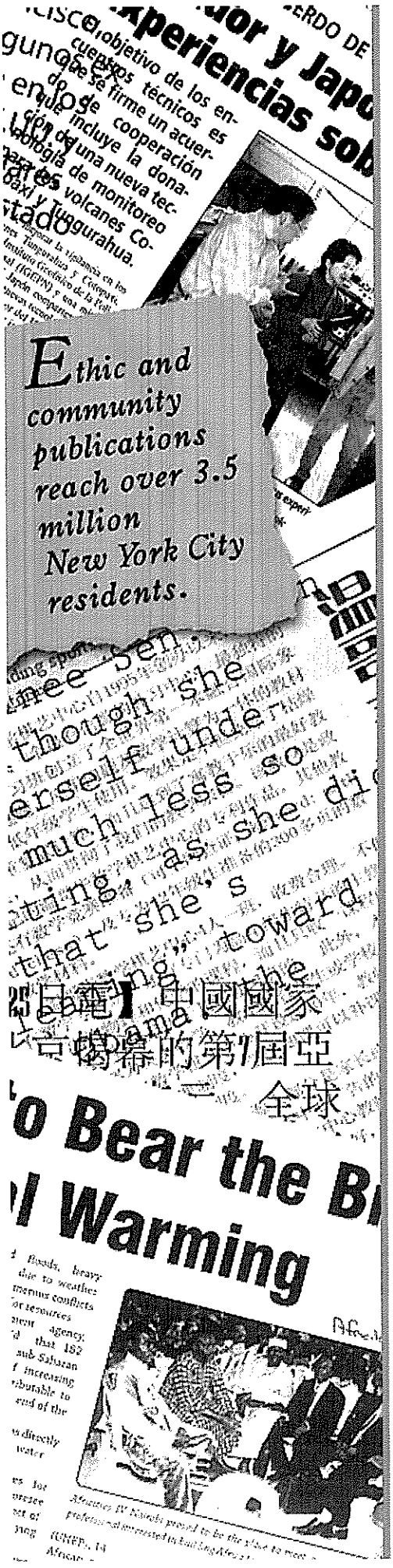


honoring excellence in ethnic and community journalism

8th Annual ippies 2009 awards

December 3rd, 2009

NYCMA
NEW YORK COMMUNITY MEDIA ALLIANCE



About NYCMA

The New York Community Media Alliance, a non-profit organization, provides technical assistance, editorial training, networking opportunities and advocacy for New York City's ethnic and community publications that are NYCMA members. NYCMA publishes *Voices That Must Be Heard*, the award-winning weekly online publication that collects and translates into English the best and most vital articles from this media sector. NYCMA's Ad Service program connects advertisers to this hard-to-reach consumer segment and generates valuable advertising revenue for member publications. The Ethnic and Community Press Fellowship offers a 10-month long, in-depth investigative reporting skills training program for journalists in this sector. NYCMA also publishes *Many Voices, One City*, a directory of over 350 ethnic and community publications and radio stations in the New York metropolitan area, which is in its fourth edition. Each year, the organization sponsors the Ippies Awards, which honor the best reporting and photojournalism generated by the ethnic and community press.

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SPONSORSHIP PACKAGES

$10,000 Gold Exclusive Sponsor

- *You will receive a VIP Table for 10 at the Ippies decorated with your organization's banner*
- *The Ippies program will include a full-page color ad for your organization*
- *Cameras will highlight your organization's logo on the Ippies sponsor wall*
- *Your promotional literature and premiums/inserts will be included in Ippies gift bag given to all guests*
- *Your organization will receive praise as a sponsor from event emcee*
- *Your organization will receive publicity as a sponsor in pre- & post-Ippies press releases*
- *Your organization will be included in ads throughout 50 member publications in the two weeks leading up to the event*

$5,000 Silver Sponsor

- *You will receive a VIP Table with 6 seats at the Ippies decorated with your organization's banner*
- *The Ippies program will include a half-page color ad for your organization*
- *Your organization's logo will appear on the Ippies sponsor wall*
- *Your promotional literature and premiums/inserts will be included in Ippies gift bag given to all guests*
- *Your organization will receive publicity as a sponsor in pre- & post-Ippies press releases*

$2,500 Bronze Sponsor

- *You will receive 4 seats at a Sponsor Table at the Ippies*
- *The Ippies program will include a color ad with the names of all Bronze sponsors*
- *Your promotional literature and premiums/inserts will be included in Ippies gift bag given to all guests*

$1,500 IPPIES Friend

- *You will receive 2 seats at a Sponsor Table at the Ippies*
- *The Ippies program will include a color ad with the names of all Friends*

$500 Ippies Contributor

- *You will receive 1 seat at a Sponsor Table at the Ippies*
- *The Ippies program will include a color ad with the names of all Contributors*

NEW YORK COMMUNITY MEDIA ALLIANCE

Market Significance

The New York Community Media Alliance serves as the primary gateway to the ethnic and community press in New York and New Jersey.

Ethic and community publications reach over 3.5 million New York City residents, close to 40 percent of the city's population, through more than 350 weekly publications and 26 foreign language dailies. NYCMA is the main link to this important advertising market.

Immigrant consumers comprise nearly a quarter of the New York State economy ($229 billion of GDP in 2006), representing an enormous market for product placement.

TOP 25 COUNTRIES OF BIRTH FOR IMMIGRANTS IN NEW YORK CITY 2007

Country of Origin	Number of Immigrants	Share of all Immigrants
Dominican Republic	356,376	11.8%
China**	251,749	8.3%
Mexico	178,713	5.9%
Jamaica	165,348	5.4%
Guyana	137,925	4.5%
Ecuador	135,043	4.4%
Haiti	92,532	3.0%
Trinidad and Tobago	89,741	2.9%
India	79,365	2.6%
Colombia	74,026	2.4%
Russia	72,083	2.4%
Poland	68,656	2.3%
Bangladesh	64,874	2.1%
Italy	63,471	2.1%
Ukraine	62,260	2.0%
Korea	62,120	2.0%
Philippines	53,725	1.8%
Pakistan	39,537	1.3%
Peru	32,041	1.1%
United Kingdom	31,158	1.0%
Israel	30,717	1.0%
Honduras	29,934	1.0%
Hong Kong	29,191	1.0%
El Salvador	27,469	0.9%
Barbados	27,253	0.9%

Source: Fiscal Policy Institute analysis of American Community Survey 2007.

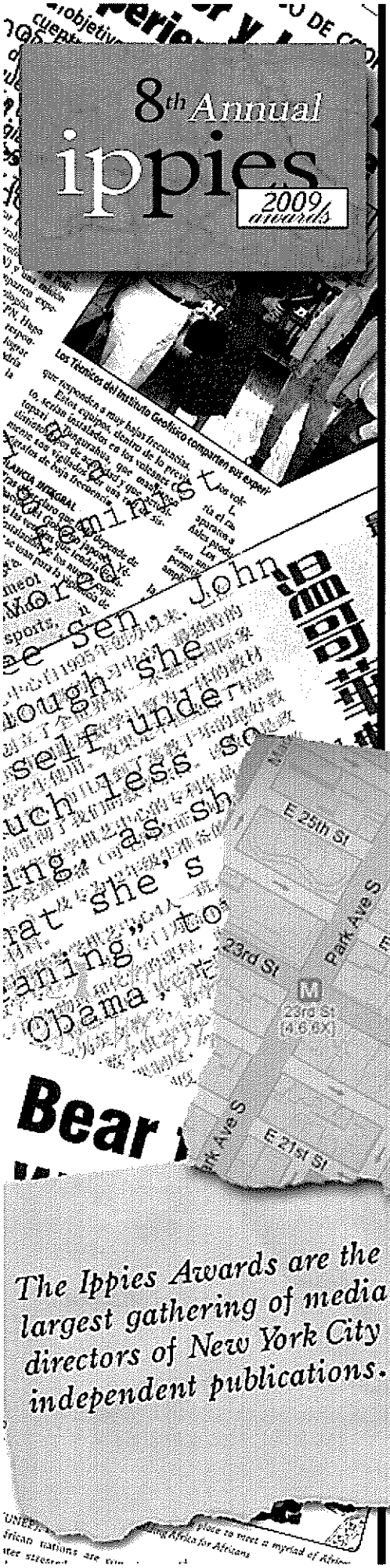
LANGUAGES SPOKEN AT HOME IN NEW YORK CITY 2007

	Total who speak the language at home	Percent who also speak English "very well"
Total population 5 years and older	7,708,259	
Speak only English	4,009,858	
Spanish or Spanish Creole	1,365,498	51%
Chinese	383,122	30%
Russian	196,189	41%
Italian	115,360	62%
French Creole	104,734	64%
Yiddish	93,147	72%
French (incl. Patois, Cajun)	76,477	67%
Korean	71,605	38%
Polish	71,512	41%
African languages	62,865	58%
Hebrew	56,471	77%
Arabic	52,836	54%
Greek	47,631	62%
Tagalog	46,386	67%
Urdu	39,775	49%
Hindi	25,573	72%
Japanese	23,801	38%
German	21,561	83%
Serbo-Croatian	19,444	60%
Portuguese or Portuguese Creole	15,646	60%
Persian	15,047	45%
Gujarathi	11,171	61%
Vietnamese	9,769	44%
Hungarian	8,989	50%
Thai	6,248	40%
Armenian	3,351	77%
Scandinavian languages	3,112	91%
Mon-Khmer, Cambodian	2,160	38%

Source: Fiscal Policy Institute analysis of American Community Survey 2007.

The Ippies, the only journalism awards in New York State to honor this media sector, represent a unique and important marketing opportunity for agencies, foundations and businesses looking to connect and promote services to the often hard-to-reach immigrant and ethnic communities served by independent publications.

The event represents the largest gathering of New York City independent publication media directors and typically draws more than 200 leaders and representatives from member publications, government agencies, community advocacy groups and grassroots organizations.



Thursday

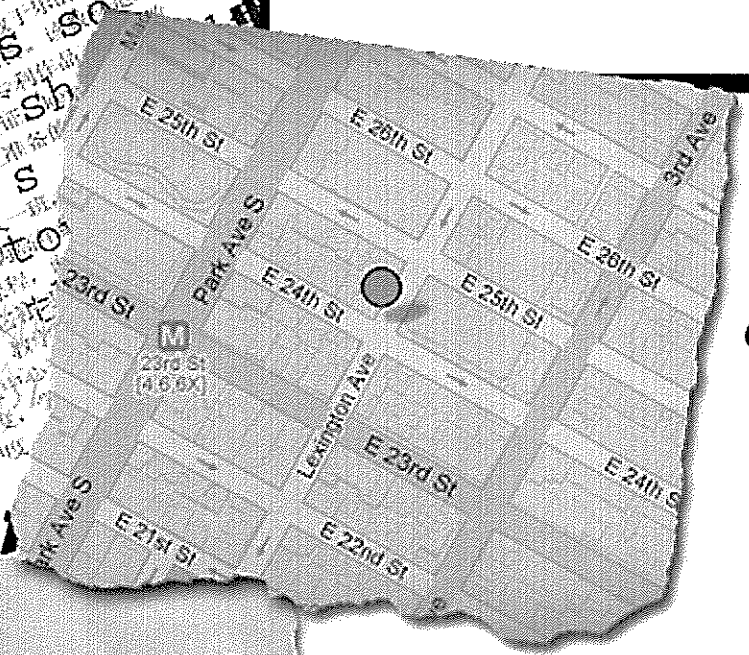
December 3rd

Reception

5PM to 6PM

Awards Ceremony

6PM to 9PM



BARUCH College

One Bernard Baruch Way
55 Lexington at 24th St
Room 14-220
New York, NY 10010

The Ippies Awards are the largest gathering of media directors of New York City independent publications.

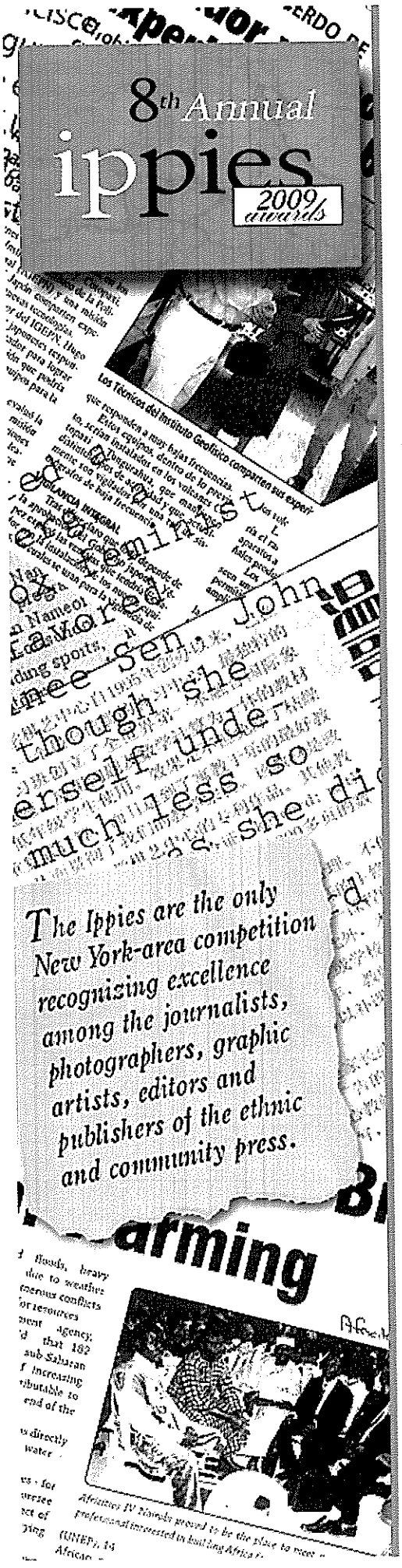
Directions Within Manhattan:

By Subway

Take the 1, 6, F, W or R to 23rd Street Station.

By Bus

Take the M1, 2,3,5,6,7,15,18, 101, or 102 to 23rd Street.



The Ippies are the Ethnic and Community Press Awards given by the New York Community Media Alliance

Awards will be given in the following categories:

Editorial

Best investigative or in-depth story

For the story that investigates an issue overlooked by other media or has the greatest community impact

Best feature

For telling a familiar story in a fresh and humanizing way or a story that breaks away from the familiar and takes risks. The voice and overall finesse of the writer will be judged

Best editorial/commentary

For the opinion article, column or editorial that presents a convincing and compelling perspective

Best article on immigrant issues, racial or social justice

For the article that takes a critical look at how immigrants and other disenfranchised communities are affected by economic, political or social issues

Best article on labor issues

For the article that illuminates workers issues or developments in the labor movement

New Best coverage on education issues

Articles that expose the complexity of the largest education system in the country in its attempt to educate a highly diverse student population; or expose difficulties encountered by immigrant students or low-income students in obtaining quality education

New Best multi-media coverage in any of the editorial categories

Outstanding radio, podcast, blog or video pieces on issues of concern to immigrant and low-income communities of color

Graphics

Best overall design

Imaginative use of typography, art, photos, cartoons and layout in conveying the publication's editorial message

Best photo essay

Judges will look for the photographic series that best conveys a storyline or concept

Best photograph

Judges will look for entries that go beyond headshots or banquet photos

New Best multi-media coverage in any of the graphics categories

8th Annual ippies 2009

☐ **$10,000 Gold Exclusive Sponsor**
Includes: VIP Table for 10 at the Ippies decorated with your organization's banner, Full-page color ad for your organization in Ippies program, Cameras will highlight your organization's logo on the Ippies sponsor wall, Promotional literature and premiums/inserts will be included in Ippies gift bag, Praise as a sponsor from event emcee, Publicity as a sponsor in pre- & post-Ippies press releases, Named in ads throughout 50 member publications in the two weeks leading up to the event.

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☐ **$2,500 Bronze Sponsor**
Includes: 4 seats at a Sponsor Table at the Ippies, Color ad with the names of all Bronze sponsors in Ippies program, Promotional literature and premiums/inserts will be included in Ippies gift bag.

☐ **$1,500 Ippies Friend**
Includes: 2 seats at a Sponsor Table at the Ippies, Color ad with the names of all Friends in Ippies program.

☐ **$500 Ippies Contributor**
Includes: 1 seat at a Sponsor Table at the Ippies, Color ad with the names of all Contributors in Ippies program

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☐ I am / We are unable to attend but have enclosed a contribution of $_____.

☐ Enclosed is my check for $_____ payable to FCNY / NYCMA.

Please charge my credit card: ☐ VISA ☐ MC ☐ AMEX in the amount of $_____

Card Number _____

Expiration _____ Security Code _____

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Address _____

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Telephone _____ Fax _____

E-mail _____

☐ I / We wish our gift to be anonymous. (Name will not be included in any sponsor listings or promotional materials.)

NYCMA
NEW YORK COMMUNITY MEDIA ALLIANCE

Please print entire form and mail with payment to:
New York Community Media Alliance
c/o Ippies 2008 Awards
115 West 29th Street, Suite 606
New York, NY 10001

Artwork or wording for program ads must be received by November 9h, 2009.
Please e-mail to: lstoler@indypressny.org

Your contribution to FCNY / NYCMA is tax deductible.

For more information about NYCMA and the Ippies, please visit our website at www.indypressny.org or call 212-279-1442.

NEW YORK COMMUNITY MEDIA ALLIANCE

2009 Ippies Awards:

The Ippies Awards is the only journalism awards in NYC to honor reporting in English and in languages other than English by the ethnic and community press. The Ippies are considered a benchmark of journalistic excellence and are a coveted prize for the publishers, editors, and reporters in New York City's ethnic and community press. Since 2002, the awards program has served as a vehicle not only to honor outstanding work but to promote coalition building within this media sector, and to draw mainstream and progressive media attention to the people responsible for bringing community perspectives to our attention. Starting 2008, the 7th year for the Ippies Awards, the celebration event also served as an opportunity to reach out to immigrant advocacy organizations, labor, NYC government agencies and other media sectors to network with the ethnic and community press, which many have found difficult to access.

Call for applications to NYCMA member publications start in June, for articles and graphics in the following categories:

- Best investigative on in-depth story on an issue overlooked by mainstream media or of greatest community impact
- Best feature
- Best editorial or commentary
- Best article on immigrant, racial or social justice issues
- Best article on labor issue
- Best article on education
- Best multimedia
- Best overall design
- Best photo essay
- Best photograph

Entries are considered in groups defined by the publication's circulation. All foreign-language entries are translated into English and passed on with all other submissions to six independent editorial and graphic judges for evaluation. Winners are announced at the Ippies Awards Dinner in December.

freepress

Testimony of	**Timothy P. Karr, Campaign Director, Free Press**
Before the	**Council of the City of New York**
Regarding	**Network Neutrality Resolution No. 712-A**
	November 20, 2009

Free Press is grateful for the opportunity to testify before the New York City Council today. As public advocates, we strongly support policies that protect the Internet's fundamental openness.[1] We are greatly encouraged that the Council is taking the lead on the vital issue of Net Neutrality and are supporting efforts in other cities to follow your example.

To that end, on Tuesday afternoon we asked Free Press members from New York City to send a note to Congress about the City Council's efforts. In little more than 48 hours, more than 4,200 New Yorkers put their names on a letter that "applauds the City Council for considering this resolution" and calls on Congress to stand behind a strong Federal Communications Commission (FCC) ruling. I am delivering a copy of their signatures to the Council with my testimony.

The FCC is weighing a Net Neutrality rule that will determine whether the Internet will remain a tremendous engine for free speech, innovation and equal opportunity.[2] There is a great deal of passion surrounding this issue as much is at stake for the tens of millions of Americans who rely upon the Internet every day.

Despite the debate, I don't believe anyone on today's panels or in this room would dispute these two notions:

First, over the past 40 years, the Internet has emerged as an unprecedented tool for:

- spreading innovative ideas,
- increasing public participation in our democracy, and
- fostering economic opportunity, even in the most overlooked communities.

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[1] Free Press is a national, nonpartisan, nonprofit organization with 450,000 members working to increase informed public participation in crucial media and communications policy debates.

[2] Timothy Karr. "FCC Fine Print Could Undermine an Open Internet," SavetheInternet.com, November 2, 2009. http://www.savetheinternet.com/blog/09/11/02/fcc-fine-print-could-undermine-open-internet

Second, I don't believe that we would disagree that we need sound public policies to encourage faster, more open and affordable Internet access for everyone in the country.

The right policies will continue to advance the most democratic communications technology ever devised. The wrong policies will jeopardize this openness and hasten the decline of U.S. broadband services relative to other developed nations.[3]

We need to pass the right policies right now.

The last time I testified for Net Neutrality here, in April 2007, we faced a White House and FCC that was held captive to the interests of the powerful phone and cable lobby, and therefore hostile to the notion of Net Neutrality rules.

But *a lot* has changed in the last two-and-a-half-years:

We have a new President who has repeatedly pledged "to take a back seat to no one in [his] commitment to Net Neutrality." President Obama appointed the principle architect of his Net Neutrality agenda, Julius Genachowski, to head the FCC.[4]

House Speaker Nancy Pelosi and House Commerce Committee Chair Henry Waxman are outspoken supporters of the FCC's efforts to pass a strong Net Neutrality rule. And, perhaps most importantly, more than 1.6 million people across the country have written or called their elected representatives urging their support of Net Neutrality.

Unfortunately, though, a lot has stayed the same, too:

In the first three quarters of 2009, AT&T, Comcast, Verizon, and their trade groups spent nearly $75 million and hired more than 500 lobbyists to discredit the public push for an open Internet.[5]

And that's just the money we know about. They have also funneled untold sums to phony front groups, coin-operated think tanks and populist-sounding PR campaigns. As we've seen with the health care and global warming debates, any effort at reform will come under a relentless assault from deep-pocketed institutions that prefer the status quo.[6]

The money against Net Neutrality is being spent to lock in incumbent control in America. The present phone and cable duopoly provides 97 percent of fixed broadband connections into American homes. As high-speed Internet becomes more prevalent – and as users start to use their connections to create and share more media – these companies are moving rapidly to reverse-engineer the openness that's become the hallmark of the Internet.

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[3] S Derek Truner, "One Nation Online," Free Press. July, 2008. http://freepress.net/files/OneNationOnline.pdf

[4] "Barack Obama on Net Neutrality," November 14, 2007, BarackObama.com http://www.youtube.com/watch?v=g-mW1qccn8k

[5] The Senate Office of Public Records [Tthe Lobbying Disclosure Act Database]

[6] Timothy Karr, "Washington's Astroturf Economy," Internet Evolution, November 16, 2009. http://www.internetevolution.com/author.asp?section_id=856&doc_id=184685&

The Internet's True Marketplace of Ideas

The history, however, is clear. The Internet was born in a regulatory climate that guaranteed strict nondiscrimination. Internet pioneers like Vinton Cerf and Sir Tim Berners-Lee always intended the Internet to be an open and neutral network.[7] And nondiscrimination provisions have governed the nation's communications networks since the 1930s.

Originally with the Internet, the physical wires were regulated separately from the content flowing over them. The reason for this was simple: to keep monopoly owners of infrastructure from using their power to distort the Web's free market.[8]

This "common carriage" protection worked brilliantly. For two decades, the Internet thrived with low barriers to entry, equal opportunity and consumer choice. The Internet became a competitive market in its truest form. Under Net Neutrality: college kids working out of their garage created Google; a Pez hobbyist conceived the idea for eBay; An Israeli teenager wrote the code for Instant Messaging.

The open Internet has allowed the crusaders at ColorofChange.org to transform themselves from an idea about racial justice in the 21st century to a political powerhouse with hundreds of thousands of online supporters.[9]

All of these success stories have shown us that innovation -- both political and economic -- thrives in an open online marketplace where ideas rise and fall on their own merits.[10]

Remove Net Neutrality, and this marketplace tilts in favor of the network owners. Ask yourself this simple question: What have companies like AT&T, Comcast and Verizon contributed to the culture of openness upon which a free-flowing Web depends?

The End of Neutrality?

After intense corporate lobbying, the FCC pulled the carpet from beneath this marketplace of ideas, in 2005 removing the nondiscrimination protections that guaranteed Net Neutrality. Soon after, the top executives of phone and cable companies announced their intention to change the Internet forever. In the pages of the *Washington Post*, *BusinessWeek*, *Wall Street Journal* and in reports to shareholders, they spoke of plans to become the Internet's gatekeepers and begin discriminating against content that doesn't

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[7] Sir Tim Berners-Lee, "Net Neutrality: This is Serious," TimBL's Blog, June 21, 2006. http://dig.csail.mit.edu/breadcrumbs/node/144

[8] S. Derek Turner, "The Revolution Will Not Be Streamed," in Changing Media: Public Interest Policies for the Digital Age. Free Press. May 2009. Pages 11-22.

[9] James Rucker, "Net Neutrality Amplifies Vital Voices of African Americans," SavetheInternet.com, October 21, 2009. http://www.savetheinternet.com/blog/09/10/21/net-neutrality-amplifies-vital-voices-african-americans

[10] Professor Lawrence Lessig. "Testimony of Lawrence Lessig on 'Network Neutrality'," February 7, 2006 at a Full Committee Hearing of the Senate Committee on Commerce, Science and Transportation. http://www.aei-brookings.org/admin/authorpdfs/page.php?id=1254

generate extra income for them.[11]

In 2007, the largest Internet cable provider, Comcast, began secretly blocking its customers' access to certain file-sharing applications. Despite an FCC sanction the cable provider still denies the FCC's authority claiming the right to do block access and degrade users' connections with impunity.[12]

What these executives were proposing -- and in Comcast's case implementing -- was a scheme to control their customers' clicks. The problem, of course, is that they had to undercut the Internet's very democratic nature to do so.

This scheme would mark a fundamental shift in the neutral way the Internet has always worked. In essence, it takes away the most basic and crucial tenet of the Internet -- a user's freedom to innovate without asking anyone's permission.

It tips the Web's even playing field to favor larger corporations, while handicapping the Internet's true innovators: outsiders and startups who can't afford to buy in to this protection racket.

This is a disaster for users and producers of Internet content. The egalitarian Internet is far too valuable and far too successful to be sacrificed to create dubious streams of new revenue for a highly profitable cartel of cable and telephone giants.

Internet Policy: Who Benefits?

Some will argue before you today that the Internet has prospered free of regulation. This is a red herring.[13] The Internet has always had baseline consumer protections written into law.

The real question isn't: "Should we regulate the Internet?" Without forward thinking broadband policies, America's economy will suffer.[14] The real question should be: "For whom do we create this policy?"

The phone and cable companies have held Washington's policymaking process in their

---

[11] See for example: "At SBC, It's All About 'Scale and Scope'," BusinessWeek Online, November 7, 2005; Jonathan Krim, "Executive Wants to Charge for Web Speed," Washington Post, December 1, 2005; Dionne Searcey and Amy Schatz, "Phone Companies Set Off a Battle Over Internet Fees," Wall Street Journal, January 6, 2006; Timothy Karr, "AT&T's New Boss Wants Your World Delivered to Him," Huffington Post, April 27, 2007.

[12] Jordan Golson & Stacey Higginbotham, "Comcast Lawsuit Questions FCC Right to Enforce Net Neutrality," GigaOm, August 12, 2009. http://gigaom.com/2009/08/12/comcast-lawsuit-questions-fcc-right-to-enforce-net-neutrality/

[13] S. Derek Turner. "Digital Déjà Vu: Old Myths about Net Neutrality," Free Press. October 1, 2009. http://freepress.net/files/dejavu.pdf

[14] Richard Hoffman. "When It Comes To Broadband, U.S. Plays Follow The Leader," *InformationWeek*, 15 Feb 2007. http://www.informationweek.com/story/showArticle.jhtml?articleID=197006038. ALSO: Robert Crandall, William Lehr and Robert Litan. "The Effects of Broadband Deployment on Output and Employment: A Cross-sectional Analysis of U.S. Data," Brookings Institute. June 2007.

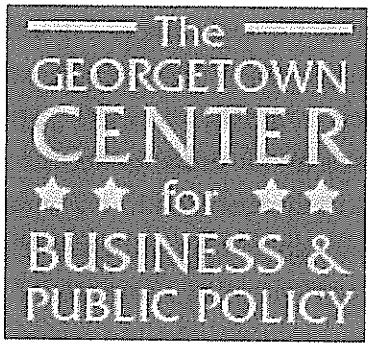
grip for far too long.[15] But for all their talk about "deregulation," the cable and telephone giants work aggressively to force through regulations that:

- protect their market monopolies and duopolies,
- stifle new entrants and competitive technologies in the marketplace, and
- increase their control over the content that travels over the Web

It's now up to the FCC to pro-actively reinstate Net Neutrality. Without this anti-discrimination rule, phone and cable companies will have both the incentive and ability to shut the doors on our 40-year experiment with open media.

We need to protect the open Internet as the essential infrastructure of our time. It is the social tool with which we will build a more prosperous, open and just nation. Free Press is encouraged by the Council of the City of New York efforts to adopt Resolution No. 712. It will have far reaching implications.

[15] The Center for Public Integrity, "Well Connected." http://www.publicintegrity.org/telecom/default.aspx?act=archives



Towards Universal Broadband:

Flexible Broadband Pricing and the Digital Divide

Dr. Kevin A. Hassett & Dr. Robert J. Shapiro

August 2009

GEORGETOWN UNIVERSITY McDonough SCHOOL of BUSINESS

37th & O Streets, NW □ Suite 558 □ Washington, DC 20057
PHONE: 202.687.3686 □ EMAIL: cbpp@msb.edu □ WEB: http://cbpp.georgetown.edu/

Pricing Flexibility and Broadband Adoption:

Reaching Universal Access through Affordability at All Income Levels[1]

Driven by the conviction that the widespread use of broadband can support economic recovery and help the United States achieve other important national goals, President Obama has proposed that every American should have the opportunity to connect to broadband service. On his campaign web site, the President declared: "America should lead the world in broadband penetration and Internet access" and he promised to bring "true broadband to every community in America."[2] In enacting the American Recovery and Reinvestment Act of 2009, the Congress signaled its agreement by providing $7.2 billion in dedicated funding to advance broadband's spread and by directing the Federal Communications Commission to develop a national strategy to achieve universal broadband.

By historical standards, access to broadband already has progressed at a remarkable pace. The service was introduced only ten years ago; yet, by early 2009 more than 6 in 10 American households subscribed to some form of broadband service for use in their home.[3] Businesses also have become wired for broadband at rapid rates, and millions of Americans also are using a growing variety of mobile devices to connect to the Internet with wireless broadband. These trends clearly show steady advances in both the deployment of broadband by service providers and the number of Americans subscribing to these high-capacity services. According to the Pew Foundation Internet & American Life Project, the percentage of homes connected to broadband service increased from 33 percent in spring 2005 to 63 percent in spring 2009.[4]

However, the data also show that the march towards universal broadband access has progressed unequally across demographic groups. More than a decade after the Commerce Department first flagged the existence of a "digital divide" in Internet connectivity between black and white Americans and between less affluent and wealthier Americans, significant gaps remain.[5] Pew's 2007 survey suggested that the racial divide was closing at an

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[1] The Georgetown University Center for Business and Public Policy provided support for this research. The views and analysis are solely those of the authors.

[2] BarackObama.com, "Organizing for America: Technology." http://www.barackobama.com/issues/technology/index_campaign.php

[3] John Horrigan, "Home Broadband Adoption 2009," Pew Internet & American Life Project, June 2009. http://www.pewInternet.org/~/media//Files/Reports/2009/Home-Broadband-Adoption-2009.pdf

[4] *Ibid.*

[5] U.S. Department of Commerce, "Falling Through the Net: A Survey of 'Have Nots' in Rural and Urban America," July 1995. http://www.ntia.doc.gov/ntiahome/fallingthru.html.

encouraging rate, and some news accounts declared that the racial divergence was a thing of the past.

Our difficult economic times have reversed these trends over the past two years, and the broadband access gap between African-Americans and white Americans widened in both 2008 and 2009.[6] Broadband adoption among African-Americans rose only slightly in 2008 and 2009 following several years of much more substantial increases. Meanwhile, broadband adoption by white households continued to rise steadily. As a result, the broadband-access gap between the races was wider in 2009 than it had been in 2005 (Table 1, below). A significant rural-urban gap in broadband uptake rates also has persisted, as rural Americans increased their broadband access at about the same pace as those who live in cities and suburbs.

Table 1. Home Broadband Adoption by Race, Percentage[7]

Ethnicity	2005	2006	2007	2008	2009
White	31	42	48	57	65
African-American	14	31	40	43	46

Gaps in broadband uptake rates also persist across household income categories. The Pew Survey, for example, found that among Americans with the highest incomes, broadband is approaching universal adoption. About eight of 10 Americans with incomes ranging from $75,000 to $100,000 had broadband access at home in the spring of 2009, as did 88 percent of those with incomes of $100,000 or more. By contrast, just over one-third of households with incomes of less than $20,000 reported a home broadband connection, and only slightly more than half of households with incomes in the $20,000 to $30,000 range have signed up for broadband at home.

Table 2. Home Broadband Adoption by Income, Percentage[8]

Household Income	2005	2006	2007	2008	2009
Under $20,000	13	18	28	25	35

[6] Horrigan 2009.
[7] Horrigan 2009 and John Horrigan, "Home Broadband Adoption 2008," Pew Internet & American Life Project, July 2008 http://www.pewinternet.org/Reports/2008/Home-Broadband-2008.aspx
[8] *Ibid.*

$20,000-$30,000	19	27	34	42	53
$75,000-$100,000	51	67	70	82	82
Over $100,000	62	68	82	85	88

Of course, the differing rates of broadband adoption across racial, geographic and income classes are strongly interrelated. A large portion of the disparity in uptake rates by race and geography, for example, are driven by differences in household income. Studies have indicated that uptake rates also are strongly correlated with education and the need for high speed Internet in the workplace.

These gaps present an important challenge to policymakers and obstacles to the goal of universal broadband. Given the growing trend by individuals to communicate online and the commitment of public and private institutions to shift services and communications to the Internet, any group that disproportionately lacks broadband-based Web communications operates at a significant disadvantage to their broadband-linked peers. Their economic opportunity are reduced; they are cut off from accessing emerging broadband-enabled health care and education services, and they will lack a increasingly prominent communications link with their government.

Despite these persistent gaps, broadband usage continues to spread to all parts of America in line with a general downtrend in its price – a pattern which is fairly typical for the diffusion of other new information technologies. As detailed in a 2006 study, technologies that enhance the quality of people's lives and add value for individuals tend to diffuse across of society as their prices decline.[9]

Respondents to the Pew survey report that their average bills for broadband service fell from $39 to $34.50 between 2004 and 2008. Interestingly, adoption continued to rise in 2009 despite a jump in prices back to the 2004 level. To some extent, the 2009 price levels may reflect the willingness of a growing number of Americans to pay more for premium services that provide even higher speeds. The average monthly cost of basic service stood at $37.10 in 2009, while premium subscribers paid an average of $44.60, according to the Pew Survey. Additionally, economic studies have concluded that households that have adopted broadband Internet are far less price sensitive or "price elastic" than prospective adopters.[10]

[9] Robert J. Shapiro, "Creating Broad Access to New Communications Technologies: build-out requirements versus market competition and technological progress," Sonecon, LLC, April 2006. http://www.sonecon.com/docs/studies/broadaccess_042406.pdf

[10] Kenneth Flamm and Anindya Chaudhuri, "An Analysis of the Determinants of Broadband Access," *Telecommunications Policy* 31 (2007): 312-326.

Small price increases for current broadband subscribers (especially middle and high income subscribers) are unlikely to push them back to dial-up service, but the higher prices can have a larger impact on the subscription choices of households that currently use dial-up (or have no Internet access at all) and are looking to upgrade their service. In this respect, low income households are particularly price sensitive.

These findings are supported by recent experience, which suggests that adoption would have been even higher in 2009 if the price increases had not occurred. Pew reports, for example, that almost one in ten Americans either cancelled or cut back Internet service for financial reasons between April 2008 and April 2009. These cutbacks were greatest at the bottom of the income scale, with 17 percent of households earning $20,000 or less reporting that they reduced or gave up service during 2008.

As policymakers consider the future of broadband policy, they must try to determine whether the historic pattern of technology diffusion will replicate itself with broadband or whether the re-widening of the Internet access gap is a harbinger of new challenges. Specifically, they must ask themselves what would happen to adoption trends if Internet service providers change their consumer pricing models to accommodate additional costs arising from expanded demand for bandwidth. This paper is intended to provide insights into those questions by examining the impact of various pricing approaches and pricing allocations among consumers.

Broadband Prices and Adoption

To be sure, pricing is not the only determinant of broadband adoption trends. Roughly seven percent of Americans who use the Internet rely on dialup connections rather than broadband, and almost one in five of these dialup consumers say that "nothing would get me to switch" to broadband.[11] Among those who use dialup or are not online at all, roughly half indicate they do not have any interest in broadband service. The success of private-public initiatives such as Connect Kentucky suggest that some of this resistance can be overcome through aggressive outreach and "digital literacy" programs that help non-users appreciate the benefits of connectivity.

However, a number of studies *have* found that price is the strongest determinant of broadband subscription. One study, for example, found that at $20 per-month, a 10 percent increase in price reduces demand by 5.3 percent (a price elasticity of demand of -0.53); while at a price of $50 per-month, roughly the then-actual market price, a 10 percent price increase

[11] Horrigan 2009.

reduces demand by 9.8 percent.[12] Another study conducted by Austan Goolsbee, now a member of the President's Council of Economic Advisors, found that significantly larger shares of affluent people were willing to pay higher prices for broadband than less-affluent people.[13] Another analysis found that a 10 percent increase in the price of high-speed connections in 2000 reduced demand for those connections by 10.8 percent overall – but by 15.9 percent among those with incomes below $25,000. For all other income groups, the dip in demand as a result of higher prices ranged from 8.5 percent to 10 percent.[14] And Pew's 2009 survey found that lower prices could persuade dial-up users to switch to broadband and that among those who use dial-up or are not online at all, one-in-five list affordability as the main reason they do not have broadband service.[15]

The range of studies broadly agrees that demand for broadband is price-driven, but the estimates of the price sensitivity range from 8 percent to 27.5 percent for every 10 percent increase in price.[16] The studies also agree that lower-income, rural and less-educated people tend to be more price sensitive in this area than higher-income, urban and better-educated users.

Possible Pressure on Prices

The predominant model of broadband pricing today and throughout the past decade has entailed payment of a flat monthly fee that allows unlimited usage. The fee may vary depending on the speed of the connection, but there is no limit on the amount of time a user may spend on line or the amount of bandwidth capacity he or she may consume. This model worked well during the early days of the Internet, because web access consisted mostly of static, text-based sites that did not require large amounts of bandwidth. The cost of providing service to each subscriber could be calculated by network operators with relative certainty, which in turn enabled operators to set consumer prices at levels that covered their cost of operations and so enabled more Americans to sign up for service.

As the range of Internet-based content and applications has exploded, consumers are using an increasing amount of bandwidth – and differences between various customers' bandwidth use also are increasing. The growing popularity of Internet video, radio and other music sites, along with the increasing use of peer-to- peer networking, have driven up

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[12] Paul Rappoport, Lestor D. Taylor and Donald J. Kridel, "Willingness to Pay and the Demand for Broadband Service," mimeo, 2003. http://www.economics.smu.edu.sg/events/Paper/Rappoport_3.pdf

[13] Austan Goolsbee, "The Value of Broadband and the Deadweight Loss of Taxing New Technology," Discussion Paper, University of Chicago, 2006. http://faculty.chicagobooth.edu/austan.goolsbee/research/broadb.pdf

[14] Kevin Duffy-Deno, "Demand for High-Speed Access to the Internet Among Internet Households," ICFC 2000, Seattle, 27 September 2000. http://www.icfc.ilstu.edu/icfcpapers00/duffy-deno.pdf.

[15] Horrigan 2009.

[16] Goolsbee 2006.

bandwidth demand at nearly an exponential rate. While one minute of Internet text browsing requires an average of 2-200 KB of bandwidth, one minute of audio requires about 1,000 KB, and 60 seconds of video consumes 9,000 KB.[17] Moreover, with the rising popularity of mobile broadband devices such as Blackberrys and iPhones, the use of high-bandwidth applications is no longer limited to offices and homes. Cisco Systems, for example, has forecast that Internet traffic will quintuple from 2008 to 2013, driven largely by video and what it calls "visual networking."[18] Furthermore, customers are becoming increasingly heterogeneous in their use of their broadband access.

Keeping pace with this fast-rising demand for bandwidth will require significant expansions in network infrastructure and capabilities, which in turn will entail substantial additional investment by service providers. The precise dollar amounts required are difficult to calculate, in part because they will be affected by technological innovations in networking equipment. But the order of magnitude is likely to be substantially greater than current investment levels.

In one, widely-cited report, EDUCAUSE, a higher-education technology group estimated that providing "big-broadband" to every home and business, with sufficient bandwidth to meet demand, would cost an additional $100 billion over the next three to five years and even larger investments in capacity going forward.[19] Another estimate cited by David McClure, the head of the U.S. Internet Industry Association, and John Ernhardt, Senior Manager of Policy Communications for Cisco Systems, projects that the long-term investments required to keep up with fast-rising bandwidth demand could cost an additional $300 billion over 20 years.[20]

While some of these projected additional investments could be funded by the fees paid by new subscribers, demand for bandwidth by current subscribers is growing smartly and much faster than increases in uptake rates. Therefore, a significant portion of the additional costs to provide expanded infrastructure almost certainly will have to be passed on to current broadband subscribers. Policymakers must consider seriously the impact on access if consumers are asked to pay more and how the pricing framework used to pass along these costs will affect those results.

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[17] Robert J. Shapiro, "The Internet's Capacity to Handle Fast-Rising Demand for Bandwidth," US Internet Industry Association, 14 September 2007. http://www.usiia.org/pubs/Demand.pdf

[18] Cisco Systems, "Hyperconnectivity and the Approaching Zettabyte Era." Cisco Systems White Paper, June 2009. http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/VNI_Hyperconnectivity_WP.pdf

[19] John Windhausen Jr., "A Blueprint for Big Broadband." EDUCAUSE White Paper, January 2008. http://net.educause.edu/ir/library/pdf/EPO0801.pdf.

[20] Davjd McClure, "The Exabyte Internet," U.S. Internet Industry Association, 1 May 2007. http://www.usiia.org/pubs/The%20Exabyte%20Internet.pdf

Therefore, a critical question for policymakers is whether all Internet users should bear these additional costs equally, or is it more appropriate to ask those who use the most bandwidth to pay a higher proportion of those costs. As detailed below, our analysis shows that the way that question is answered could have a significant impact on consumers' ability and willingness to subscribe to broadband services. Existing data show that lower-income Americans already are less likely to sign up for broadband service, in large measure because they cannot afford it. Should this group be asked to subsidize high-bandwidth consumers under a pricing model that charges everyone the same fee, even as many of those households may be deterred from adopting broadband service because they cannot afford to pay a higher share of their income to connect to the Internet. This outcome would almost certainly expand the existing racial, geographic and income gaps.

The link between prices and broadband adoption suggests that higher prices for all consumers will slow the drive to universal broadband and expand the gap that now separates white from African-American and the less affluent from wealthier citizens. As they consider their policy options, the President, Congress, and regulators all need to appreciate the interaction between prices and broadband adoption rates. This study aims to help in their decision-making by examining the impact of illustrative pricing models on adoption rates, especially for those Americans at the lower end of the income spectrum.[21] As noted above, other policy actions may offset the affect of prices. For purposes of this analysis, however, we will examine pricing in isolation from other policy variables.

Simulating the Future of Broadband Adoption

To explore these issues, we model the impact of the additional investments required to avoid Internet congestion and provide access to all American households under different pricing strategies and a variety of other assumptions. First, we generate a baseline projection of broadband uptake by income level under current conditions. We then estimate the deviations from this baseline case for different pricing approaches, in order to illustrate the impact of each approach on the goal of universal broadband access.

Our projection method follows closely the method used in our 2007 study.[22] For ease of presentation, we focus on four scenarios in this study. We also have run simulations of

[21] The paper draws on our earlier work: Kevin A. Hassett and Robert J. Shapiro, "The Impact of Pricing Regulation on Broadband Adoption by Lower-Income Households," mimeo, 2007. http://cbpp.georgetown.edu/62495.html.
[22] The 2007 study is available through Sonecon, LLC. A technical appendix with detailed simulations, including additional ones examining the impact of other pricing strategies and macroeconomic variables, is available from the authors on request.

a number of other scenarios, including several that reflect the impact of the current recession. The recession will delay the achievement of universal broadband by slowing the rate of adoption in the near term, but it should not fundamentally alter longer term trends.

We begin by using the recent broadband uptake rates by income level collected by the Pew Internet and Life Project in 2009. There is survey evidence that the rate of broadband uptake has slowed considerably as the market has reached a mature phase.[23] Accordingly, we assume that the diffusion patterns for broadband access will be similar to those for dial-up Internet access and personal computer ownership. We use data on rates of dial-up Internet uptake by income level from the U.S. Census Bureau Current Population Survey from 2000 to 2003 to predict the increases in broadband uptake through 2011 and then use overall computer adoption rates to simulate increases from 2012 through 2017.

Furthermore, since studies show that rates of Internet uptake are income sensitive, we make additional adjustments to the baseline in order to incorporate expected income increases for each income group in our model. We use the most recent projections of economic growth from the Congressional Budget Office's (CBO) March 2009 report, "A Preliminary Analysis of the President's Budget and an Update of CBO's Budget and Economic Outlook," and assume that the income of each bracket will grow at the rate that CBO projects for the economy as a whole.

What the Simulations Show

In this section, we present the results of a series of simulations that examine how different pricing approaches, macroeconomic factors, and sensitivity assumptions are likely to affect the rate of broadband uptake by income group. Table 3, below, presents the baseline case of broadband adoption in the absence of future price increases.

Table 3. Projected Shares of Households with Broadband Internet, By Income, 2009-2017, Baseline Case: No Price Increases

Household Income	2009 (Actual)	Projected Share of Households with Broadband Internet (%)							
		2010	2011	2012	2013	2014	2015	2016	2017
Under $30,000	44.1	51.5	60.8	69.1	78.4	87.6	93.2	99.0	99.0

[23] John Horrigan, "Is Home Broadband Adoption Slowing?" Pew Internet & American Life Project, 18 September 2008. http://www.pewinternet.org/Commentary/2008/September/Is-Home-Broadband-Adoption-Slowing.aspx.

$30,000 - $74,999	68.6	74.6	83.0	88.7	92.5	94.5	96.7	98.9	99.0
$75,000 and above	85.5	87.7	92.7	95.8	97.5	99.0	99.0	99.0	99.0

Without any additional charges to customers to finance the additional investment required to accommodate fast-rising bandwidth demand, we would expect to see universal broadband by 2017. [24] It is important that this simulation be seen as a counter-factual scenario, because Internet providers would not be able to make the investments necessary to facilitate universal broadband in the absence of a source of additional revenues. However, for analytical purposes, it is critical to examine this baseline in order to fully appreciate the real world effect of other scenarios. It is instructive to note that without price increases to finance the additional investment required to service the fast-rising demand for bandwidth, President Obama's goal of universal broadband access could be achieved in seven years.

However, as noted earlier in this study, the rapid increases in bandwidth demand associated with the fast-rising use of video and audio applications will compel Internet providers to undertake substantial investments to upgrade their existing infrastructure to maintain service reliability and satisfy customers.

Absent another source of revenue, such as a system that assesses fees on content providers or high bandwidth users, the costs of these additional investments will generate broad price increases substantially larger than those experienced during the expansion of dial-up Internet access. Table 4, below, examines the rate of broadband adoption by income group, taking into account the price increases necessary to finance the additional investment and the relative sensitivity of each income group to these price increases. In this scenario, we assume that those price increases are passed along to consumers in uniformly higher flat, monthly fees.

Table 4. Broadband Access with $300 Billion in Additional Investment and Flat Rate Pricing, By Income, 2009-2017

	2009 (Actual)	Projected Share of Households with Broadband Internet (%)							
Household Income		**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**

[24] There may well be year-by-year cost savings from Moore's Law-type advances in electronic circuits. But only a small part of the necessary network expansion costs consists of electronic equipment, and all installed network equipment have long depreciation lives. Therefore, cost reductions from advances in electronic circuits would provide very modest assistance in restraining overall cost growth.

Under $30,000	44.1	51.5	58.1	63.5	69.6	75.3	78.0	80.9	79.4
$30,000 - $74,999	68.6	74.6	80.4	83.8	85.3	85.4	85.9	86.7	85.7
$75,000 and above	85.5	87.7	90.0	90.7	90.3	90.0	88.5	87.4	86.4

These results show a dramatic change in broadband uptake rates based on the price increases related to the necessary, additional investments. While these price increases affect all income groups, the largest impact is felt by lower-income and middle-income families. In the baseline case, the rate of broadband adoption among lower-income households increases by more than 34 percentage points by 2013, compared to a 25 percentage point increase with higher flat pricing. By 2017, almost 20 percent fewer lower-income households adopt broadband Internet compared to the baseline case (79.4 percent, compared to 99.0 percent), and over 13 percent fewer middle-income households purchase residential broadband than under the baseline (85.7 percent compared to 99.0 percent). These results should be instructive to policymakers committed to achieving universal broadband access. Policies that have the effect of forcing providers to pass along their additional investment costs in higher, flat monthly fees may dramatically slow universal access.

The results are very different if we assume the providers can use flexible pricing strategies that charge heavy bandwidth users for their additional consumption. We do not know precisely what form such new pricing models will take and, therefore, we cannot say precisely how costs would be allocated among different groups of consumers. But for analytical purposes, we have tested two scenarios in which price increases are allocated by usage.

Our first scenario uses survey evidence to assume that 20 percent of broadband users account for the large increases in bandwidth demand.[25] Table 5, below, illustrates the impact on broadband subscription rates by income group if 80 percent of the costs of the additional investment are borne by that minority of heavy-bandwidth consumers. Heavy bandwidth users are assumed to be relatively price insensitive, so their broadband subscription rates remain unaffected by price increases. We do not have adequate data to assess this assumption, but it is reasonable given the likelihood that habit formation would drive consumers to continue the practices that have driven their high bandwidth usage to date. To the extent that high bandwidth users are more sensitive to higher prices than we have assumed, companies would have to choose between spreading the cost to lower bandwidth

[25] James J. Martin and James W. Westall, "Assessing the Impact of BitTorrent on DOCSIS Networks," *Proceedings of IEEE BROADNETS 2007, Fourth International Conference on Broadband Communications, Networks, and Systems*, September 2007. http://people.clemson.edu/%7Ejmarty/papers/bittorrentBroadnets.pdf

users, and increasing prices more for high bandwidth users. The results of such a policy should be bounded by the simulations we present here. In this pricing scenario, with 80 percent of the additional cost allocated to the 20 percent of very high bandwidth users, future broadband adoption rates remain generally consistent with the baseline case. Lower-income households' access to broadband rises to 78.3 percent in 2013 and 98.5 percent in 2017 under this flexible pricing approach, compared to 69.6 percent and 79.4 percent under the flat-pricing approach.

Table 5. Broadband Access with $300 Billion in Additional Investment, Flexible Pricing, and 80 Percent of the Additional Costs Borne By Heavy, Price-Insensitive Users, By Income, 2009-2017

Household Income	2009 (Actual)	Projected Share of Households with Broadband Internet (%)							
		2010	2011	2012	2013	2014	2015	2016	2017
Under $30,000	44.1	51.5	60.8	69.0	78.3	87.3	92.8	98.6	98.5
$30,000 - $74,999	68.6	74.6	83.0	88.7	92.4	94.3	96.4	98.6	98.7
$75,000 and above	85.5	87.7	92.7	95.8	97.4	98.8	98.8	98.7	98.7

We next examine a pricing approach in which 50 percent of the costs of the additional investment are borne by inelastic, high-bandwidth consumers and 50 percent of those costs are passed along to all consumers via higher, flat subscription fees. In this scenario, Table 6, below, lower-income households adopt broadband at a noticeably slower pace than they do when the heavy-bandwidth users bear 80 percent of the cost. With all households absorbing half of the total costs of the additional investment, lower-income households increase their rates of broadband access to 75.0 percent in 2013 and 91.3 percent in 2017, compared with 78.3 and 98.5 percent when they bear 20 percent of the additional cost.

Table 6. Broadband Access Rates with $300 Billion in Additional Investment, Flexible Pricing, and the Additional Costs Divided 50-50 Between All Consumers and Heavy Users, By Income, 2009-2017

Household Income	2009 (Actual)	Projected Share of Households with Broadband Internet (%)							
		2010	2011	2012	2013	2014	2015	2016	2017
Under $30,000	44.1	51.5	59.7	66.9	75.0	82.8	87.2	91.9	91.3

$30,000 - $74,999	68.6	74.6	82.0	86.8	89.7	91.0	92.5	94.1	93.8
$75,000 and above	85.5	87.7	91.6	93.8	94.7	95.5	94.9	94.4	94.1

For the purposes of these simulations, we assumed that heavy bandwidth users are relatively insensitive to higher costs. However, flexible pricing that applies to them half or more of the costs of the additional investment required to accommodate their demand could induce heavy users to cut back on their bandwidth demand. In this case, the additional investment costs would be reduced, easing the additional pricing pressures for all broadband subscribers.

Policy Implications

Given the national commitment to achieving universal broadband and considering the growing appetite for online communication, it seems likely that at some future date every American who wants broadband at home will have it. How soon that day will arrive is less clear. Our analysis suggests that the pace at which Americans achieve universal broadband access could differ greatly, depending on economic factors and policy choices including policies that affect how broadband providers defray the costs of the additional investment needed to expand broadband capacity.

On the one hand, the amount of private investment required to ensure that the network can keep pace with growing demand is a key variable. But how that investment is financed, and the extent to which those costs fall on lower-income and middle-income consumers, will be equally important to the goal of universal access.

To the extent that lower-income and middle-income consumers are required to pay a greater share of network upgrade costs, we should expect a substantial delay in achieving universal broadband access. Our simulations suggest that spreading the costs equally among all consumers – the minority who use large amounts of bandwidth and the majority who use very little – will significantly slow the rate of adoption at the lower end of the income scale and extend the life of the digital divide.

If costs are shifted more heavily to those who use the most bandwidth and, therefore, are most responsible for driving up the cost of expanding network capabilities, the digital divergence among the races and among income groups can be eliminated much sooner.

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PUBLICATIONS:

A. JOURNAL ARTICLES

"Enabling Efficient Wireless Communications: The Role of Secondary Spectrum Markets" (with Scott Wallsten), Information Economics and Policy, forthcoming.

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CONGRESSIONAL AND REGULATORY TESTIMONIES:

U.S. Senate (Commerce, Science and Transportation Committee; Energy and Natural Resources Committee, Subcommittee on Water and Power); Federal Communications Commission; U.S. International Trade Commission; Tennessee State Legislature (Senate Finance, Ways and Means Committee; Special Joint Legislative Committee on Business Taxation; and, Senate State and Local Government Committee); Maryland State Legislature (Environmental Works Committee); Pennsylvania Public Utility Commission; Michigan Public Service Commission; Missouri Public Service Commission; Illinois Commerce Commission; West Virginia Public Utility Commission; Wyoming Public Utility Commission; Washington Utilities and Transportation Commission; Utah Public Service Commission; Wisconsin Public Service Commission; California Public Utilities Commission; Florida Public Service Commission; Delaware Public Service Commission; Montana Public Service Commission; Maryland Public Service Commission; Massachusetts Department of Public Utilities; Georgia Public Service Commission; Colorado Public Utilities Commission; North Carolina Public Utilities Commission; Missouri Public Service Commission; Texas Public Utility Commission; Arkansas Public Service Commission; Connecticut Department of Public Utility Control; Kansas State Corporation Commission; and New Jersey Board of Public Utility Commissioners.

INVITED SEMINARS AND SELECTED CONFERENCE PRESENTATIONS:

Columbia University, University of Chicago, London Business School, University of Paris (Dauphine IX), Vanderbilt University, Washington University in St. Louis, University of Michigan, Ohio State University, University of Minnesota, University of Florida, University of Texas, Rutgers University, American University, University of Missouri, Kansas University, University of Utah, University of Basel (Switzerland), University of Freiburg (Germany), University of Central Florida, American Enterprise Institute, Federal Communications Commission, Telecommunications Policy Research Conference (TPRC), National Conference of State Legislatures, U.S. Advisory Commission on Intergovernmental Relations, Southwestern Bell Corporation

SELECTED CONSULTING:

U.S. Department of Justice, Antitrust Division; U.S. Federal Trade Commission; AT&T; Sprint; MCI Telecommunications; Verizon; Optus Communications (Australia); United Parcel Service; Tennessee Valley Authority; Antitrust Division, Office of the Attorney General, State of Tennessee; U.S. Senator Howard Baker, Jr., U.S. Senate Majority Leader; Oak Ridge National Laboratory; AmerenUE; Arkansas Consumer Research; Division of Energy Conservation and Rate Advocacy, Office of the Arkansas Attorney General; U.S. Department of Energy

PROFESSIONAL PRESENTATIONS:

American Economic Association Annual Conference, Western Economic Association Annual Conference, Southern Economic Association Annual Conference, European Association for Research in Industrial Economics Annual Conference, Center for Research in Regulated Industries Eastern Annual Conference, Center for Research in Regulated Industries Western Annual Conference, Southeastern Economic Analysis Conference

WORKING PAPERS:

"Can you Hear Me Now? Exit Voice and Loyalty Under Increasing Competition" (with Jeffrey T. Macher), January 2009.

"Exploring the Information Asymmetry Gap: Evidence from FDA Regulation," (with Jeffrey T. Macher and Jackson A. Nickerson), revised, January 2009.

"Estimating Monopoly Power in Regulated Markets: The Case of Local Exchange Telephone Service," (with Simran Kahai and David L. Kaserman), February 2006.

"The Influence of Firms on Government" (with Mirjam Schiffer), revised September 2008.

EDITORIAL REVIEWER:

National Science Foundation, Brookings Institution, Federal Trade Commission, The MIT Press, American Economic Review, Quarterly Journal of Economics, Journal of Law and Economics, Economic Journal, Journal of Business, RAND Journal of Economics, Journal of Regulatory Economics, Review of Economics and Statistics, Economic Inquiry, Journal of Industrial Economics, Journal of Economics & Management Strategy, Journal of Law, Economics and Organization, Review of Industrial Organization, Scandinavian Journal of Economics, Eastern Economic Journal, Southern Economic Journal, Contemporary Economic Policy, Economic Development and Cultural Change, Industrial Relations, Growth and Change, Review of Regional Studies, Journal of Economics and Business, Quarterly Review of Economics and Business, Journal of Policy Analysis and Management, Quarterly Journal of Business and Economics, Regional Science and Urban Economics, Financial Review, Journal of Money, Credit, and Banking, Social Science Quarterly, Telecommunications Systems, Public Finance Quarterly, Japan and the World Economy, Energy Economics

EDITORIAL, CORPORATE BOARDS AND OVERSIGHT BODIES

Associate Editor, Information Economics and Policy, 2007-present.

Editorial Board, Journal of Regulatory Economics, 1999-present.

Board of Academic Advisors, The Free State Foundation, 2008 – present.

President, Transportation and Public Utilities Group, 2005-2006.

Editorial Board, Review of Industrial Organization, 2002-2003.

Board of Directors, Vice President, National Safety Council, October 2002- 2006.

Research Advisory Committee, National Regulatory Research Institute (Ohio State University), 1993-1997.

PROFESSIONAL MEMBERSHIPS AND COMMITTEES:

American Economic Association
Western Economic Association
Southern Economic Association
American Law and Economics Association
International Telecommunications Society
European Association for Research in Industrial Economics

Testimony of John W. Mayo

before the NYC City Council

November 20, 2009

Good morning. My name is John Mayo. I am a Professor of Economics, Business and Public Policy at Georgetown University's McDonough School of Business. I am also the Executive Director of the Georgetown Center for Business and Public Policy. I have studied regulation and antitrust issues for the past 25 years, and have done considerable research on the telecommunications industry. I have served as an economic advisor to both federal and state regulatory agencies, to the Department of Justice Antitrust Division and to various private telephone companies.[1] My testimony here today is uncompensated and the view I express are my own and do not reflect those of any organization with which I have been affiliated.

Now to get to the point, I urge you not to pass the resolution before you today. I do so for four reasons. First, while you and I and essentially everyone associated with the internet can agree that we would love to have a set of public policies in place to promote a jobs, innovation and competition, I must tell you that based on state-of the art economic research it is altogether unclear that the codification of net neutrality principles will actually promote those goals. Indeed, there are a number of research efforts within the economics community that indicate that the very laudable goals that we can all agree upon are more likely to be harmed by the imposition of overreaching net neutrality regulation. For example, one of the concerns that is often raised is whether the current deployment and adoption of broadband is creating a digital divide. In research at the Georgetown Center for Business and Public Policy, it was found that restrictions on pricing, as would occur under net neutrality regulation, are likely to lead to greater price increases for broadband service, and reduced broadband subscription by minorities and lower income consumers than would a market that permits firms to price the internet freely. [2]

Second, the resolution advocates focusing governmental policies on successful rather than failing markets. This concern is reflected in an editorial recently run by the Washington Post entitled "The FCC's Heavy Hand: Federal regulators should not be telling Internet service providers how to run their businesses." The editorial indicates that the proposal to codify net neutrality fails to answer what the Post refers to as "the most important question of all." Specifically, "is this intervention necessary?"

The fact is that a decade ago only 3 million Americans subscribed to broadband Internet services. Today some 65 million households subscribe to broadband. On a quality adjusted basis the prices of broadband access have fallen so that it is now more accessible and more affordable than ever. And infrastructure providers, ranging from wireless companies, to wireline and satellite companies are investing tens of billions of dollars in an attempt to keep up with the insatiably increasing demand by

[1] My complete vita is provided separately.

[2] See "Toward Universal Broadband: Flexible Broadband Pricing and the Digital Divide," Georgetown Center for Business and Public Policy, September 2009. Available at http://cbpp.georgetown.edu/

consumers for applications and content. While my own assessment of the conduct of this market is that it has been wildly successful to date, proponents of net neutrality regulation are very quick to point to the need to increase competition in the provision of broadband. But while they see government regulation of pricing models as the vehicle to best promote that goal, I will tell you that economists are virtually unanimous in seeing government regulation of pricing as a last resort in failing markets rather than a first resort in successful markets.

Third, the proposed resolution promotes that Congress codify net neutrality regulation at the very same moment that we as a society are finally getting serious about defining in rather specific terms what we might mean by this term. So, it should be reassuring that no less than three federal governmental agencies (the Department of Justice, the Federal Trade Commission, and the Federal Communications Commission) all have oversight responsibilities under *existing* laws. Collectively, these agencies may, and ought to, set regulatory requirements that are "in the public interest," prevent "contracts, combinations or conspiracies in restraint of trade," and prevent "unfair methods of competition."

Finally, the resolution is effectively backwards looking. The fundamental challenge of the internet – the real threat – to the internet is that the infrastructure of the network of networks known as the internet is able to keep up with the exploding demand. As the internet is transitioning from one in which demand was for low-bandwidth intensive text applications to one increasingly dominated by high bandwidth intensive video applications, the demand for bandwidth is growing exponentially. To date, the network expansion has been carried out in Adam Smithian fashion by private firms. Regulation of the pricing methods of these firms creates the very real risk of reductions in the investment propensity of these firms. The result would be to guarantee that very consequence – a second-tier broadband infrastructure -- that many of the proponents of net neutrality regulation seek to avoid. The point is that as a society we should be extraordinarily cognizant of the risk of such of unintended consequences.

In conclusion, let me say that, as with other policy measures, New Yorkers stand to benefit or pay disproportionately for sound or failed internet policies. For this reason, while I do not favor this resolution, I do very much applaud the Council for its concern in this matter.

Thank you, and I look forward to your questions.

Testimony of Howard J. Symons

on behalf of

Cable Telecommunications Association of New York, Inc.

before the

Committee on Technology in Government

of the Council of the City of New York

on

the FCC's Proposed Net Neutrality Principles and Resolution No. 712A-2007

November 20, 2009

Good morning. My name is Howard Symons and I am appearing today on behalf of the Cable Telecommunications Association of New York, Inc. (CTANY). CTANY is the principal trade association for the cable industry in New York, representing cable operators serving more than 95 percent of the State's households. The cable industry is also the largest broadband provider of high-speed Internet access in New York after investing $6 billion over 10 years to build out a two-way interactive network with fiber-optic technology.

In New York City, Cablevision and Time Warner Cable together have invested billions of dollars since 1995 to bring high-speed Internet service to New Yorkers in all five boroughs. More than 50 percent of New York City residents now subscribe to high-speed Internet access. As broadband service availability has grown, its price has fallen significantly, and the speeds cable broadband offers have shot up dramatically, all to the benefit of New York City consumers.

The availability of cable high-speed Internet access services has dramatically enhanced the value of the Internet for consumers, spurring the development of innovative online services that were impractical or even impossible when dial-up access was the norm. The cable industry's willingness to invest in broadband in the 1990s also forced the telephone companies to follow suit, providing the further consumer benefit of marketplace competition and choice.

The efforts of cable and other broadband network providers to build larger and faster networks have also spurred the development and helped ensure the success of countless numbers of new Internet businesses and applications – online shopping and other commercial services, online government services, online video services, social networking websites, data-sharing services, and online interactive game services, to name a few. In 2008, for instance, $132 billion

was spent purchasing goods and services over the Internet. All of these developments draw in new broadband consumers – and so spur new broadband deployment.

I offer these statistics because they illustrate the centrality of broadband Internet access to our economy, our society, and our political discourse – and therefore what's potentially at risk from the imposition of net neutrality regulations.

As you know, the FCC is in the middle of an exhaustive review of net neutrality principles. This review already encompasses thousands of pages of technical data and information to assist the FCC in making a decision about *whether* to adopt net neutrality principles as binding requirements. This is crucial – the FCC has not yet made such a decision, and it would therefore be premature for the City Council to adopt Resolution 712-A or any resolution in this area until the expert federal agency charged with promulgating telecommunications policy has had an opportunity to develop a complete factual record and fully examine the issues.

The cable industry is concerned that proposed net neutrality rules, which are designed to address the perceived inability of consumers to access the content of their choice, could call into question broadband service providers' legitimate ability to manage their networks, such as by deterring spam and viruses, protecting against transmission of pirated content, and ensuring that a small number of users do not slow down the Internet for everyone.

The cable industry fully supports the FCC's data-driven, transparent, fact-based process for examining these important issues. We are confident, though, that when the facts are in, we will be able to demonstrate that there are no real-world problems with broadband Internet access service providers today, and that the regulation of broadband Internet access services through net neutrality rules is unnecessary and could even be counterproductive.

Unnecessary because cable operators today deliver a fully "open" service to their subscribers – consistent with the objectives of the FCC's principles – without any regulatory mandates requiring them to do so:

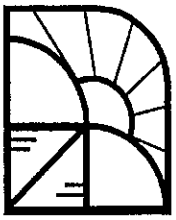
- Every cable broadband subscriber today can access the content he or she seeks over the Internet. Cable operators do not and will not block subscribers' access to any lawful content.
- Cable modem subscribers have the ability to do anything they want on the Internet. They can download or stream videos, upload and send pictures to friends, or call family across the world. They can use file-sharing software from peer-to-peer networks.
- Subscribers can also attach gaming devices, or any other computing device they want to use, to the network.

Counterproductive because cable operators have invested the tremendous sums needed to be able to offer this high-quality service because they have the regulatory freedom and flexibility to change and modify the service as market conditions change. Net neutrality rules, including particularly the FCC's proposed fifth principle on "nondiscrimination," could thwart new business models, invite litigation, and create uncertainty that will deter investment and innovation. Foregoing those opportunities will put the U.S. behind, not ahead, of the world in Internet development.

Historically, broadband network investment and innovation (including wide deployment throughout New York City) has flourished under a light regulatory touch. It is critical to continued investment that rules are not imposed in the absence of any demonstrated problem requiring a regulatory solution. As FCC Chairman Genachowski has recognized, "broadband providers need room to experiment with new technologies and business models in order to earn a return on their investment and deploy high-speed broadband to all Americans." And Commissioner McDowell has cautioned that "one way to provide a *disincentive* for investment is to create regulatory uncertainty."

This is a debate about means, not ends; the cable industry strongly supports a free and open Internet. Indeed, cable's investment of billions of dollars in risk capital has been a critical element in delivering the free and open Internet service that New Yorkers enjoy today. We welcome the opportunity to make our case that investment, innovation, and consumer welfare are all enhanced by continued government restraint. We hope that you and other policymakers will approach these issues with a healthy skepticism of hypothetical harms and with a full understanding of the very real consequences that regulatory action may have on investment, job creation, and the continued expansion and improvement of next generation networks.

Thank you for inviting me today. I welcome any questions you may have.



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Written Statement of

Lawrence J. Spiwak

President

Phoenix Center for Advanced Legal & Economic Public Policy Studies

Before the

New York City Council

Committee on Technology in Government

Hearing on

"Establishing Strong Network Neutrality Principles in Order to Protect the Internet"

November 20, 2009

Testimony of Lawrence J. Spiwak

President, Phoenix Center for Advanced Legal & Economic Public Policy Studies

New York City Council
Committee on Technology in Government
"Establishing Strong Network Neutrality Principles in Order to Protect the Internet""

November 20, 2009

I. Introduction

Madam Chair and Council Members, good morning and thank you for inviting me to testify today.

My name is Lawrence J. Spiwak, and I am the President of the Phoenix Center for Advanced Legal and Economic Public Policy Studies, a non-profit 501(c)(3) organization that focuses on publishing academic-quality research on the law and economics of telecommunications and high-tech industries. Our research agenda is consistently targeted at providing policymakers information about the important role that pro-entry policies must play in the communications industry. In the last decade, we have written over seventy papers on telecommunications policy, many of which have been published in leading academic journals. Moreover, we make all of our research—as well as rebuttals by those who do not agree with us—available free at our website, www.phoenix-center.org. To this end, I am listed in the top two percent of scholars downloaded on the Social Science Research Network, and my academic work has been

cited by, among others, United States Federal Communications Commission, the United States Securities and Exchange Commission, the United States Federal Trade Commission, the United States Department of State, the United States Department of Commerce, United States Code Annotated, the United States Congressional Research Service, American Jurisprudence (2d), the International Telecommunication Union (ITU), and the Organisation for Economic Co-Operation and Development (OECD).

Given our reputation for both analytical honesty and rigor (coupled with the fact that we do not lobby or act as parties to any regulatory proceeding), not only are Phoenix Center members often called upon by various governments to testify to present our research, but to serve in some capacity. For example, the Phoenix Center has served for the last three years (including acting as Chairman) on the North American Numbering Council (the Federal Advisory Board charged with advising the Federal Communications Commission on telephone numbering issues) (http://www.fcc.gov/wcb/cpd/Nanc/nancback.html); we have conducted a study for the United States Department of Commerce on the "Valley of Death" for basic research (which is soon to be republished in an academic journal)[1]; I was selected to participate in a United States Department of State trip to Manila and Hanoi as part of President Bush's "Digital Freedom Initiative" to talk about Universal Service and broadband deployment, as well as to participate last summer in a United States Department of State conference

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1 G.S. Ford, T.M. Koutsky, L.S. Spiwak, *A Valley of Death in the Innovation Sequence: An Economic Investigation* (2007)(available at: http://www.phoenix-center.org/Valley_of_Death_Final.pdf), *and forthcoming in* AMERICAN JOURNAL OF EVALUATION (Winter 2009).

in Ghana on the benefits of broadband deployment in the developing world; our Chief Economist currently serves on the Board of ConnectAlabama by direct appointment of the Governor; and, most recently, we just completed a project sponsored by the Governments of Portugal and Brasil to develop a new "Broadband Adoption Index"[2] (which is also scheduled to be republished shortly in an academic journal).

By way of my personal background, I received my undergraduate degree from George Washington University, and I received my law degree from Benjamin N. Cardozo School of Law. I am also a member of good standing in the Bars of New York, Massachusetts and the District of Columbia. Before founding the Phoenix Center, I was a senior attorney in the Office of General Counsel at the Federal Communications Commission and, before that, the Federal Energy Regulatory Commission. I would also like to add that while in law school, I was a member of the Mayor Koch's Summer Graduate School Honors Program, where I helped coordinate New York City's first effort at developing an alternative fuel program for the City's public transportation system.

II. Defining the Issue

So what exactly is "net neutrality"? Honestly, I don't know. If you ask three people, you are bound to get five answers. And that is precisely the problem.

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[2] T.R. Beard, G.S. Ford and L.J. Spiwak, *The Broadband Adoption Index: Improving Measurements and Comparisons of Broadband Deployment and Adoption*, PHOENIX CENTER POLICY PAPER NO. 36 (July 2009)(available at: http://www.phoenix-center.org/pcpp/PCPP36Final.pdf), *and forthcoming in* FEDERAL COMMUNICATIONS LAW JOURNAL (Spring 2010).

Net neutrality is an *idea;* it is *not* a policy. Policies differ from ideas in that a policy is an idea put into practice. Policies are made by people, and people are imperfect. Ideas become policy in political and often adversarial environments. It is subject to interpretation by regulatory agencies and courts, both of which may be influenced by personal or political ideologies. It is subject to modification, reversal, and remand over time. Compliance must be enforced, and the enforcement mechanism may render impotent even the best of intentions.

But there is more: A policy is not a single rule; it is a portmanteau of rules, regulations, and enforcement. It is the sum of the incentives created by the actual practice of intervention in all its parts that renders the outcomes. Those familiar with communications policy realize that the practice of regulation is imperfect. No intervention is exempt from the ugliness, no matter who is in charge. There is neither person nor computer smart enough to properly address all the relevant margins to an intervention, and the final set of rules and regulations are certain to be smothered in political ideology. This truth cannot be ignored; markets may occasionally fail, but regulation is always defective. As such, the headroom in the cost-benefit calculation must be very high for regulation to have much hope of success.[3]

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3 *See* C. Sunstein, THE COST-BENEFIT STATE: THE FUTURE OF REGULATORY PROTECTION (2002) at 9 ("the strongest argument for cost-benefit balancing are based not only on neoclassical economics, but also on an understanding of human cognition, on democratic considerations, and on an assessment of the real-world record of such balancing," noting that cost-benefit analysis "can protect democratic processes" from interest groups that are "pressing for regulation when the argument on its behalf is fragile.").

As for net neutrality, many argue that intervention is needed, but finding the idea of net neutrality put to paper is difficult. There are a few potential exceptions, though even these they lack the details necessary to predict all the consequences. Representatives Markey and Eshoo have proposed legislation which, by necessity, has particular language in it. But, even here, the FCC and subsequently the courts would have to interpret and implement its particulars. As the parameters of the "reasonable network management" qualifier becomes more established, the effect of the statement on behavior will become more apparent. For now, however, there are sharks lurking below.

For this reason, while we at the Phoenix Center have been avid (and indeed very public) supporters of the current *post hoc* adjudicative process at the Federal Communications Commission to enforce the FCC's Internet Policy Statement, we have expressed severe reservations about the imposition of a "bright line" *ex ante* non-discrimination rule. We do so not because we dogmatically think the market is "hyper-competitive" and there are a "thousand broadband flowers blooming",[4] but because both theory, empirics, and our professional experience in the industry inexorably lead us

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[4] If anything, we have been quite clear that given the huge fixed and sunk costs required for entry, the size of the market and the general intensity of price competition, the number of network providers will necessarily be few. G.S. Ford, T.M. Koutsky, L.S. Spiwak, *Competition After Unbundling: Entry, Industry Structure and Convergence*, 59 FEDERAL COMMUNICATIONS LAW JOURNAL 331 (2007). However, economic literature, antitrust and FCC precedent all indicate that high concentration under such conditions is not per se evidence of poor market performance. *Id.* Such conditions were recently acknowledged by the FCC's Omnibus Broadband Initiative team, who recognized that competitive intensity will depend on different end-user broadband demand scenarios, particularly because the incremental cost to universal availability varies significantly depending on speeds required. OBI September 29, 2009 Slide Presentation at 39, 45 and n. 1) (available at: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293742A1.pdf).

to the conclusion that such a bright line rule will likely result in higher prices, increased transaction costs, less deployment and increased industry consolidation.[5] In other words, the costs of a "bright line" non-discrimination rule simply don't outweigh the benefits and, therefore, it is better to work to improve the existing adjudicative process.

Because my time is limited, let me give two examples.

First, let's hearken back to the 2008 auction of the 700 MHz DTV spectrum. There, we had a concrete example of how firms react to "open network" requirements. Spectrum encumbered by "open access" requirements sold at a 40% discount relative to unencumbered spectrum in the same auction. Why is that? Because the results show that the bidders accounted for a 32% reduction in profitability because of the "open network" conditions in their bids, and that is fine. But the real policy question is not how much the U.S. taxpayers lost in missed auction revenue by this "open network" experiment, but what happens if you apply "bright line" rules that reduce profitability

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5 *See, e.g.*, T.R. Beard, G.S. Ford, T.M. Koutsky, L.J. Spiwak, *Network Neutrality and Industry Structure*, 29 HASTINGS COMMUNICATIONS AND ENTERTAINMENT LAW JOURNAL 149 (2007); T.R. Beard, G.S. Ford, T.M. Koutsky, L.J. Spiwak *Network Neutrality and Foreclosing Market Exchange*, 1 INT. J. MANAGEMENT AND NETWORK ECONOMICS 160 (2009); G.S. Ford, T.M. Koutsky, L.J. Spiwak, *The Efficiency Risk of Network Neutrality Rules*, PHOENIX CENTER POLICY BULLETIN NO. 16 (May 2006)(available at: http://www.phoenix-center.org/PolicyBulletin/PCPB16Final.pdf); George S. Ford, Thomas M. Koutsky and Lawrence J. Spiwak, *Consumers and Wireless Carterfone: An Economic Perspective*, PHOENIX CENTER POLICY BULLETIN NO. 21 (September 2008) (available at: http://www.phoenix-center.org/PolicyBulletin/PCPB21Final.pdf); *see also* G. Ford, PHOENIX CENTER PERSPECTIVES NO. 09-04: *Finding the Bottom: A Review of Free Press's Analysis of Network Neutrality and Investment* (October 29, 2009)(available at: http://www.phoenix-center.org/perspectives/Perspective09-04Final.pdf).

by 32% across the entire mobile industry? The simple answer is that somebody is going to go bust, thus leading to increased industry concentration (and likely higher prices).[6]

Second, a key goal of the American Recovery and Reinvestment Act of 2009 ("ARRA") is to provide all Americans with access to affordable broadband services, particularly to those Americans living in rural markets where demand and cost conditions do not favor network deployment.[7] While this is certainly a worthy social goal, it will be impossible—absent a massive subsidy—for us to achieve this objective if we impose a bright line non-discrimination rule which, by definition, will raise entry costs and reduce firms' profits.[8] And guess who will bear the brunt to pay for this of this subsidy? Your constituents—*i.e.*, people who live in your urban districts.[9]

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6 G.S. Ford, T.M. Koutsky and L.J. Spiwak, *Using Auction Results to Forecast the Impact of Wireless Carterfone Regulation on Wireless Networks*, PHOENIX CENTER POLICY BULLETIN NO. 20 (Second Edition) (May 2008)(available at: http://www.phoenix-center.org/PolicyBulletin/PCPB20Final2ndEdition.pdf); *see also* George S. Ford, PHOENIX CENTER PERSPECTIVES NO. 08-01: *Calculating the Value of Unencumbered AWS-III Spectrum* (June 25, 2008)(available at: http://www.phoenix-center.org/perspectives/Perspective08-01Final.pdf); G.S. Ford, T.M. Koutsky, & L.J. Spiwak, *A Policy And Economic Exploration of Wireless Carterfone Regulation*, 25 SANTA CLARA COMPUTER & HIGH TECH. L.J. 647 (2009).

7 Indeed, according to the FCC's own calculations, the incremental cost to build just one 100+ Mbps network to 111-116 households is approximately $350 billion. OBI September 29, 2009 Slide Presentation, *supra* n. 4, at 45.

8 G.S. Ford, L.J. Spiwak and M.L. Stern, *Expanding the Digital Divide: Network Management Regulations and the Size of Providers*, PHOENIX CENTER POLICY BULLETIN NO. 23 (October 2009)(available at: http://www.phoenix-center.org/PolicyBulletin/PCPB23Final.pdf)l *see also* G.S. Ford, T.M. Koutsky and L.J. Spiwak, *The Burden of Network Neutrality Mandates on Rural Broadband Deployment*, PHOENIX CENTER POLICY PAPER NO. 25 (July 2006)(available at: http://www.phoenix-center.org/pcpp/PCPP25Final.pdf).

9 *See, e.g.*, Amy Schatz, *Feds Mull Rules, Fees to Spur Net Access*, WALL STREET JOURNAL (November 18, 2009)("Federal regulators are considering whether the government should take greater control of the Internet and ask consumers to pay higher phone charges in order to provide all Americans with cheaper access to broadband Internet service."

While many agree today that traffic control is an essential component of network management and typically a source of consumer benefit by reducing congestion and prioritizing latency sensitive traffic, there are those who continue to advocate for regulatory constraints on the ability of network operators to manage freely Internet traffic to attenuate congestion. Some proposals call for application neutrality, where ISPs are prohibited from targeting particular applications for congestion control.[10] The more quixotic arguments call for a regulatory or legislative mandate requiring the neutral treatment of all Internet traffic (in addition to other regulations of ISP behavior).[11] In either world, the risk is that solutions to network congestion will be (largely) limited to capacity expansion, and many proponents of Internet regulation view this as a desirable outcome.[12]

The FCC made it quite clear in its 2005 Broadband Policy Statement that firms should be allowed to engage in some sort of "reasonable network management"[13] and, for the most part, even advocates of network neutrality rules generally state that they

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10 L. Lessig and R. McChesney. *No Tolls on The Internet*, WASHINGTON POST (June 8, 2006) (available at: http://www.washingtonpost.com/wp-dyn/content/article/2006/06/07/AR2006060702108.html. ("Net neutrality means simply that all like Internet content must be treated alike and move at the same speed over the network. The owners of the Internet's wires cannot discriminate."). Yet, if an application is solely responsible for congestion, then it seems sensible for an ISP to "throttle" such use, even if in a targeted manner. Expanding congestion control to applications and users not causing congestion is plainly inefficient.

11 *See, e.g.*, S. Meinrath and V. Pickard, *The New Network Neutrality: Criteria for Economic Freedom*, 12 INTERNATIONAL JOURNAL OF COMMUNICATIONS LAW & POLICY 225-243 (2008).

12 *Id.*

13 *FCC Broadband Policy Statement*, 20 FCC Rcd 14986, FCC 05-151(August 5, 2005)("The principles we adopt are subject to reasonable network management.")

agree.[14] While many view this as a consensus, the definition of "reasonable network management" is unfortunately subjective and, therefore, the debate over how to define the term rages on. A significant group argues that this term should be defined very narrowly. More specifically, recent policy initiatives seem to indicate a distaste for granular network management and instead a preference that operators should be strongly encouraged (if not simply forced) to "invest their way out" of congestion problems by expanding capacity.[15] Even if not explicit, the effect of certain rules may render traffic shaping or pricing options too costly for carriers to implement, leaving capacity expansion as the only feasible option.

For example, in last summer's hotly contested dispute over whether Comcast improperly blocked BitTorrent, a peer-to-peer ("P2P") application, the FCC held that a network provider could not discriminate against a particular application or protocol, even if that protocol causes significant congestion on the network.[16] Instead, the FCC

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14 *See, e.g.*, Vint Cerf, Chief Internet Evangelist, *What's a Reasonable Approach for Managing Broadband Networks?* Google Public Policy Blog (August 4, 2008)(available at: http://googlepublicpolicy.blogspot.com/2008/08/whats-reasonable-approach-for-managing.html); Rick Whitt, Google Washington Telecom and Media Counsel, *Net Neutrality, Con't (Part 2): Type-Based Differentiation*, Google Public Policy Blog (June 27, 2007)("[W]e do not dispute that broadband providers should have the ability to manage their networks, as well as engage in a broad array of business practices.")(available at: http://googlepublicpolicy.blogspot.com/2007/06/net-neutrality-cont-part-2-type-based.html); Harold Feld, *The FCC Releases the Comcast Complaint Order Part I – Why This Is A Huge Win*, Wetmachine (August 20, 2008)(available at: http://www.wetmachine.com/totsf/item/1283).

15 Congestion is but one factor requiring network management to maintain quality. Network quality also includes performance characteristics related to jitter, packet loss, and latency. Capacity expansion may do little or nothing to change these dimensions of quality.

16 *But c.f., MGM v. Grokster*, 545 U.S. 913, 920 n. 1 (2005):

> Peer-to-peer networks have disadvantages as well. Searches on peer-to-peer networks may not reach and uncover all available files because search requests may not be transmitted to every computer on the network. There may be redundant copies of popular

Footnote Continued...

concluded that carriers must treat *all* applications and protocols "equally."[17] Although the Commission stated that Comcast could have imposed a cap on average users' capacity and then charged the most aggressive users overage fees or throttled back the usage of *all* high capacity users (rather than just those who were using the congestion causing application),[18] the Commission reiterated that the alternative of "feasible facility improvements" remained very much on the table.[19] Today, there is significant resistance to cap- or price-based solutions to congestion management[20] and, with all due respect, your proposed resolution opposes pricing solutions as well.[21]

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files. *The creator of the software has no incentive to minimize storage or bandwidth consumption, the costs of which are borne by every user of the network. Most relevant here, it is more difficult to control the content of files available for retrieval and the behavior of users.*

Emphasis supplied.

17 *In re Formal Complaint of Free Press and Public Knowledge Against Comcast Corporation for Secretly Degrading Peer-to-Peer Applications, Memorandum and Order,* FCC 08-183, 23 FCC Rcd 13,028 (rel. Aug. 20, 2008) at ¶ 41; but c.f. G.S. Ford, T.M. Koutsky and L.J. Spiwak, *The Welfare Impacts of Broadband Network Management: Can Broadband Service Providers be Trusted?* PHOENIX CENTER POLICY PAPER NO. 32 (March 2008)(available at: http://www.phoenix-center.org/pcpp/PCPP32Final.pdf)(providing an economic model which demonstrates that if it is shown that a congestion externality is present and that a traffic management tool directly remedies that externality, it is appropriate to presume that this type of traffic management by a private firm is legitimate and welfare enhancing).

18 *Id.* at ¶ 49.

19 *Id.* at ¶ 49, n. 227, citing *Service Rules for the 698–746, 747–762, and 777–792 MHz Bands; Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems; Section 68.4(a) of the Commission's Rules Governing Hearing Aid-Compatible Telephones; Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services; Former Nextel Communications, Inc. Upper 700 MHz Guard Band Licenses and Revisions to Part 27 of the Commission's Rules; Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band; Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010; Declaratory Ruling on Reporting Requirement under Commission's Part 1 Anti-Collusion Rule,* WT Docket Nos. 07-166, 06-169, 06-150, 01-309, 03-264, 96-86, CC Docket No. 94-102, PS Docket No. 06-229, *Second Report and Order,* 22 FCC Rcd 15289, 15371, ¶ 222 (2007) (700 MHz Second Report and Order).

20 *See, e.g.,* April 16th 2009 Press Release of Senator Charles Schumer ("In the face of enormous community opposition and at [Senator] Schumer's urging, [Time Warner Cable] will shelve [their tiered pricing] plan for all of their test markets.")(available at:

Footnote Continued...

A more recent example comes in the form of the Notice of Funds Availability ("NOFA") recently issued by Rural Utilities Service (RUS)/National Telecommunications and Information Agency (NTIA) to allocate ARRA broadband stimulus funds.[22] There, the NTIA and RUS went beyond the FCC's "Four Principles" embodied in the Commission's 2005 Broadband Policy Statement[23] by imposing a "fifth" *ex ante* non-discrimination requirement to "ensure neutral traffic routing" and to prevent grant awardees from "favor[ing] any lawful Internet applications or content over others."[24] Although the NOFA would permit awardees to engage in "generally accepted technical measures" to facilitate reasonable traffic management "such as caching and application-neutral bandwidth allocation, as well as measures to address spam, denial of service attacks, illegal content, and other harmful activities", awardees are nonetheless

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http://schumer.senate.gov/new_website/record.cfm?id=311573); *but c.f.* L. Spiwak, *Is YOUR Broadband Access About to Go Bye Bye?* FOX FORUM (June 2, 2009) (available at: http://www.foxnews.com/opinion/2009/06/02/broadband-access-bye-bye).

21 *See, e.g.*, Resolution No. 712:

> Whereas, In the past, network providers have delivered data over the Internet on a "best efforts" basis, without creating different levels of quality of service based upon amounts paid by content providers; and
>
> Whereas, With growth of the Internet and the increased demand for more broadband video, data, and telephone service, infrastructure network executives have indicated the likelihood that content providers will be charged more for faster data/content delivery, in part, to offset the cost of new high-speed lines; and
>
> Whereas, Many are concerned that charging for services will lead to a type of Internet "toll road" where an individual's access to locations on the Internet will be faster to the websites of those content providers who pay a higher price to the network owner; and
>
> Whereas, Without network neutrality, smaller companies and individuals will be unable to afford premium network access which will thus, hurt competition and the innovation that has been the hallmark of the Internet to date....

22 Department of Agriculture (RUS) and Department of Commerce (NTIA), Notice of Funds Availability, 74 Fed. Reg. 33104 (June 9, 2009)(hereinafter *"NOFA"*).

23 FCC Broadband Policy Statement, *supra* n. 13.

24 *NOFA* at 33132-33.

prohibited from "charg[ing] some application and content providers for 'fast lanes' that would put others at a competitive disadvantage."[25] While perhaps carefully worded, the requirements have effectively discouraged any of the larger broadband providers, which presumably are some of the lowest cost providers in the country, from applying for such funds.[26]

Finally, and perhaps most extreme, is the recently introduced H.R. 3458, the "Internet Freedom Preservation Act" co-sponsored by Representatives Edward Markey and Anna Eshoo.[27] Under the plain terms of this bill, not only would an Internet access service provider be prohibited from "impos[ing] a charge on any Internet content, service, or application provider ... beyond the end user charges associated with providing the service to such provider," but the service provider may "not provide or sell ... any offering that prioritizes traffic over that of other such providers on an Internet access service" and may "not install or utilize network features, functions, or capabilities that impede or hinder compliance with this section."[28] Moreover, the concept of "reasonable network management" would be defined exclusively by FCC regulation (as opposed to the current and more flexible *ex post* adjudicative approach),[29]

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25 *Id.* Notably, applications are not neutral with respect to their demands on the network, so treating all applications the same is, in fact, favoring certain applications over others.

26 *See, e.g.*, Cecilia Kang, *Major Carriers Shun Broadband Stimulus: Funds Would Come With Tighter Rules*, WASHINGTON POST (August 14, 2009)(available at: http://www.washingtonpost.com/wp-dyn/content/article/2009/08/13/AR2009081302433.html).

27 http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.3458.

28 HR 3458 at §§ 12(b)(1)-(6).

29 *Id.* at § 12(k)(4).

and congestion reducing activities would be considered "reasonable" only "if it furthers a critically important interest, is narrowly tailored to further that interest, and is the means of furthering that interest that is the least restrictive, least discriminatory, and least constricting of consumer choice available."[30] Efficient solutions play no role in the proposed legislation, so the result will no doubt be higher costs and, in turn, higher prices for consumers. Last, and perhaps most germane here, the Federal Communications Commission would be charged with promulgating rules to force network operators "to the extent feasible, make available sufficient network capacity to users to enable the provision, availability, and use of an Internet access service to support lawful content, applications, and services that require high bandwidth communications to and from an end user."[31]

So what's the problem? Our research demonstrates that such rules are likely to affect disproportionately networks located in rural areas or smaller networks in urban markets given the cost disadvantages faced by such firms. Since these markets are a central target of both the ARRA's stimulus funding and required National Broadband Plan, the imposition of strong "network management" provisions that require you to "invest your way out of congestion" are likely to result in lower quality service and less availability in rural areas and potentially reduce competition in urban areas, as well as to reduce the effectiveness of stimulus grants and other subsidies. Further, our research

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30 *Id.* at § 12(d).

31 *Id.* at § 12(c)(3).

indicates an elastic response of subsidy levels to increases in costs resulting from such regulations; specifically, a 1% increase in deployment costs arising from regulation increases the subsidy required for ubiquitous coverage by nearly 2%. And, as pointed out earlier, the big payers of this subsidy will likely be your urban constituents in the form of higher prices. Communications policy has a long history of taxing urban consumers to subsidize rural consumers and there is no proposal today to alter that reality.[32]

III. Conclusion

In the end, this debate is not about desire, but about process. Everyone I know is in favor of an open Internet. The first question to answer is what is the genuine threat to openness? On this question, judgments are hindered by the existing hysteria and hyperbole. The really difficult policy question is how best do we accomplish "openness" that has a sound legal foundation, respects engineering realities and does not violate the basic rules of economics? Do we improve on the current *post hoc* adjudicative process, or do we impose a blunt "bright line" *ex ante* rule that may end up making things worse for consumers? Accordingly, I respectfully submit that this Council let the talented folks at the FCC do their job and parse through this very complex and difficult issue without adding any more unnecessary politicization to the

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32 *See supra* n. 9.

process. No decision by the FCC has ever been made better by the increase of political pressure.

Madam Chair, thank you again for the invitation to testify today. I would welcome any questions the Committee might have.

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Written Testimony of
JOSHUA BREITBART
POLICY DIRECTOR, PEOPLE'S PRODUCTION HOUSE
before
THE NEW YORK CITY COUNCIL COMMITTEE ON TECHNOLOGY IN GOVERNMENT
on
"RESOLUTION 712 CALLING ON THE UNITED STATES CONGRESS TO CODIFY STRONG NETWORK NEUTRALITY PRINCIPLES"

November 20, 2009

My name is Joshua Breitbart. I am the Policy Director of People's Production House. People's Production House provides young people, immigrants, and low-wage workers with a comprehensive education for the information age, combining media production, media literacy and media policy. We work in public schools and with community organizations in all five boroughs. We also support policies that increase opportunities for members of the public to participate in local journalism. To that end, we have produced videos and developed teaching activities that we are integrating into the Radio Rootz media literacy curriculum that we teach in public schools throughout the city.

First, I would like to thank the Committee for introducing a resolution on this important issue. You are not alone in recognizing that this federal policy is of vital local importance. New Immigrant Community Empowerment, Picture the Homeless, Families For Freedom, Good Old Lower East Side have all asked me to convey their support for this resolution to you.

The Haitian Times, one of our city's leading ethnic newspapers (and perhaps the leading newspaper of any kind in my neighborhood) published an editorial I wrote on the importance of net neutrality. The New York Community Media Alliance, who is here today to testify, syndicated the article, sending it out to its entire membership of ethnic and independent newspapers in the metro region. I have attached this editorial to my testimony.

Our local Internet Service Providers that would be subjected to these proposed regulations – Verizon, Time Warner, Cablevision – are certainly active participants in the democratic process. Since 2005, the cable industry has spent over $24,000,000 on lobbyists in New York State. Just in 2007, Verizon spent $3,200,000 on lobbying in New York, deploying 24 lobbyists, the most of any company in the state.[1] At the federal level, Verizon alone has already spent over $13 million on lobbying, according to the Center for Responsive Politics.

Why Net Neutrality Matters

For many New Yorkers, though, the diversity and abundance of information on the Internet has become part of our daily lives. We assume that we will always be able to view the websites of our choosing and even upload our own photos and videos onto the Internet. However, as teachers of radio journalism, we at People's Production House cannot take net neutrality – the principle that prohibits discrimination of content and applications on the

1 Common Cause New York, "The Cable TV Industry: Hardwiring Influence" (November 2008). http://www.commoncause.org/atf/cf/%7BFB3C17E2-CDD1-4DF6-92BE-BD4429893665%7D/CableTV-Nov08.pdf

Internet – for granted. We include lessons on net neutrality as part of our year-long courses in public schools because without it, our students could soon be making entertaining and informative radio pieces without the ability to share them online.

In opposing net neutrality, some companies say they need to be able to block what they call unreasonable use of their networks. If the companies believe they are the reasonable ones, then why, in 2007, when cable television and Internet service behemoth Comcast was found to be blocking a service called Bit Torrent that is popular for downloading movies, did they at first try to deny it? The Federal Communications Commission penalized the company, but Comcast is challenging the FCC's authority in court – suing for its right to block our access to video services like Bit Torrent or voice services like Skype. Now that Comcast is seeking to purchase NBC Universal, it will have even more reason to block competitors' content traveling over their wires.

For community journalists like the immigrants, low-wage workers, and public school students that we teach at People's Production House, this is a scary thought. The NBC corporation has been broadcasting its content since 1926, while our trainees are just now finding the power of distributing their own media through the Internet. They're finding new ways of engaging in civic life, new job skills, and a new sense of community, locally and globally. Without net neutrality, Comcast and other corporate giants could take that power away.

Net neutrality was the law of the land until 2005 and it brought us many benefits. For example, Skype is an Internet-based voice service that is extremely popular among the recent immigrants we teach who wish to keep in touch with family around the world. Skype competes with cable companies' voice services like Cablevision's Optimum Voice and Digital Phone from Time Warner Cable. Without net neutrality, those companies could have kept Skype from launching by blocking it or charging the companies exorbitant fees that would be passed on to users.

Applying Net Neutrality Rules to Wireless Networks

Opponents of net neutrality point to the existing variety of online voice services as evidence that the system works. They call net neutrality a "solution in search of a problem," but the problem is staring anyone who owns an Internet-enabled mobile phone right in the face. As it is now, most cellular phone companies – who have so far been exempt from net neutrality – block Skype from operating on their networks so people are forced to use their minutes for calls rather than their data connections.

This is particularly harmful to poor people, people of color, and seniors who are all more likely to have a mobile phone than a broadband-enabled personal computer or laptop. While laptop users can use whatever chat or voice service they want – thanks, so far, to net neutrality – mobile phone users can only access the parts of the Internet that their service providers approve. For international calls they still have to rely on expensive phone company connections or unreliable pre-paid phone cards. We need to extend net neutrality protections to wireless networks, not allow these kinds of discriminatory practices to spread, especially not now that the Mayor is finally taking action to close the digital divide in our city with its new NYC Connected Communities initiative.

As the Chair will recall, I made similar comments about net neutrality before this committee in this chamber in 2007, testifying in support of your resolution to establish strong network neutrality principles in order to protect the Internet. At the time, I urged this Committee to endorse the the application of net neutrality principles to broadband over cell phones. I was joined by Cameron Craig of the NewYork City AIDS Housing Network who spoke of how he and his colleagues found mobile devices more practical, easier to learn, and, for him, easier to type on since he had limited use of his hand and found it easier to type on a Blackberry than a standard computer keyboard.

His is not an isolated case. As I testified before this committee regarding white spaces and the importance of mobile access, mobile phones are far more widespread than computers with at-home Internet, especially among the groups currently marginalized from the Internet. The absence of net neutrality rules for this mode of connection has already created a tiered Internet, with walled gardens, restrictions on what devices users can

connect to the network, and blocked applications.

The freedom for wireless service providers to leverage their control of the network to tax content providers has not led to great investments in infrastructure, as opponents of this resolution claim it would. On the contrary, as with wired broadband, our country lags behind other countries in wireless speeds and consumer choice. A lack of network neutrality for wireless networks has limited competition and given carriers the ability and the motivation to squeeze every last possible penny out of their old infrastructure.

Fortunately, the Federal Communications Commission has recognized this problem. In 2007, it required licensees of the upper 700 MHz "C-Block" to allow customers to use applications of their choice and attach devices of their choice to the wireless network. In its recently-launched proceeding on net neutrality, the Commission affirmed that its six principles apply to all broadband connections, including wireless. How these principles, which we hope will soon be rules, will be applied to wireless networks is still up for debate, however, so I encourage the City Council to call on Congress and the FCC to apply strong net neutrality rules to wireless networks.

Network Management versus Network Capacity

Opponents of net neutrality argue that certain forms of content like Voice over Internet Protocol or streaming high definition video require low-latency and low-jitter throughput to be useful, while other forms like email and basic web surfing are less sensitive. Carriers want to be able to differentiate and prioritize these types of content and charge you for quality assurance. However, this is only an issue when the network has limited capacity; the scarcity of bandwith creates the opportunity to maximize profit from the available capacity. As Sascha Meinrath and Victor Pickard point out in their article, "The New Network Neutrality: Criteria for Internet Freedom," "With adequate capacity, packet prioritization becomes a moot point. Thus, "smart networks" [where carriers prioritize some forms of content over others] have the potential to create a *disincentive* for system-wide capacity upgrades."[2]

Consistent with this observation, the recently released report from the Berkman Center for Internet and Society at Harvard University, "Next Generation Connectivity: A Review of Broadband Internet Transitions and Policy from Around the World," shows that the most consistently successful way to achieve the widely-held goals of high adoption rates, high bandwidth capacity, and low price is through open access policies. Establishing functional separation, in which the provision of Internet service is separated from the provision of content, leads to network operators focusing on building, maintaining, and upgrading the network.

Network neutrality, which in fact represents a historical step back from the open access regime established (at least nominally) in the Telecommunications Act of 1996, is at least a solid step in the right direction. Leaving network operators free reign to manage a mix of their own content and the rest of our content is a clear conflict of interest.

To the extent that any level of content management by the network operator may be justified, The Internet Freedom Preservation Act of 2009 now before Congress wisely lays out a narrow set of criteria for what would qualify it as reasonable network management "only if it furthers a critically important interest, is narrowly tailored to further that interest, and is the means of furthering that interest that is the least restrictive, least discriminatory, and least constricting of consumer choice available."

The act also intends to clarify an Internet access service provider's ability to offer so-called managed services, or what the act calls "private transmission capacity services." These would be permissible if they do not "diminish or degrade the level of Internet access service offered to the public by the same pro vider" and "are not offered in

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2 Sascha D. Meinrath & Victor W. Pickard, "The New Network Neutrality: Criteria for Internet Freedom," *International Journal of Communications Law & Policy* (Issue 12, Winter 2008). http://www.newamerica.net/publications/articles/2008/new_network_neutrality_criteria_internet_freedom_6730

an anticompetitive, unreasonable, discriminatory, or deceptive manner." If City Council wishes to delve into the more technical aspects of net neutrality, I recommend you consider these definitions that already have the backing of 18 members of Congress who have signed as co-sponsors of The Internet Freedom Preservation Act of 2009.

Essential Infrastructure or Private Property

In terms of the broader social, political, and economic impacts of these policies, Meinrath and Pickard offer a more expansive definition of network neutrality and I recommend the member of the Committee to it. We can get caught up in the technical aspects of this issue, but, as they point out, "'Neutrality' is not just a technical specification, but also facilitates a social contract that supports equity and justice through data communications." Specifically, they offer ten points that comprise this level of network neutrality. Their paper, available online, contains further explanation of each of these points. "The new network neutrality envisions a more democratic network infrastructure that"[3]

1. Requires Common Carriage.
2. Is Open Architecture and Supports Open Source Driver Development.
3. Is Open Protocol and Open Standard.
4. Supports an End-to-End Architecture (i.e., is based upon a "dumb network").
5. Is Private (e.g., no back doors, deep packet inspection, etc.).
6. Is Application-Neutral.
7. Is Low-Latency and First-In/First-Out (i.e., requires adequate capacity).
8. Is Interoperable.
9. Is Business Model Neutral.
10. Is Run by its Users

The net neutrality debate ultimately boils down to the question of whether you see the Internet as essential infrastructure or as private property. The near-universal agreement that broadband adoption is a critical policy goal and the continued migration of municipal services online, not to mention the rapid development of online-only municipal services, clearly indicates that the Internet is a public utility and needs to be treated as such. This City Council resolution recognizes that reality and we urge you to support it.

3 Sascha D. Meinrath & Victor W. Pickard, *ibid*

Net Neutrality is a Must

by Joshua Breitbart
11.18.09 - 02:04 pm

For many of us, the diversity and abundance of information on the Internet has become part of our daily lives. We assume that we will always be able to view the websites of our choosing and even upload our own photos and videos onto the Internet. However, as teachers of radio journalism, we can't take net neutrality – the principle that prohibits discrimination of content and applications on the Internet – for granted. Our organization, People's Production House, includes lessons on net neutrality as part of our year-long courses in public schools because without it, our students could soon be making entertaining and informative radio pieces without the ability to share them online.

With last week's introduction of Resolution 712, the New York City Council has taken up this important issue. While we don't hear much about it in the news, the current debate over net neutrality will determine the future of how we communicate. Two companies alone – Verizon and AT&T – have spent over $20 million on federal lobbying this year trying to thwart The Internet Freedom Preservation Act of 2009, a bill in Congress that would enshrine net neutrality in law. Resolution 712, if the Council passes it, would endorse this bill.

Net neutrality was the law of the land until 2005 and it brought us many benefits. Skype is an Internet-based voice service that is extremely popular among the recent immigrants we teach who wish to keep in touch with family around the world. Skype competes with the voice services of cable companies like Optimum and Time Warner. Without net neutrality, those companies could have kept Skype and similar products like Magic Jack from launching by blocking it or charging the companies exorbitant fees that would be passed on to users.

Opponents of net neutrality point to the existing variety of online voice services as evidence that the system works. They call net neutrality a "solution in search of a problem," but the problem is staring anyone who owns an Internet-enabled mobile phone right in the face. As it is now, most cellular phone companies – who have so far been exempt from net neutrality – block Skype from operating on their networks so people are forced to use their minutes for calls rather than their data connections.

This is particularly harmful to poor people, people of color, and seniors who are all more likely to have a mobile phone than a broadband-enabled personal computer or laptop. While laptop users can use whatever chat or voice service they want – thanks, so far, to net neutrality – mobile phone users can only access the parts of the Internet that their service providers approve. For international calls they still have to rely on expensive phone company connections or unreliable pre-paid phone cards. We need to extend net neutrality protections to wireless networks, not allow these kinds of discriminatory practices to spread, especially not now that the Bloomberg administration is finally taking action to close the digital divide in our city with its new NYC Connected Communities initiative.

Some companies say they need to be able to block unreasonable use of their networks. Then why, in 2007, when cable television and Internet service behemoth Comcast was found to be blocking a service called Bit Torrent that is popular for downloading movies, did they at first try to deny it? The Federal Communications Commission penalized the company, but Comcast is challenging the FCC's authority in court – suing for its right to block our access to video services like Bit Torrent or voice services like Skype. Now that Comcast is seeking to purchase NBC Universal, it will have even more reason to block competitors' content traveling over their wires.

For community journalists like the immigrants, low-wage workers, and public school students that we teach at People's Production House, this is a scary thought. The NBC corporation has been broadcasting its content since 1926, while our trainees are just now finding the power of distributing their own media through the Internet. They're finding new ways of engaging in civic life, new job skills, and a new sense of community, locally and globally. Without net neutrality, Comcast and other corporate giants could take that power away.

People's Production House, along with New Immigrant Community Empowerment, Picture the Homeless, and many other local community organizations are endorsing the City Council resolution. There will be a hearing on Resolution 712 in City Hall on Friday, November 20, 2009 at 10:00 a.m. To contact your Council Member and show your support, call 311.

Joshua Breitbart is the Policy Director for People's Production House.

<http://haitiantimes.com/printer_friendly/4539705>

blip.tv

405 Broome St., 5th Floor
New York NY 10013
http://www.blip.tv

November 20th, 2009

NET NEUTRALITY TESTIMONY

Justin Day – CTO, blip.tv

I want to thank the Council for allowing me the opportunity to address Resolution 712-A.

I am a co-founder and the CTO of a growing Internet-based digital media business focused on hosting and distributing independent web shows. It is essential to our business to deliver our partners' content to viewers at as low of a cost basis as possible. Large players like Google already enjoy significant cost benefits due to their volume. Bandwidth accounts for nearly half of our overall expenses, including employees. Adding an additional cost for last mile delivery could effectively destroy our margins, and at the least introduce uncertainty that would prevent us from modeling out any potential for future profitability.

Had we started this business under the current threat of these uncertain times we may have chosen to focus on international markets, or to not start at all. Instead we are based in New York City and are hiring. We at 19 employees now and expect to be at 60 by the end of 2011. A large part of ability to scale is based on our continued equal access to the edge of the Internet. I urge your support for this important resolution.

Thank you for your attention to this important issue, and to your commitment to health of the Internet as a whole.

FOR THE RECORD

Manhattan Neighborhood Network

Testimony of Dan Coughlin, Executive Director, Manhattan Neighborhood Network (MNN) before the NYC Council Committee on Technology in Government regarding Network Neutrality, Nov. 20, 2009

My name is Dan Coughlin. I am the Executive Director of Manhattan Neighborhood Network, the Cable Public Access Center serving the Borough of Manhattan.

Founded in 1992, the mission of Manhattan Neighborhood Network (MNN) is to ensure the ability of Manhattan residents to exercise their First Amendment rights through the medium of cable television. MNN cablecasts thousands of hours of local programming on four Public Access channels and provides free access to video production equipment, media training services and New Media technologies to Manhattan residents and community groups.

MNN emphasizes creating diversity in the media landscape and has developed specific outreach and training programs to bring non-traditional and underserved communities to new media technology.

On behalf of the entire MNN community, I'd like to commend the City Council Committee on Technology in Government for its efforts in supporting nondiscriminatory access to communications technology, services and information. Open, public access is vitally important for democracy and education in the digital age. It is equally crucial to move swiftly and decisively to protect open access to the Internet.

MNN is proud to add our name to the list of community groups that are urging the City Council to pass Resolution 712, calling on Congress to codify strong network neutrality principles in order to ensure that the Internet will continue to foster an information commons accessible on an open, equitable and non-discriminatory basis to all.

On behalf of the staff, board and community producers MNN serves I want to thank you for your demonstrated commitment to open and nondiscriminatory access to communication.

TESTIMONY REGARDING NETWORK NEUTRALITY
BEFORE THE NEW YORK CITY COUNCIL'S COMMITTEE ON TECHNOLOGY IN GOVERNMENT

By Charles M. Davidson, Director
The Advanced Communications Law & Policy Institute
at New York Law School
LL.M (Trade Regulation), New York University
M.I.A. (International Business), Columbia University
J.D., B.A., University of Florida

November 20, 2009

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I. INTRODUCTION

Thank you, Madame Chairman, for allowing me to testify here today. I am the Director of the Advanced Communications Law & Policy Institute (ACLP) at New York Law School. The ACLP is an interdisciplinary public policy program that focuses on analyzing key regulatory issues in the advanced communications arena in order to help facilitate the development of sound public policies that benefit all consumers. Immediately prior, I served as a Commissioner on the Florida Public Service Commission, the agency with regulatory jurisdiction over Florida's telephone, electric, natural gas, and water utilities.

Over the past year, the ACLP has focused on the issue of broadband from a variety of vantages. Since broadband is already available to "most of us,"[1] our inquiries have honed in on the issue of broadband adoption, in particular the dynamics of broadband adoption as it pertains to specific user groups (e.g., senior citizens[2] and people with disabilities[3]) and to discrete sectors of the economy (e.g., healthcare,[4] energy, education, and government). In October 2009, the ACLP submitted a comprehensive report to the Federal Communications Commission (FCC) that identified the existence of over 60 barriers to broadband adoption across these six user groups and sectors of the economy.[5] *The primary conclusion of that report, and each of the ACLP's other broadband inquiries, is that policymakers and regulators should focus on policies to spur broadband adoption so that all users have the opportunity to participate in our emerging digital society.*[6] Recent ACLP inquiries have also identified myriad ways that local officials can raise awareness of the beneficial impacts of broadband adoption, support innovative training and education programs that work with non-broadband adopters, and otherwise provide a clear value proposition for using broadband.[7] The City Council is best positioned to enhance adoption and

effective utilization of broadband among residents, businesses, and institutions in New York City.

My comments today will focus on the positive impacts of broadband adoption and the importance of implementing policies and approaches that seek to bolster utilization of this technology. In particular, my comments will make the following points:

1. The true value of broadband – measured from both an economic and social-welfare perspective – can only be realized if the adoption rate is maximized. Thus, officials at all levels of government should focus on bolstering utilization of this technology among under-adopting segments of the population.
2. Broadband is emerging as a critical medium for the delivery of innovative new services in a number of sectors, including the healthcare and energy arenas. The imposition of regulations that would limit the ability of innovators to experiment with the deployment of cutting-edge tools and applications should be resisted at this point in time.
3. The mobility and ubiquity of wireless broadband devices is a boon to technology and public policy innovators in many sectors of the economy (e.g., public safety and education). However, the unique nature of wireless broadband networks militates against the implementation of regulations that would impair network management.

The broadband sector is at a critical turning point in its evolution. Demand for innovative services and content continues to increase as broadband is further integrated into additional sectors of the economy. However, a significant number of potential users remain offline for a

wide variety of reasons. The key question for elected officials, especially those at the local and state levels, is how do we close the gap between adopters and non-adopters without foreclosing continued innovation? My testimony concludes by articulating a set of recommendations for enhancing the role of local elected officials in the broadband context. There are many opportunities for helping bring broadband to under-adopting constituents. It is respectfully submitted that proceedings focused on issues like network neutrality[8] distract from the positive aspects of broadband deployment and adoption, and divide rather than unite stakeholders.

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II. BROADBAND IN THE UNITED STATES: AN ANALYSIS OF ITS IMPACTS ON INDIVIDUAL USERS & A DISCUSSION OF WHY ADOPTION MATTERS

Broadband is widely available in the United States. The FCC recently reported that 100 percent of the population resides in 100 percent of zip codes with at least one broadband subscriber.[9] In addition, the FCC has also found that only four percent of consumers cited lack of access to a broadband connection in their immediate area as a reason for not adopting the service.[10] Moreover, over 90 percent of zip codes have four or more broadband providers in them.[11] However, despite such robust availability and widespread competition for subscribers, a significant number of people have yet to adopt broadband. As such, elected officials should focus on implementing policies to spur adoption and effective utilization of broadband across all user groups, especially those that, for whatever reason, remain largely offline.

Section A assesses why broadband adoption matters. In particular, this section focuses on: the economic impacts of increasing subscribership and the importance of adoption on two specific under-adopting demographic groups – senior citizens and people with disabilities.

Section B analyzes major barriers to and gaps in broadband adoption across demographic groups. Despite a general upward trend in broadband adoption across the general population, more than half of certain user groups remain unconnected to broadband. Under-adopting groups face a largely unique set of barriers to further broadband adoption. As a result, a one-size-fits-all policy will not be adequate for spurring additional demand and adoption of broadband.

A. Why Broadband Adoption Matters

Increased adoption and usage of broadband will facilitate a number of short- and long-term benefits. Indeed, a growing number of studies have found actual and potential cost-savings, economic opportunities, and other life-enhancing benefits associated with robust broadband adoption and utilization among the general population and within specific demographic groups.[12] This section provides three examples of the depth and scope of these impacts.

1. *The Economic Impacts of Increasing Broadband Subscribership*

Wide availability and robust adoption of broadband has positive impacts on employment, small business creation, and productivity. Studies from as early as 2001, when less than 13 million broadband lines were in service,[13] estimated that annual consumer welfare gains enabled by broadband could exceed $400 billion.[14] More recent studies have focused more specifically on discrete economic impacts of broadband adoption and usage. For example, a study from 2005 found that "communities in which mass-market broadband was available...experienced more rapid growth in employment, the number of businesses overall, and businesses in IT-intensive sectors."[15] Another study found that a seven percentage point increase in broadband adoption "could result in $92 billion through an additional 2.4 million jobs per year created, $662 million saved per year in reduced healthcare costs...and $134 billion per year in total direct economic impact of accelerating broadband across the United States."[16] In 2009, LECG estimated that the

"addition of ten more broadband lines per 100 individuals across the United States (30 million new broadband lines) would raise U.S. GDP by over $110 billion."[17]

Increased usage of wireless broadband is also projected to have increasingly positive and discernible impacts on U.S. GDP. One report estimates that "by 2016, the value of the combined mobile wireless voice and broadband productivity gains to the U.S. economy [is estimated to be] $427 billion per year."[18] Another recent study estimated that "new wireless broadband investments of $17.4 billion will, within twenty-four months of making this additional investment, increase GDP by 0.9% to 1.3%, which translates into dollar terms to $126.3 billion to $184.1 billion, and will result in an increase of between 4.5 million and 6.3 million jobs."[19] In addition, wireless broadband is being used as a key delivery medium for cutting-edge innovations in the healthcare, energy, public safety, and education arenas (see below for further discussion).

2. *The Impacts of Broadband on Senior Citizens*

Broadband has the ability to radically transform the lives of the more than 37 million people over the age of 65 currently living in the United States.[20] For example, broadband has the ability to:

- *Stimulate brain functions and sharpen mental acuity.* With over 60 percent of seniors worrying about "staying sharp" as they age, a number of broadband-enabled tools and games have been developed to stimulate new brain functions and sharpen mental acuity.[21]
- *Facilitate more meaningful communication with family and friends.* Studies have found that seniors who master computer skills appear to have fewer depressive symptoms than those who remain technologically unconnected[22] and that increased integration through social support services can protect against some mortality risks and lead to better mental health.[23]
- *Enable a number of employment opportunities.* According to AARP, 69 percent of baby boomers and seniors are willing and able to work past retirement.[24] Broadband-enabled options like telecommuting provide seniors with employment opportunities.

- *Provide a number of cost-savings.* Broadband allows for easy comparison shopping from home on a wide array of goods, including prescription drugs, which are often cheaper online.[25] These savings alone could offset the monthly subscription price for broadband, which is essential for the many senior citizens who live on a fixed income.
- *Allow seniors to age at home for longer.* Seniors use broadband connections to look up health information and to enable a growing range of in-home telemedicine services. These include in-home monitoring systems that provide real-time tracking of vital signs and other key metrics. By 2012 it is expected that over 3 million seniors will be using these types of systems.[26] The cost-savings flowing from these types of services have the potential to be enormous (see below).

The senior population is expected to double by 2050.[27] Currently, over 60 percent of healthcare spending is spent on seniors.[28] By one estimate, among people turning 65 today, 69 percent will require some form of long-term care.[29] These trends, along with the coming wave of baby boomer retirees, support the need for a new senior care model, one that empowers older adults to live more independently. Broadband is a critical tool in helping to shift this paradigm since it has proven to improve the overall quality of life for older adults. As such, it is essential that efforts focus on spurring broadband adoption among this segment of the population.

3. *The Impacts of Broadband on People with Disabilities*

There are currently over 50 million people with disabilities in the United States.[30] Broadband is an interactive tool that enables a universe of useful services and applications for people with disabilities, including:

- *Enhanced communication capability.* Broadband provides a text- and video-based medium that supports viable and affordable alternatives to traditional speech-based communication for people with an array of disabilities.
- *Access to a wide array of educational opportunities.* On average, people with disabilities have completed less schooling than the general population.[31] Broadband enables an array of distance learning programs, including online universities and other virtual classrooms.
- *The ability to pursue a variety of employment opportunities.* The unemployment rate among people with disabilities is significantly higher than that of the general population.[32] Broadband enhances the job search process

by, among other things, providing access to disability-specific job sites. In addition, people with disabilities can use broadband to enable a number of telecommuting options and to launch a business from home. This is critical since, over the last several decades, evidence suggests that people with disabilities "have a higher rate of self-employment and small business experience than people without disabilities."[33]

- *Economy-wide gains.* According to one estimate, a one percentage point increase in the employment rate of people with disabilities would result in an increase of over $11 billion in total economic output between 2010 and 2030.[34]
- *In-home healthcare tools and services that can save money and provide convenient treatments.* Broadband is being used by people with disabilities to access critical health information and to enable in-home telemedicine tools that are proving to be effective and cost-efficient.

Broadband provides people with disabilities the opportunity to use an array of technologies, services, and applications that enable real social, economic, and health-related gains. As such, it is essential that broadband policies include a robust set of demand stimulation and adoption mechanisms in order to increase the number of people with disabilities using broadband.

B. Barriers to & Gaps in Broadband Adoption

Adoption of broadband in the United States continues to increase each year. According to a recent report by the Pew Internet & American Life project (Pew), 63 percent of homes had adopted broadband by April 2009, up from 55 percent in April 2008 and 42 percent in March 2006.[35] Home adoption increased across every major demographic group between 2008 and 2009, and over the last several years there has been a general upward trend in adoption across all demographic groups.[36] However, a closer look at adoption data reveals several worrying trends.

First, there is a lack of relevance of broadband among many under-adopting demographic groups. In other words, non-adopters perceive a lack of a clear and compelling value proposition for adopting and using broadband. Indeed, Pew has found that half of non-broadband adopters "question the relevance of connecting to the Internet – either at all or with high-speed at

home."[37] Some have suggested that a lack of relevant online content could explain a perceived lack of value of using broadband among some demographic groups. For example, one study has suggested that enhancing online content targeted at the African Americans could spur further adoption of broadband among this segment of the population.[38]

Second, there appears to be a positive correlation between income and broadband adoption. Pew reports that adoption rates increase with higher incomes levels: households with incomes over $100,000 per year have an 88 percent adoption rate, compared to 82 percent for those earning between $75,000 and $100,000 per year and 80 percent for households reporting income of between $50,000 and $75,000 per year.[39] The adoption rate for those earning less than $20,000 per year is under 40 percent.[40]

The relationship between income levels, non-adoption, and the price of broadband, however, is less clear. Only 19 percent of non-broadband adopters cite the price of the service as the primary reason for not subscribing to broadband.[41] Yet affordability of accessing broadband – which includes more than the price of broadband service – is a barrier to broadband adoption for certain demographic groups (e.g., seniors who live on fixed incomes and people with disabilities who require an assistive technology to use a computer or broadband connection[42]) even though monthly subscription prices have stayed flat, on average, over the last several years.[43] Affordability is a relative term and varies from group to group and person to person. *Some may find broadband affordable at any price, whereas someone who lives on a fixed income may find broadband unaffordable at most prices.* Data suggests, however, that the actual price of the broadband connection standing along does not have major influence over adoption decisions.

Third, there is a wide adoption gap between older users and younger users. Indeed, only 30 percent of adults over the age of 65 have adopted broadband, compared to 77 percent of those

aged 18-29.[44] Moreover, there is a "gray gap" between younger seniors and older seniors.[45] Indeed, one study found that 58 percent of people age 55-59 have home broadband; 48 percent of those between age 60-64, 42 percent of those age 65-69, and 31 percent of those age 70-75 have adopted broadband, while 16 percent of those over 76 have home broadband.[46] Within the senior population, an array of factors influences adoption decisions.[47]

Fourth, minority populations are less likely to have adopted broadband than whites. For example, less than half – 46 percent – of African American households had adopted broadband by 2009, compared to 65 percent of white households.[48] African Americans are more likely than other demographic groups to cite lack of relevance as a primary reason for not adopting broadband.[49] However, African Americans are the most avid users of wireless Internet service, often accessed on mobile phones.[50]

Fifth, data supports a "clear correlation between education and [broadband] adoption."[51] Thirty percent of people with less than a high school have adopted broadband, whereas 83 percent of those with a college degree have adopted it.[52] This relationship is evident in the disabilities community. As a group, people with disabilities have completed less education than people without disabilities.[53] The broadband adoption rate among this segment of the population was estimated to be 24 percent in 2008.[54] In addition to influencing income levels, less educational attainment oftentimes has a negative impact on exposure to broadband and its positive impacts.[55]

Finally, a wide range of data indicates that each demographic segment faces many unique barriers to broadband adoption, which, in most cases, has resulted in low adoption rates.[56] For example, among senior citizens, lack of training to effectively use a broadband connection, along with a low computer ownership rate and fears about online security, are major barriers to

broadband adoption.[57] Affordability of accessing broadband (e.g., costs associated with purchasing a computer, necessary assistive technologies, and a broadband connection) is a major concern among people with disabilities,[58] but a widespread negative perception regarding the accessibility of broadband is oftentimes the primary barrier to adoption within this segment of the population.[59]

The dynamics associated with broadband adoption are multiple and oftentimes specific to a user group. As a result, elected officials should develop policies that address the particular needs of discrete demographic groups in order to enhance the adoption rate across the entire population. Focusing on issues like network neutrality at a time when more than half of certain user groups remain offline risks shifting limited resources and the public's focus away from non-adopters and toward esoteric policy issues that typically divide rather than unite stakeholders in the broadband market.

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III. WHERE BROADBAND IS TAKING US & HOW WE GET THERE

Among broadband adopters, demand for more robust, interactive, and bandwidth-intensive applications continues to increase at an exponential rate. Service providers, innovators, and all stakeholders along the broadband "value chain"[60] are investing in the development and deployment of advanced services to satisfy individual and organizational or institutional customers. Thus, consumer demand is largely shaping the trajectory of the broadband market.

Innovators in many sectors of the economy are responding to consumer preferences for broadband-enabled technologies by integrating broadband into their business models in order to meet demand for interactive, real-time services. In particular, the innovations being developed and deployed in the healthcare and energy sectors are illustrative of how many sectors are

increasingly using broadband to deliver life-enhancing and potentially lifesaving tools and applications.

However, many of these services are still in the experimental or pilot stages of development. While the early results of these next-generation broadband services have been extremely promising and have resulted in discernible cost-savings and welfare gains, wide-scale deployments remain on the horizon. In the meantime, ongoing innovations, pilot initiatives, and new technologies will allow innovators at the network's edge and at the network's core to develop protocols and management techniques that allow for the reliable and fast delivery of critical, time-sensitive applications like real-time health monitoring systems. Moreover, consumer demand will continue to shape these applications and may result in a preference for the prioritized and guaranteed delivery of certain types of services.[61] As such, innovators along the broadband value chain require as much latitude as possible to experiment and tinker with business models and network management techniques in order to provide consumers with the services that they demand. Thus, policies like network neutrality, which could hamstring innovation by restricting the scope of experimentation among certain service providers (e.g., network owners that wish to manage new types of traffic flowing over their infrastructure), should be avoided at this point in the evolution of the broadband market.

This section first examines how broadband is being used to facilitate cutting-edge innovation in the healthcare and energy arenas. These sectors are rapidly incorporating broadband into a number of key innovations that could, in the long-term, enable enormous consumer and economy-wide gains. This section concludes with observations regarding the need for continued flexibility in the design of network management protocols as consumer demand

evolves and an assessment of the viability of a collaborative approach to devising such a flexible standard.

A. The Impacts of Broadband on Healthcare

Broadband is playing an increasingly vital role in healthcare reform by enabling a universe of telemedicine services[62] that, in turn, provide a number of life-enhancing, and potentially lifesaving, benefits. Among other benefits, broadband-enabled telemedicine and health information technology services (e.g., electronic health records or EHRs) enable enhanced medical services for use in rural parts of the country, streamline the administration of healthcare, enable a wide array of cost savings, and empower individuals to have more control over medical decisions.[63] In sum, broadband-enabled telemedicine is poised to shift the traditional healthcare paradigm towards more individualized care by empowering patients to make more informed decisions and to receive targeted medical care in their homes.[64]

For patients, broadband-enabled telemedicine facilitates a number of positive impacts. These include:

- *Rural healthcare access.* Telemedicine allows patients who live in remote parts of the country or who are physically unable to travel long distances to receive quality healthcare, often via real-time broadband-enabled services like videoconferencing.[65]
- *Remote monitoring.* This encompasses a wide range of tools and services, including the use of sensors to record movements and the use of wireless devices to monitor vital signs and symptoms (e.g., glucose levels[66]) and the use of cameras and software to remotely monitor several intensive care patients at once.[67] A recent study estimated that "a full embrace of remote monitoring alone could reduce healthcare expenditures by a net of $197 billion (in constant 2008 dollars) over the next 25 years with the adoption of policies that reduce barriers and accelerate the use of remote monitoring technologies."[68]
- *In-home care.* A recent trial involving patients with various heart-related ailments estimated that broadband-enabled real-time video consultations could replace upwards of 45 percent of in-person visits regarding heart-related matters.[69]

- *Increased access to specialists,* which allows for more efficient diagnosis and treatment.[70] Leveraging the expertise and experience of a specialist often leads to more successful and effective treatments.[71]
- *Early disease detection.* In-home monitoring systems are being tested to detect the early onset of cognitive diseases like Alzheimer's.[72] Treating these types of diseases "costs the United States more than $148 billion annually in Medicaid and Medicare services and in indirect costs to businesses that employ [Alzheimer's] and dementia caregivers."[73] Early "interventions that could delay the onset of Alzheimer's disease by as little as one year would reduce prevalence of the disease by 12 million fewer cases in 2050."[74]

For healthcare providers, broadband is being used as a platform to enable a variety of advanced medical tools that enhance care and streamline operations. Examples include:

- *Outsourcing critical medical data to specialists for diagnoses.* Over the past few years increasing amounts of radiological data have been outsourced to doctors in India for review and diagnosis.[75] While this and other types of "outsourced" medicine have been somewhat controversial,[76] these efforts ultimately decrease costs for patients and doctors in the United States.[77]
- *Reduce the number of physicians needed in rural areas.* Broadband helps to make up for a dearth of physicians who practice in rural areas. Indeed, a 2005 study found that only three percent of medical students expressed a desire to work in rural areas.[78]
- *Continuing medical education.* Broadband enables chat groups, videoconferencing, and Internet-based continuing education programs based in urban healthcare facilities for use by rural physicians. These types of programs allow rural doctors and patients to stay abreast of new developments in the field of medicine and telemedicine.
- *More efficiently managed patient data.* EHRs store an individual patient's medical history – test results, doctor recommendations, medications, etc. – in a digital form.[79] These and other health IT tools facilitate better communication among healthcare providers, which in turn allows doctors to provide their patients with more comprehensive care.[80]

Enhancing adoption and use of these services is essential to realizing the many benefits and cost-savings associated with telemedicine tools. Effective utilization of telemedicine for in-home care has the potential to save millions, if not billions, of dollars each year in healthcare costs. In 2009, a U.S. Veterans Affairs in-home telehealth pilot reported a 19 percent decrease in hospitalizations, a 25 percent decrease in bed days of care, and a 27 percent decline in 4-year

diabetes mortality rate.[81] The decrease in hospitalizations alone totals $2.2 billion per year in cost savings.[82] Moreover, broadband-enabled telemedicine could replace in-person consultations,[83] eliminate unnecessary transfers[84]and increase prescription accuracy.[85] Studies have also estimated that robust utilization of EHR systems could lead to annual cost savings of between $77 billion[86] and $80 billion.[87]

B. The Impacts of Broadband on the Energy Sector

In addition to having the potential to transform the U.S. healthcare paradigm, broadband is increasingly essential to energy reform efforts at the state and federal levels. Indeed, the ability of broadband to transmit data in real-time provides energy companies with a number of ways for integrating this technology into various aspects of the energy business. Two examples are illustrative of this trend.

First, broadband is being used to modernize the electric grid by enabling "smart" technologies that provide energy providers and consumers with real-time consumption information. A wide-scale "smart grid" will have a number of impacts on the energy sector. These include:

- *More efficient energy distribution.* According to the U.S. Department of Energy, "electricity losses in the transmission and distribution systems exceed 10 percent of total energy generated."[88] These losses cost rate payers hundreds of millions of dollars per year; reducing them via a smart grid could result in better energy efficiency and cost savings.[89]
- *Lower carbon emissions.* The U.S. Department of Energy estimates that robust use of the smart grid could equate to eliminating fuel and greenhouse gas emissions from 53 million cars.[90] In addition, the FCC has estimated that use of the smart grid may save between 60MM and 480MM tons of carbon emissions per year, while annually creating $6 billion to $40 billion in value.[91]
- *More diverse fuel supply.* The smart grid will enable the incorporation of key renewable energy fuel sources – e.g., wind and solar – that are also intermittent in nature.[92] This will boost the energy supply and cut carbon emissions.[93] According to one study, "integrating wind or solar power into the grid at scale – at levels higher than 20 percent – will require advanced energy management techniques and approaches at the grid operator level. The Smart

Grid's ability to dynamically manage all sources of power on the grid means that more distributed generation can be integrated within it."[94]

Second, households and businesses are using an array of broadband-enabled energy efficiency tools to decrease consumption, limit carbon emissions, and save money. In combination with other "holistic" approaches "executed at scale," widespread and coordinated energy efficiency programs, which would include broadband-enabled smart grid services and devices, could result in over $1.2 trillion in gross energy savings thru 2020.[95] This approach is expected to "reduce end-use energy consumption in 2020 by 9.1 quadrillion BTUs, roughly 23 percent of projected demand, potentially abating 1.1 gigatons of greenhouse gases annually."[96] Specific examples of these types of tools include:

- *Demand response programs.* The constant flow of real-time usage data, and a consumer's ability to access that data via an online portal, will allow the customer to alter usage patterns and lower their bills via responsive pricing programs.[97] FERC estimates that the potential reduction in consumption due to demand-response programs is approximately 41,000 MW per year.[98]
- *Smart meters.* These tools relay transmission and usage information in real-time to the consumer and provider, allowing for instantaneous adjustments to transmission and usage patterns.[99] Eventually, smart meters will allow customers to "set temperature preferences for their thermostats…or opt in or out of programs that let them use cleaner energy sources, such as solar or wind power."[100]
- *Smart buildings.* Buildings contribute 43 percent of the carbon emissions in the United States.[101] The smart grid could allow buildings to be fitted with technologies that allow internal systems (e.g., heating and cooling) to seamlessly communicate with the electric grid.[102]
- *Telecommuting.* According to one study, "[e]ach Internet telecommuter saves about… 3500 kilowatt hours a year."[103] Another study has found that "[t]elecommuting will reduce greenhouse gas emissions by 247.7 million tons due to less driving, 28.1 million tons due to reduced office construction, and 312.4 million tons because of energy saved by businesses."[104]

Some have estimated that "better use of this sort of real-time information across the entire electrical grid could allow at least a 20 percent improvement in energy efficiency in the United States."[105] With energy demand expected to increase by 30 percent by 2030, and with electricity

prices projected to increase by 50 percent over the next several years, widespread adoption and use of smart grid-enabled consumer tools is critical to more efficient energy distribution and more affordable consumption for both individual customers and large institutions.[106]

C. Conclusions

Many of the innovative broadband-enabled applications and services currently being developed in numerous sectors of the economy are in their nascent stages. Restricting the ability to experiment with network management protocols or other such approaches that are critical to ensuring the reliable delivery of time-sensitive services (e.g., real-time remote healthcare monitoring of vital signs) could slow or halt the many gains described above.

The FCC, however, recently initiated a comprehensive rulemaking[107] to understand broadband network dynamics and to craft rules that seek to preserve the fundamental attributes of the Internet, namely openness and modularity.[108] The result of this process will hopefully include a robust record of observations and data by network engineers, network managers, academics, and other experts on the efficacy of implementing network neutrality rules. However, in lieu of formal rules, alternative approaches should be considered.

One approach that might be especially viable at a time when the broadband market is continuing to evolve is a collaborative model that brings together stakeholders from across the broadband value chain to monitor the maturation of the network and devise a flexible framework for ensuring that consumers receive the content that they demand in the ways that they are demanding it. For example, in-home telemedicine services like real-time monitoring of vital signs may become extremely popular among all demographic groups. Consumers may demand that these services, which could enable emergency alerts if needed, be given priority over other,

less critical services (e.g., downloading a movie). A collaborative approach could result in the requisite flexibility that innovators need at this point in the evolution of the broadband market.

Moreover, such a collaborative approach would follow the spirit of the development of the Internet. Indeed, this collaborative *esprit de corps* fostered a creative environment that led to some of the most basic, and yet most popular, protocols upon which the Internet has been built. These include the development of: the Transmission Control Protocol (TCP) and Internet Protocol (IP), basic tools that are used in tandem to transfer packets of data over the Internet;[109] the Simple Mail Transfer Protocol (SMTP), which was created to harmonize a number of disparate electronic mail protocols and which gave rise to what we now know as email;[110] the File Transfer Protocol (FTP), which facilitated the most efficient transfer of files among users;[111] and, the World Wide Web (WWW), a set of protocols for displaying hyperlinked documents linked across the Internet and upon which modern websites are built.[112] *Each of these developments required the collaboration of a wide range of participants, including the network engineers designing the protocols, other engineers who validated and accepted the protocols, network companies that were increasingly using these protocols to do business, and end-users who had to interface with the protocols on a daily basis.* It is this sort of organic, voluntary cooperation among stakeholders in the Internet industry – from computer scientist all the way down to the average consumer – that has produced the modern Internet and spurred the enormous consumer welfare gains that have flowed from it.

This collaborative model continues to be successfully employed to address current questions regarding Internet design and maintenance, and has provided useful best practices for implementing similar notions in other segments of the advanced communications sector. Extending this approach to the broadband market could provide a viable alternative approach to

network neutrality and would support the further integration of broadband into additional sectors of the economy.

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IV. THE CRITICAL ROLE OF WIRELESS BROADBAND IN CONTINUED INNOVATION

Wireless broadband is quickly emerging as a vital platform for the delivery of services and applications to all user groups, including senior citizens, people with disabilities, and minority communities. In addition, wireless broadband is facilitating the development and deployment of key innovations in a variety of sectors, including healthcare, energy, public safety, and education, among many others.[113] However, unlike wired broadband, the deployment of wireless broadband is impacted by factors other than investment levels. The major distinguishing factor is that wireless broadband requires ample spectrum to be deployed on the scale needed to enable the services and benefits described below.[114]

Many stakeholders, including the FCC,[115] agree that additional swaths of spectrum are needed to support the robust types of services discussed herein. However, this is a "complex challenge" for a number of reasons[116] and, in the short-term, additional spectrum will likely be unavailable to innovators in the wireless space. Since the explosion in demand for and usage of wireless data has, in some cases, begun to strain existing network resources, wireless providers require as much latitude as possible to manage their spectrum resources in order to provide a reliable user experience.

This section provides an overview of the wireless broadband and how it is being used to deliver innovative new service in many sectors of the economy. In particular, this section provides examples of how wireless broadband is being used in the public safety, education,

healthcare, and energy spaces. The section then assesses the critical role of wireless network management at a time when additional spectrum resources are in short supply.

A. The Mobile Society: An Overview of the Current Wireless Broadband Market

The United States is fast becoming a society defined by its ability to be productive regardless of location. As a result, the concept of mobility has begun to inure itself into a growing segment of the population. This has been driven by the wide availability of robust networks and a range of wireless devices, pricing plans and add-on services, all of which are changing the way Americans live and work.[117] These trends have accelerated in recent years due to innovation across the entire wireless market – wireless carriers are investing billions to create more expansive and robust networks; handset makers are designing more advanced devices to accommodate more intensive data usage; and content developers are using new platforms for deploying a universe of add-on applications that are redefining the wireless market.

There are currently over 276 million wireless subscribers in the United States, which represents a penetration rate of 89 percent.[118] The number of subscribers increased by 40 percent between June 2005 and June 2009 while the number of wireless-only households nearly tripled.[119] Consumers are using more minutes on their wireless phones each month[120] and a rapidly increasing number of subscribers are using their handheld devices to participate in an array of non-voice activities. These include sending and receiving text messages, which remains the most widespread activity,[121] searching online,[122] purchasing goods and services via mobile phones,[123] and sending and receiving emails, among many others. Indeed, these types of data-based, as opposed to voice-based, activities have dramatically increased in popularity over the last few years.[124] As a result, data services and the revenues they generate have become a key component of business models for carriers. The market for mobile data service grew 30 percent

between 2008 and 2009 and continues to expand despite recent economic turbulence.[125] Cisco estimates that this market will grow rapidly over the next five years, driven in large part by greater demand for and use of an array of video-based applications.[126]

Innovators in a growing number of sectors are leveraging the mobility and reliability inherent in wireless broadband networks to develop cutting-edge solutions for use in an array of contexts. For example, wireless broadband helps emergency services, such as police and fire departments, communicate and act more efficiently. More and more police departments are using wireless broadband devices to improve response times and bolster their effectiveness. Wireless computing devices in emergency vehicles allow officers to search for information about a suspect, to load maps directing them to the location of an emergency call, and to receive real-time updates about criminal activities.[127] Municipalities are also exploring the feasibility and value of deploying proprietary wireless networks to facilitate these public safety gains.[128] New York City, for example, recently launched a next-generation wireless broadband network that supports high-speed data and video transmission for use by first responders.[129]

Wireless broadband technologies are also increasingly important to the primary, secondary, and continuing education of students across the United States. These technologies are being used to bring educational service to "eager learners wherever they may be."[130] One of the primary short-term uses of wireless broadband for educational purposes is the provision of distance learning services and applications to students in remote rural areas of the country. In many of these areas, wireless broadband will be a key enabler of distance learning services and Internet access, providing students with an opportunity to have similar resources that urban and suburban counterparts have. As the FCC has observed, broadband "can significantly improve the quality of education by providing students in rural America with the ability to do online research,

interact with their teachers and schools from home, and obtain college credit and college degrees, even though they are not physically on campus."[131] Online learning via a wireless or wired broadband connection also represents a new mode of learning that is a boon to all students.[132]

A recent pilot program in North Carolina involving ninth-grade students is illustrative of the role that wireless broadband can play in transforming the educational experience and enhancing individual achievement. The program – Project K-Nect[133] – used "smartphones with advanced mobile broadband technologies to deliver educational material to students...According to its project director, 75 percent of participating classes outperformed other cohorts in math subjects in the recently completed first phase of research. Students also displayed increases in average study time [and] significant gains in parental involvement" were reported.[134]

Wireless broadband is essential to innovations in a number of other industries, including the healthcare and energy sectors. For example, a key component of smart grid deployments will be wireless sensors that leverage mobile broadband networks to relay consumption and transmission information across the many miles of transmission infrastructures. Currently, many utilities are experimenting with using mobile networks to monitor transmission and usage and some have begun to experiment with using different spectrum bands for sending and receiving this data.[135] In the healthcare arena, hospitals and other healthcare providers are also increasingly using mobile phones to enhance communication[136] and to make more informed decisions at the point of care.[137]

B. Network Demand & Management in the Wireless Broadband Context

The innovations described in the previous section are driving demand for more robust and ubiquitous wireless broadband services and devices. To date, service providers have met this demand by investing in the deployment of advanced wireless network infrastructure, developing

an array of phones and service plans to meet individual needs,[138] encouraging the development and use of third-party applications on smartphones, efficiently using existing spectrum resources,[139] and otherwise fostering a vibrant wireless "ecosystem."

As a result of the wide availability and increasing affordability of wireless broadband service, mobile data usage continues to increase across all user groups and demographics. Indeed, Nielsen recently reported that mobile data usage increased 34 percent between 2008 and 2009.[140] Growth was observed across every age group, with adults over the age of 65 experiencing the largest growth rate.[141] Data usage among people with disabilities also continues to increase[142] and certain minority groups, particularly African-Americans and Hispanics, utilize mobile devices for Internet access much more frequently than other demographic groups.[143] Smartphone owners in particular are avid data users.[144] For example, AT&T has reported 5,000 percent growth in wireless data usage since the iPhone was released.[145] Overall, Cisco estimates that mobile data traffic will increase some 66 times by 2013.[146]

These upward trends in usage by individual subscribers, coupled with the increasing integration of wireless broadband into sectors like healthcare, energy, and education, among many others, undergird projections for the amount of spectrum that is needed to support more intensive uses and innovations. Indeed, several organizations have estimated that a large amount of spectrum needs to be made available to enable continued deployments of advanced networks. For example, in 2006, the International Telecommunications Union issued a report that called for a substantial amount of new spectrum to be made available to support new innovations and deployments.[147] Similarly, 3G Americas has observed that "with the projected increase in the use of mobile-broadband technologies, the amount of spectrum required by the next generation of wireless technology could be substantial."[148] CTIA – The Wireless Association considered these

various proposals and has called for the allocation of 800 MHz of spectrum in order to "meet rapidly increasing demand" for wireless services.[149]

Despite the high demand for spectrum by innovators, spectrum is in short supply. CTIA has estimated that wireless service providers currently "operate with just under 450 MHz of spectrum," which is much less than the spectrum available in other developed nations, and that only 40 MHz of spectrum is "in the pipeline" for use by network operators."[150] However, there is a growing appreciation among elected officials for the possibility of a spectrum shortage as the United States fully transitions to a society and economy defined by broadband-enabled transactions and services. Indeed, the FCC has acknowledged that even though the FCC has "authorized a 3-fold increase in commercial spectrum" over the last several years, "many anticipate a 30-fold increase in wireless traffic," which presages a potential "spectrum gap."[151]

In light of this "spectrum gap,"[152] wireless service providers require wide latitude to manage their networks lest traffic congestion lead to a slow-down or the temporary cessation of service. Indeed, the FCC has recognized the unique nature of wireless networks and is currently seeking comment on the extent to which network management regulations are appropriate in this context.[153] As the FCC undertakes its investigation of the need for network management and neutrality rules, it will likely become increasingly clear that wireless broadband networks are unique and operators require as much latitude as possible to manage this scarce and finite resource.[154]

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V. How Local Elected Officials Can Bolster Broadband Adoption

This section articulates a set of recommendations for those local elected officials who wish to ensure that their constituents are not left behind in the transition to a fully digital society.

Recommendation #1: *Undertake efforts to understand and appreciate the contours and dynamics associated with broadband demand and adoption.* Unlike assessing the state of broadband availability, gauging levels of demand and adoption is more challenging, especially within certain user groups (e.g., people with disabilities) and demographic groups (e.g., low-income users). Thus, local elected officials should endeavor to study the many policy and non-policy barriers and impediments that directly and indirectly broadband demand, adoption, and use by their constituents. These issues might include access to a computer, negative perceptions related to the usability of various computer and Internet technologies, and the lack of a clear value proposition being offered to user groups like senior citizens, people with disabilities, and healthcare providers. A growing literature on broadband adoption provides local elected officials with a useful starting place.[155] However, additional inquiries are likely needed to identify the specific needs and obstacles of local populations.

Recommendation #2: *Highlight the key role that existing programs play in stimulating demand for and spurring adoption of broadband.* Nonprofit groups and other programs play an invaluable role in raising awareness, providing access to affordable computers, training, tech support, and other critical components associated with broadband usage. Many of these programs offer tailored training services for a particular user group (e.g., senior citizens or people with disabilities). One-size-fits-all training programs may be effective in teaching the basics of effective computer and Internet usage to a majority of students but, given the different needs of user groups, some may be left behind. Thus, local groups that provide targeted services are of

enormous value in stimulating demand for and spurring adoption of broadband among those users who remain offline.

Recommendation #3: *Create mechanisms that support these local efforts.* The lifeline for many of these local organizations is public funding. While some local nonprofits like are able to attract private support, many programs rely entirely on public funding. Thus, dedicating a reliable stream of funding and creating competitive grant programs to support these efforts would allow current service providers to focus on providing training to seniors and encourage additional organizations to be developed and launched.

Recommendations #4: *Partner with local organizations to raise awareness of technology in general and broadband specifically.* For example, in New York City, City Councilmember Gale Brewer worked with Older Adults Technology Services to put on a "touch tank" for senior citizens. This event brought seniors together to experience new technologies, answer any questions, and allay any fears or intimidation they might have.[156] Several national organizations have also successfully conducted campaigns to raise awareness of broadband. For example, the Alliance for Public Technology has sponsored a "Broadband Changed my Life!" campaign that aggregates success stories that describe how people have benefited from using broadband.[157] Similarly, local, state and federal elected officials could tout the positive impacts of broadband on specific demographic groups by commissioning studies or holding hearings. U.S. Senator Herb Kohl, for example, has convened numerous hearings of the Senate's Special Committee on Aging and has called for the preparation of various reports on a wide array of senior issues.[158]

Recommendation #5: *Leverage existing resources in order to carefully tailor and target outreach efforts.* In 2005, the New York City Council passed a local law that called for the formation of a broadband advisory committee that was charged with examining the local

broadband market and deciding whether or not municipal action was needed.[159] Over the course of the last several years, the City Council has held public hearings in each of the city's five boroughs in order to gauge levels of broadband availability and use.[160] The City Council, led by the Committee on Technology in Government, could leverage this infrastructure and the information it has collected to date in order to target outreach and education efforts at segments of the population or parts of the city that have low broadband adoption rates.

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VI. CONCLUSION

Since more than half of certain demographic groups – senior citizens, people with disabilities, low-income households, and African Americans – remain unconnected to broadband, local elected officials should focus on bolstering adoption and effective utilization of this critical technology. Proceedings that focus on contentious or tangential issues do little to close the gap between the digital haves and have-nots. Thus, I respectfully urge the City Council to shift its focus away from theoretical and esoteric issues like network neutrality and back to circumstances on the ground. To a senior citizen or disabled person who has yet to adopt broadband, network neutrality does not matter. But what does matter a great deal is a "touch tank" or a City Council hearing on the importance of broadband to seniors[161] or other such events that raise awareness of the many great things about broadband. Going forward, I respectfully urge the City Council to continue down these more constructive paths.

ENDNOTES

[1] *In the Matter of a National Broadband Plan for Our Future, Notice of Inquiry*, at para. 5, FCC GN Docket No. 09-51 (rel. April 2009).

[2] *See* Charles M. Davidson & Michael J. Santorelli, *The Impact of Broadband on Senior Citizens*, A Report to the U.S. Chamber of Commerce (Dec. 2008), *available at* http://www.nyls.edu/user_files/1/3/4/30/83/BroadbandandSeniors.pdf ("*Broadband & Seniors*").

[3] *See* Charles M. Davidson & Michael J. Santorelli, *Broadband & People with Disabilities*, A Report to the U.S. Chamber of Commerce (forthcoming 2009).

[4] *See* Charles M. Davidson & Michael J. Santorelli, *The Impact of Broadband on Telemedicine*, A Report to the U.S Chamber of Commerce (April 2009), *available at* http://www.nyls.edu/user_files/1/3/4/30/83/BroadbandandTelemedicine.pdf ("*Broadband & Telemedicine*").

[5] *See* Charles M. Davidson & Michael J. Santorelli, *Barriers to Broadband Adoption*, A Report to the FCC (Oct. 2009), *available at* http://www.nyls.edu/user_files/1/3/4/30/83/ACLP%20Report%20to%20the%20FCC%20-%20Barriers%20to%20BB%20Adoption.pdf ("*Barriers to Broadband Adoption*").

[6] *Id.* at p. 1.

[7] *See, e.g., Broadband & Seniors* at p. 32-35 (highlighting how elected officials can raise awareness of broadband and new technologies, including a "touch tank" organized by New York City Councilmember Gale Brewer).

[8] *See* Res. No. 712-A, New York City Council, *available at* http://legistar.council.nyc.gov/LegislationDetail.aspx?ID=451196&GUID=31682574-4432-473F-B6BF-F5F13E57F507&Options=ID|Text|Attachments|Other|&Search=712.

[9] *See High-Speed Services for Internet Access: Status as of June 30, 2008,* at Table 18, FCC Wireline Competition Bureau Report (July 2009), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-292191A1.pdf ("*FCC Broadband Stats - July 2009*").

[10] *See FCC Broadband Taskforce Presentation,* at Slide 81, Sept. 29, 2009, Federal Communications Commission, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293742A1.pdf (citing a recent Pew study) ("*FCC Broadband Taskforce Presentation - Sept. 29, 2009*").

[11] *FCC Broadband Stats - July 2009* at Chart 12.

[12] For additional examples of the positive impacts of broadband on specific user groups, *see, e.g., Barriers to Broadband Adoption* (highlighting the impacts of broadband on senior citizens, people with disabilities, telemedicine, energy, education, and government).

[13] *See High-Speed Services for Internet Access: Status as of June 30, 2005*, at Table 10, FCC Wireline Competition Bureau Report (rel. April 2006), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-264744A1.pdf.

[14] *See* Robert W. Crandall & Charles L. Jackson, *The $500 Billion Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access*, at p. iv, Criterion Economics LLC (July 2001.

[15] See William A. Lehr, Carlos A. Osorio, Sharon E. Gillet & Marvin A. Sirbu, *Measuring the Economic Impact of Broadband Deployment*, at p. 3, A Report to the U.S. Dept. of Commerce, Economic Development Administration (2005), *available at* http://www.eda.gov/PDF/MITCMUBBImpactReport.pdf ("*Measuring Economic Impact of Broadband*").

[16] *See, e.g., The Economic Impact of Stimulating Broadband Nationally*, at p. 5, A Report from Connected Nation (rel. Feb. 21, 2008), *available at* http://connectednation.com/_documents/Connected_Nation_EIS_Study_Full_Report_02212008.pdf ("*Connected Nation Report*").

[17] *See Economic Impact of Broadband: An Empirical Study*, at p. 8-9, LECG (Feb. 2009), *available at* http://www.connectivityscorecard.org/images/uploads/media/Report_BroadbandStudy_LECG_March6.pdf.

[18] *See* Roger Entner, *The Increasingly Important Impact of Wireless Broadband Technology and Services on the U.S. Economy*, at p. 2, A Study for CTIA – The Wireless Association, *available at* http://files.ctia.org/pdf/Final_OvumEconomicImpact_Report_5_21_08.pdf.

[19] *See* Alan Pearce & Michael S. Pagano, *Accelerated Wireless Broadband Infrastructure Deployment: The Impact on GDP and Employment*, 18 Media L. & Pol'y 105, 105-106 (2009).

[20] *See A Statistical Profile of Older Americans 65+*, U.S. Department of Health and Human Services, Administration on Aging (June 2008), *available at* http://www.aoa.gov/press/prodsmats/fact/pdf/ss_stat_profile.pdf.

[21] *See Senior Citizens Most Concerned about Health; Get News from Doctor, Internet*, June 8, 2006, Senior Journal, *available at* http://seniorjournal.com/NEWS/SeniorStats/6-08-23-SeniorCitizensMost.htm.

[22] *See Senior Citizens who Master Computers Have Less Depression*, Aug. 18, 2005, Senior Journal, *available at* http://seniorjournal.com/NEWS/Aging/5-08-18MasterComputers.htm.

[23] *See generally* T.E. Seeman, *Social Ties and Health: The Benefits of Social Integration*, 6 Annals of Epidemiology 442-451 (1996).

[24] *See* AARP Policy Book, Ch. 10, Utilities: Telecommunications, Energy and Other Services, at p. 10-40, *available at* http://assets.aarp.org/www.aarp.org_/articles/legpolicy/10_utili07.pdf.

[25] In 2004 *Checkbook* magazine found vast price differences among prescription drugs within the same metropolitan areas and concluded that online retailers often offered lower prices for certain drugs. *See Prescription Drugs: Smart Shopping Yields Big Savings*, CONSUMER CHECKBOOK.ORG, *available at* http://www.checkbook.org/cgi-bin/free/drug.pdf.

[26] *See Senior Citizens to See High Tech Sensors in Homes, on Bodies to Monitor Health*, Dec. 6, 2007, Senior Journal, *available at* http://www.seniorjournal.com/NEWS/Features/2007/7-12-06-SenCit2See.htm.

[27] *See* Jeffrey S. Passel and D'Vera Cohn, *U.S. Population Projections: 2005-2050*, at p. 20, Pew Research Center (rel. Feb. 11, 2008), *available at* http://pewhispanic.org/files/reports/85.pdf.

[28] *See* Majd Alwan, Devon Wiley & Jeffrey Noble, *State of Technology in Aging Services,* at p. 1, Center for Aging Services Technology (Nov. 2007), *available at* http://www.agingtech.org/documents/bscf_state_technoloy_phase1.pdf.

[29] *See* Aging Services: The Facts, *General Facts*, American Association of Homes and Services for the Aging, *available at* http://www.aahsa.org/aging_services/default.asp.

[30] *See* Press Release, *Americans with Disabilities: July 26,* May29, 2007, U.S. Census Bureau, *available at* http://www.census.gov/Press-Release/www/releases/archives/facts_for_features_special_editions/010102.html.

[31] According to one study only 12.5 percent of people with disabilities between the ages of 21 and 64 had a bachelor's degree in 2007, compared to nearly 31 percent for people without a disability. *See 2007 Disability Status Report – U.S.*, at p. 42, Rehabilitation Research and Training Center on Disability Demographics and Statistics, Cornell University, *available at* http://www.ilr.cornell.edu/edi/disabilitystatistics/StatusReports/2007-PDF/2007-StatusReport_US.pdf?CFID=7676403&CFTOKEN=73912389&jsessionid=f030ad698d2ccb1a9bcc34517277762361b1 ("*2007 Disability Status Report*").

[32] The unemployment rate of people with disabilities reached 16.2 percent in September 2009, compared to 9.2 percent for people without disabilities. *See* Bureau of Labor Statistics (August-September 2009), *available at* http://www.bls.gov/cps/cpsdisability.htm.

[33] *See* U.S. Dept. of Labor, Office of Disability Employment Policy, Small Business and Self Employment for People with Disabilities, http://www.dol.gov/odep/programs/promotin.htm.

[34] *See* Robert E. Litan, *Great Expectations: Potential Economic Benefits to the Nation From Accelerated Broadband Deployment to Older Americans and Americans with Disabilities*, New Millennium Research Council (Dec. 2005), available at http://www.newmillenniumresearch.org/archive/Litan_FINAL_120805.pdf ("*Great Expectations*").

[35] *See* John Horrigan, *Home Broadband Adoption 2009*, Pew Internet & American Life Project, at p. 9-10 (June 2009), *available at* http://www.pewinternet.org/~/media//Files/Reports/2009/Home-Broadband-Adoption-2009.pdf ("*Home Broadband Adoption 2009*").

[36] *Id.* at p. 13-14.

[37] *Id.* at p. 8.

[38] *See Broadband Imperatives for African Americans: Policy Recommendations to Increase Digital Adoption for Minorities and Their Communities,* at p. 11, A Report from the National Black Caucus of State Legislators et al. (Sept. 2009), *available at* http://www.jointcenter.org/index.php/content/download/2638/17064/file/MTI_Broadband_Report_Print.pdf ("*Broadband Imperatives*").

[39] *Home Broadband Adoption* at p. 14.

[40] *Id.*

[41] *Id.* at p. 8.

[42] *Barriers to Broadband Adoption* at p. 26-27 (observing that "The multiple cost components for people with disabilities who wish to adopt broadband have had a discernible impact on broadband adoption. Individual components – e.g., a broadband subscription – may be affordable, but when combined with expensive ATs and the cost of purchasing a computer, broadband adoption becomes beyond the means of many people with disabilities.").

[43] *Home Broadband Adoption 2009* at p. 25.

[44] *Id.* at p. 13.

[45] *Broadband & Seniors* at p. 8

[46] *See* Sydney Jones, *Generations Online in 2009*, at p.5, Pew Internet & American Life Project (Jan. 2009), *available at* http://pewresearch.org/pubs/1093/generations-online ("*Generations Online in 2009*").

[47] *Barriers to Broadband Adoption* at p. 107-17 (highlighting several barriers to broadband adoption for seniors).

[48] *Home Broadband Adoption 2009* at p. 13.

[49] *Broadband Imperatives* at p. 4.

[50] *See* John Horrigan, *Wireless Internet Use*, at p. 4, Pew Internet & American Life Project (July 2009), *available at* http://www.pewinternet.org/~/media//Files/Reports/2009/Wireless-Internet-Use.pdf ("*Pew Wireless Study 2009*").

[51] *See* Rahul Gaitonde, *Clear Correlation Between Education and Adoption, Says FCC Consumer Research Director*, Oct. 20, 2009, BroadbandCensus.com, *available at* http://broadbandcensus.com/2009/10/clear-correlation-between-education-and-adoption-says-fcc-consumer-research-director/.

[52] *Home Broadband Adoption 2009* at p. 14.

[53] *2007 Disability Status Report – United States* at p. 42.

[54] *See Consumer Insights to America's Broadband Challenge*, at p. 5, Connected Nation (2008), *available at* www.nga.org/Files/pdf/0812broadbandchallenge.pdf.

[55] *Barriers to Broadband Adoption* at p. 25 (noting that lack of exposure to broadband in educational and work environments is a barrier to broadband adoption for people with disabilities).

[56] *Id.*

[57] *Id.* at p. 10-17.

[58] *Barriers to Broadband Adoption* at p. 26-27.

[59] *Id.* at p. 2.

[60] In the wireless context, the FCC defines the "value chain" as "the chain of individual, value-creating activities. This chain includes not only those activities performed by wireless communications service providers themselves,

but also those performed by all other entities, including providers of inputs and complements to wireless communications services." This term is applicable in all of the other segments of the broadband market. *See In the Matter of Fostering Innovation and Investment in the Wireless Communications Market*, at n. 2, GN Docket No. 09-157 (rel. August 27, 2009) ("*FCC Wireless Innovation NOI*").

[61] The FCC has recognized the nascent nature of these types of services and has asked for comments on crafting network management rules for them. *See In the Matter of Preserving the Open Internet*, at para. 151, GN Docket No. 09-191 (rel. (Oct. 22, 2009) (seeking comment on the network dynamics of "managed or specialized services" like telemedicine or smart grid applications) ("*FCC Net Neutrality NPRM*").

[62] "Telemedicine" refers to "the use of electronic communications and health information technology (HIT) to provide clinical services" for remote patients. *See* Issue Paper, *Telemedicine, Telehealth, and Health Information Technology*, at p. 3, American Telemedicine Association (May 2006), *available at* http://www.americantelemed.org/files/public/policy/HIT_Paper.pdf.

[63] *Broadband & Telemedicine.*

[64] *See, e.g.*, Eric Dishman, *Inventing Wellness Systems for Aging in Place*, Computer Magazine (May 2004); *Broadband & Telemedicine* at p. 3.

[65] *Broadband & Telemedicine* at p. 14.

[66] MedApps, for example, has released an FDA-approved product that allows for information gleaned from its glucose measuring to be sent via Bluetooth to a patient's cell phone and transmits the information to a central server in near real-time. *See MedApps D-PAL Remote Patient Monitoring System for Diabetes*, July 12, 2007, MedGadget.com, *available at* http://medgadget.com/archives/2007/07/medapps_dpal_remote_patient_monitoring_system_for_diabetes.html.

[67] *See* Laura Landro, *The Picture of Health*, Oct. 27, 2008, Wall St. J. (describing an electronic ICU [eICU] program that "uses two-way video cameras and software that tracks patients' vital signs and instantly registers any changes in lab test results or physical condition. That enables doctors in the command center to spot early warning signs that a patient is taking a turn for the worse, advise bedside staff on giving medications and treatments, and point out potential errors or oversights." Further, a recent study found that average cost savings flowing from eICU programs was $5,000 per case.).

[68] *See* Robert Litan, *Vital Signs via Broadband: Remote Health Monitoring Transmit Savings, Enhances Lives*, at p. 2, White Paper of Better Healthcare Together (Oct. 2008), *available at* http://betterhealthcaretogether.org/SitesResources/bhcty2/Resources/Documents/VITAL%20SIGNS%20via%20BROADBAND%20FINAL%20with%20FOREWORD%20and%20TITLE%20pp%2010%2022.pdf.

[69] *See* Mark Terry, *Three Modalities of Cardiovascular Telemedicine*, 14 J. Telemed. & e-Health 1031, 1032 (Dec. 2008) ("*Three Modalities*").

[70] *See* Stacie Huie, *Facilitating Telemedicine: Reconciling National Access with State Licensing Laws*, 18 Hastings Comm. & Ent. L.J. 377, 389 (1996).

[71] *Id.*

[72] The Oregon Center for Aging & Technology ("ORCAT") is one institution that has launched a pilot program that uses in-home wireless sensors to monitor cognitive decline among older adults. For more information, *see* ORCAT, Current Research, http://www.orcatech.org/research.php#etac.

[73] *See International Conference on Alzheimer's disease, Highlights of Research Findings*, at p. 1, Alzheimer's Association, *available at* http://www.alz.org/icad/downloads/2008_ICADhighlights.pdf.

[74] *See* Press Release, *Alzheimer's disease to Quadruple Worldwide by 2050*, June 10, 2007, Johns Hopkins University Bloomberg School of Public Health, *available at* http://www.jhsph.edu/publichealthnews/press_releases/2007/brookmeyer_alzheimers_2050.html (announcing a study by Ron Brookmeyer et al. entitled *Forecasting the Global Burden of Alzheimer's Disease*).

[75] *See, e.g.*, Andrew Pollack, *Who's Reading Your X-Ray?* Nov. 16, 2003, N.Y. TIMES.

[76] *See* Archie A. Alexander, III, *American Diagnostic Radiology Moves Offshore: Is This Field Riding the "Internet" Wave Into a Regulatory Abyss?* 20 J.L. & Health 199 (2007) (explaining the controversy surrounding outsourcing in general and arguing in favor of teleradiology as beneficial to patients and doctors.).

[77] *Barriers to Broadband Adoption* at p. 46-47.

[78] *See* Myrle Crosdale, *Admissions Process Aims to Boost Rural Doctors*, Feb. 7, 2005, American Medical Association AmedNews.com, *available at* http://www.ama-assn.org/amednews/2005/02/07/prsb0207.htm.

[79] *Broadband & Telemedicine* at p. 3.

[80] *See, e.g.,* Press Release, *National Survey of Radiologists Reveals Systemic Problems Hurting Industry and Patient Care,* Dec. 3, 2008, Compressus, *available at* http://www.compressus.com/publicwww4/PDF_Press%20Releases/FH%20Compressus%20Survey%20Release%20Final-120208.pdf (reporting the results of a survey that found, among things, that "Ninety-four percent [of surveyed radiologists] connected the inability of medical imaging systems to communicate with information systems of physicians and hospitals with missed or delayed diagnosis" and "[71] percent of radiologists consider this failure to share data with other physicians and hospitals as a growing crisis for the industry.")..

[81] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at slide 100 (citing: Chumbler NE et al, *Mortality risk for diabetes patients in care coordination, home-telehealth program,* Journal of Telemedicine and Telecare 2009:15:98-01; Bates DW et al, *Veteran senate hearings,* http://veterans.senate.gov.)

[82] *Id.*

[83] A recent study estimated that broadband-enabled real-time video consultations could replace upwards of 45% of in-person visits regarding heart-related matters. *Three Modalities* at p. 1032.

[84] One study estimates that telemedicine "could save the U.S. healthcare system $4.28 billion [annually] just from reducing transfers of patients from one location, such as a nursing home for medical exams at hospitals, physicians' offices, or other caregiver locations." *See* Alexander H. Vo, *The Telehealth Promise: Better Healthcare and Cost Savings for the 21st Century*, at p. 8, Univ. Texas Medical Branch, *available at* http://attcenter.utmb.edu/presentations/The%20Telehealth%20Promise-Better%20Health%20Care%20and%20Cost%20Savings%20for%20the%2021st%20Century.pdf.

[85] Computerized physician order entry could save up to $1.1 billion nationally through a 13% decline in duplicate tests. *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at slide 102.

[86] *See* Sharona Hoffman & Andy Podgurski, *Finding a Cure: The Case for Regulation and Oversight of Electronic Health Records Systems,* 22 Harv. J. L. & Tech. 104, 116 (2008) (citing Jan Walker et al., *The Value of Health Care Information Exchange and Interoperability*, 25 Health Affairs W5-10, W5-16 (2005)).

[87] *See* Richard Hillestad et al., *Can Electronic Medical Record Systems Transform Healthcare? Potential Health Benefits, Savings, and Costs*, at p. 1103, Health Affairs, Vol. 24, No. 5 (2005). It is estimated, however, that implementing EHRs across the entire U.S. healthcare system could cost upwards of $100 billion. *See* David Goldman, *Obama's Healthcare Challenge*, Jan. 12, 2008, CNN Money, *available at* http://money.cnn.com/2009/01/12/technology/stimulus_health_care/index.htm.

[88] *See National Transmission Grid Study* at p. 63, U.S. Department of Energy (May 2002), *available at* http://www.pi.energy.gov/documents/TransmissionGrid.pdf.

[89] *Barriers to Broadband Adoption* at p. 51.

[90] *See The Smart Grid: An Introduction,* at p. 7, Prepared for the U.S. Department of Energy by Litos Strategic Communication (2008), *available at* http://www.oe.energy.gov/DocumentsandMedia/DOE_SG_Book_Single_Pages.pdf ("*DOE Smart Grids*").

[91] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at Slide 108 (citing: Normalized from *The iGridProject,* The Brattle Group, July 2009; *Smart 2020: Enabling the Low Carbon Economy in the Information Age,* United States Report Addendum, GESI and BCG, Nov. 2008; *Power Delivery System of the Future: A Preliminary Estimate of Costs and Benefits*, EPRI, July 2004; *The Green Grid: Energy Savings and Carbon Emissions Reduced Enabled by a Smart Grid, EPRI,* Jun. 2008).

[92] *Barriers to Broadband Adoption* at p. 53.

[93] *See, e.g., Wiser Wires,* Oct. 8, 2009, The Economist (observing that "More intelligence in the grid would also help integrate renewable sources of electricity, such as solar panels or wind turbines. As things stand, the trouble is that their output, being hostage to the weather, is highly variable. A standard grid becomes hard to manage if too many of them are connected to it; supply and demand on electricity-transmission systems must always be in balance. A smart grid could turn on appliances should, for instance, the wind blow more strongly.").

[94] *DOE Smart Grids* (citing a study by the European Wind Energy Association).

[95] *See* Hannah Choi Granade et al., *Unlocking Energy Efficiency in the U.S. Economy*, at p. iii, McKinsey Global Energy and Materials, McKinsey & Co., *available at* http://www.mckinsey.com/clientservice/electricpowernaturalgas/downloads/US_energy_efficiency_full_report.pdf ("*McKinsey Energy Efficiency*").

[96] *Id.*

[97] *See, e.g., Primer on Demand-Side Management*, at p. 30-32, A Report to the World Bank (Feb. 2005), *available at* http://siteresources.worldbank.org/INTENERGY/Resources/PrimeronDemand-SideManagement.pdf (describing a real-time pricing pilot project in Chicago).

[98] *See Smart Grid System Report*, at p. 30, U.S. Dept. of Energy (July 2009), *available at* http://www.oe.energy.gov/DocumentsandMedia/SGSRMain_090707_lowres.pdf (citing a Dec. 2008 FERC staff report on advanced metering and demand response).

[99] *Barriers to Broadband Adoption* at p. 54.

[100] *See Building the smart grid*, June 4, 2009, The Economist, *available at* http://www.economist.com/sciencetechnology/tq/displaystory.cfm?STORY_ID=13725843.

[101] *See* Bracken Hendricks, *Wired for Progress: Building a National Clean-Energy Smart Grid, Version 1.0*, at p. 1, Center for American Progress (Feb. 2009), *available at* http://www.americanprogress.org/issues/2009/02/pdf/electricity_grid.pdf ("*Wired for Progress*").

[102] McKinsey argues that viewing a building as one integrated system, "rather than as a set of independent end-uses," can result in "additional energy savings in a cost effective manner." *McKinsey Energy Efficiency* at p. 32.

[103] *See* Joseph Romm, *The Internet and the New Energy Economy* in SUSTAINABILITY AT THE SPEED OF LIGHT 39 (Dennis Pamlin, ed., 2002), *available at* http://assets.panda.org/downloads/wwf_ic_1.pdf.

[104] *See* Joseph P. Fuhr Jr. & Stephen B. Pociask, *Broadband Services: Economic and Environmental Benefits*, The American Consumer Institute (Oct. 2007), *available at* http://www.theamericanconsumer.org/2007/10/31/broadband-services-economic-and-environmental-benefits/.

[105] *Wired for Progress* at p. 31.

[106] *See Technology Providers: One of Six Smart Grid Stakeholder Books*, at p. 3, Prepared for the U.S. Department of Energy by Litos Strategic Communication (2008), *available at* http://www.oe.energy.gov/DocumentsandMedia/TechnologyProviders.pdf.

[107] *FCC Net Neutrality NPRM.*

[108] JONATHAN ZITTRAIN, THE FUTURE OF THE INTERNET 31-32 (Yale U. Press 2008).

[109] For a classic discussion on the early development of the Internet, *see* Bruce Sterling, *A Brief History of the Internet*, Magazine of Fantasy and Science Fiction (Feb. 1993); *see also* Roy Rosenzweig, *Wizards, Bureaucrats, Warriors, and Hackers: Writing the History of the Internet*, at p. 8, Amer. Hist. Rev., vol. 103, No. 5 (Dec. 1998).

[110] *See* Jonathan B. Postel, *Simple Mail Transfer Protocol* (Aug. 1982), *available at* http://www.ietf.org/rfc/rfc0821.txt.

[111] *See* J. Postel & J. Reynolds, *File Transfer Protocol* (Oct. 1985), *available at* http://www.ietf.org/rfc/rfc959.txt.

[112] LAWRENCE LESSIG, THE FUTURE OF IDEAS 41 (Random House 2001).

[113] *See, e.g.*, FCC Chairman Julius Genachowski, Prepared Remarks: America's Mobile Broadband Future, Oct. 7, 2009, FCC, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293891A1.pdf ("*Genachowski Wireless Remarks – Oct. 7, 2009*").

[114] *FCC Wireless Innovation NOI* at para. 20 (noting that "The provision of innovative wireless services is critically dependent on having access to spectrum. Further, as wireless is increasingly used as a platform for broadband communications services, the demand for spectrum bandwidth will likely continue to increase significantly, and spectrum availability may become critical to ensuring further innovation and deployment in the wireless sector.").

[115] *Genachowski Wireless Remarks – Oct. 7, 2009* (noting that a primary objective is "unleashing spectrum for broadband").

[116] *FCC Wireless Innovation NOI* at para. 25.

[117] For an overview of how the market has evolved to become more consumer-centric, *see* Charles M. Davidson, *Losing the Forest for the Trees: Properly Contextualizing the Use of Early Termination Fees in the Current Wireless Marketplace*, ACLP Scholarship Series (June 2009), *available at* http://www.nyls.edu/user_files/1/3/4/30/83/Early%20Termination%20Fees%20-%20June%202009.pdf ("*Losing the Forest*").

[118] *See* CTIA – The Wireless Association, Wireless Quick Facts: Year End Figures (to June 2009), http://www.ctia.org/advocacy/research/index.cfm/AID/10323 ("*CTIA Wireless Stats*").

[119] *Id.*

[120] In 2007, the average number of minutes used per month by subscribers was 769, up from 255 in 2000. *In re Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, Thirteenth Report*, FCC DA-09-54, at Table 12 ("*13th CMRS Report*").

[121] CTIA reports the average number of text messages sent per month in the U.S. is over 135 billion, *CTIA Wireless Stats.*

[122] Google's recent acquisition of AdMob has underscored the enormous and as-yet tapped potential value of the mobile search market. *See, e.g.* Robert D. Hof, *Why Google is Buying AdMob*, Nov. 9, 2009, Business Week, *available at* http://www.businessweek.com/technology/content/nov2009/tc2009119_588360.htm.

[123] Consumer acceptance of mobile transactions has grown significantly over the last two years and has fueled a market for mobile payments that is expected to reach $300 billion per year by 2013. *See* Darcy Travlos, *All Eyes on Mobile Commerce*, Nov. 10, 2009, Forbes, *available at* http://www.forbes.com/2009/11/10/travlos-apple-amazon-intelligent-investing-mobile.html.

[124] *13th CMRS Report* at para. 209.

[125] *See* Jason Ankeny, *U.S. Mobile Data Service Revenues Jump to $10.6B in Q2*, Aug. 10, 2009, FierceMobileContent.com, *available at* http://www.fiercemobilecontent.com/story/u-s-mobile-data-service-revenues-jump-10-6b-q2/2009-08-10.

[126] *See Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update*, at p. 1, Cisco White Paper (Jan. 2009), *available at* http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf (estimating a global compound annual growth rate in mobile data traffic of 131 percent between 2008 and 2013) ("*Cisco Visual Networking Index*").

[127] *See, e.g.*, CTIA, Wonder of Wireless: August, Wireless at Work – Fighting Crime with Wireless, http://www.ctia.org/consumer_info/wow/index.cfm/2009/8/.

[128] According to MuniWireless.com, as of March 2009, 55 cities are deploying wireless public safety networks. *See Muniwireless.com 28 March 2009 List of US Cities and Regions*, at p. 4, MuniWireless.com, *available at* http://www.muniwireless.com/reports/Mar-28-2009-list-of-cities.pdf.

[129] *See* Gary E. Salazar, *New York City Rolls Ahead with Public-Safety Network Plans*, Jan. 21, 2009, RCR Wireless, *available at* http://www.rcrwireless.com/article/20090121/WIRELESS/901219992/new-york-city-rolls-ahead-with-public-safety-network-plans.

[130] *See Statement of Commissioner Michael J. Copps, Fostering Innovation and Investment in the Wireless Communications Market (GN Docket No.09-157); A National Broadband Plan For Our Future,* GN Docket No. 09-51, Aug. 27, 2009, FCC, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-09-66A3.doc.

[131] *See* Michael J. Copps, *Bringing Broadband to Rural America: Report on a Rural Broadband Strategy*, at para. 19, FCC (rel. May 22, 2009), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-291012A1.pdf.

[132] A recent report by the U.S. Department of Education concluded that, "[o]n average, students in online learning conditions performed better than those receiving face-to-face instruction." See Steve Lohr, *Study Finds That Online Education Beats the Classroom,* Aug. 19, 2009, Bits Blog, N.Y. Times, *available at* http://bits.blogs.nytimes.com/2009/08/19/study-finds-that-online-education-beats-the-classroom (citing *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies,* http://www.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf).

[133] *See* Project K-Nect, Home, http://www.projectknect.org/Project%20K-Nect/Home.html.

[134] *See* Carly Shuler, *Pockets of Potential: Using Mobile Technologies to Promotes Children's Learning*, at p. 14, Industry Brief, The Joan Ganz Cooney Center at Sesame Workshop (Jan. 2009), *available at* http://www.joanganzcooneycenter.org/pdf/pockets_of_potential.pdf.

[135] *See What if a WiMAX Gear Maker Tuned Into Affordable UHF for you?*, Sept. 11, 2009, Smart Grid Today (describing how a WiMAX equipment maker is retrofitting its products to provide access to alternative wireless bands for use by energy utilities.).

[136] *See* Mitch Wagner, *Florida Hospitals Dial up iPhones for Nurses*, Nov. 8, 2009, Information Week, *available at* http://www.informationweek.com/news/healthcare/mobile-wireless/showArticle.jhtml?articleID=221600691&cid=RSSfeed_IWK_ALL (reporting on a pilot program that used iPod touch devices to wirelessly rely text messages among nurses in lieu of traditional announcements, pages, and alarms. Patients reported better conditions due to a decrease in noise levels, and nurses reported increases in the effectiveness of their care).

[137] A recent article observed that "The use of mobile information technology to assist healthcare professionals in making treatment decisions at the point of care is expected to improve the quality, safety, and value of care delivery. Added value from these applications is extremely important for the growing number of seniors who want to independently age in place in the least restrictive environment possible." *See* Gregory L. Alexander et al., *Mobile IT Applications*, at p. 21, Long Term Living (Jan. 2009), *available at* http://eldertech.missouri.edu/files/Papers/Alexander/LTL%20-%20Mobile%20IT%202009.pdf.

[138] *Losing the Forest* (assessing the evolution of consumer demand and the response of service providers).

[139] Several studies suggest that U.S. wireless carriers are among the most efficient users of spectrum in the world. For example, a 2009 study estimated that U.S. wireless carriers served three times as many subscribers per MHz of spectrum than carriers in Britain and twice as many as carriers in Japan. *See* Gerald R. Faulhaber & David J. Farber, *Innovation in the Wireless Ecosystem: A Customer-Centric Framework*, at p. 21, submitted in response to the *FCC Wireless Innovation NOI, available at* http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=7020039960 (citing G. Campbell, *Global Wireless Matrix 2Q09; Voice and Data Divergence*, Bank of America / Merrill Lynch Research (June 25, 2009), available from Bank of America / Merrill Lynch).

[140] *See Women, Teens, and Seniors Help Fuel 34% Mobile Web Spike,* Sept. 30, 2009, NielsenWire, *available at* http://blog.nielsen.com/nielsenwire/online_mobile/mobile-web-up-34-percent-july-09/.

[141] Senior mobile data usage increased 67 percent between 2008 and 2009. This large spike, however, is due to a very low percentage of older adults using mobile data. As of 2009, only three percent of adults over 65 used mobile data services. *Id.*

[142] A recent study by the Wireless Rehabilitation Engineering Research Center (RERC) found that "wireless information and communications technologies play an increasing role in education, employment, healthcare, and other aspects of independent living for people with and without disabilities." *See* Wireless RERC, Background: Addressing a Significant Need, http://www.wirelessrerc.org/about-us/background-addressing-a-significant-need.html. A recent survey by the Wireless RERC found that after voice communications, text messaging, email, and Internet access were the most important uses of a cell phone among people with disabilities. *See Second Report: Findings of the Survey of User Needs (SUN), 2007-2009,* at p. 5, Wireless RERC (March 2009), *available at* http://www.wirelessrerc.org/publications/SUN%20Second%20Findings%20Report_2009-03-25.doc.

[143] *Pew Wireless Study 2009* at p. 29 (finding that these two demographic groups are more likely to participate I most mobile data activities than Whites) & p. 33 (observing that African-Americans are "70% *more likely* to [access the Internet on a wireless device on a typical day] than white Americans.").

[144] *13th CMRS Report* at p. 8 (noting that 58 percent of smartphone users had accessed information via their handheld device compared to just 13 percent of all wireless subscribers).

[145] *See* Nate Anderson, *Wireless carriers beg FCC for spectrum, blame smartphones,* Sept. 27, 2009, Ars Technica, *available at* http://arstechnica.com/tech-policy/news/2009/09/wireless-carriers-beg-fcc-for-spectrum-blame-smartphones.ars.

[146] *Cisco Visual Networking Index.*

[147] *See Estimated Bandwidth Requirements for the Future Development of IMT-2000 and IMT-Advanced,* International Telecommunications Union (ITU), Report ITU-R, M.2078, at 25 (2006) (estimating that an additional 1,300 MHz of spectrum would be needed by 2015).

[148] *See HSPA to LTE-Advanced: 3GPP Broadband Evolution to IMT-Advanced (4G),* at p. 21, 3G Americas (Sept. 2009).

[149] *See* Letter from Christopher Guttman-McCabe, Vice President, Regulatory Affairs, CTIA, to Julius Genachowski, Chairman, Federal Communications Commission, *et al,* GN Docket No. 09-51 (filed Sept. 29, 2009), *available at* http://files.ctia.org/pdf/filings/2009_09_29_Spectrum_Demand._FINAL.pdf.

[150] *See Comment Sought on Spectrum for Broadband, National Broadband Plan Public Notice #6,* at p. 3, GN Docket Nos. 09-47, 09-51, 09-137 (rel. Sept. 23, 2009) (citing comments filed by CTIA in the Commission's national broadband docket on June 8, 2009).

[151] *Genachowski Wireless Remarks - Oct. 7, 2009* at p. 5. *See also* Charles Mathias, *Is There Enough Spectrum?* Oct. 6, 2009, FCC Blogband, *available at* http://blog.broadband.gov/?entryId=10878 (noting that "The amount of spectrum available for use for broadband devices is crucial in determining an overall national broadband plan. With the continued rise of the use of smartphones, and the needs for spectrum associated with their use, we have to look to the future availability of spectrum and where that spectrum is located.").

[152] FCC Chairman Julius Genachowski recently expressed uncertainty regarding the ability of the agency to make additional spectrum available in the short-term. Indeed, he concluded that "I am not confident that we will identify the spectrum we will need to meet the demands of the country." *See* John Eggerton, *FCC Chairman Not Sure FCC Can Gauge Spectrum Demands*, Nov. 18, 2009, *available at* http://www.multichannel.com/article/389714-FCC_Chairman_Not_Sure_FCC_Can_Gauge_Spectrum_Demands.php.

[153] *FCC Net Neutrality NPRM* at para. 154-160.

[154] *See, e.g.,* Phil Weiser & Dale Hatfield, *Spectrum Policy Reform and the Next Frontier of Property Rights*, 15 Geo. Mason L. Rev. 549, 556-557 (2008) (observing that, even though spectrum is "infinitely renewable," it is "still a scarce resource in the sense that two individuals cannot use the same frequency at the same time in the same place without canceling out--or at least interfering with-- both transmissions.").

[155] These resources include: *Barriers to Broadband Adoption* (previously cited), *Broadband Imperatives* (previously cited), and *Expanding and Accelerating the Adoption & Use of Broadband throughout the Economy,* A Report of the U.S. Broadband Coalition (Nov. 2009), *available at* http://www.baller.com/pdfs/US_Broadband_Coalition_A&U_Report_11-13-09.pdf.

[156] *See* Success Stories, *"Touch Tank" Puts Technology in the Hands of Seniors*, OATS, *available at* http://www.oatsny.org/touch_tank.htm.

[157] *See* http://www.apt.org/BB-changed-my-life/.

[158] For more information, *please see* http://aging.senate.gov/.

[159] Local Law 126 of 2005, Int. No. 625-A. Additional information is *available at* http://legistar.council.nyc.gov/LegislationDetail.aspx?ID=444034&GUID=F0EA8014-69F5-4F7B-AB88-EEF2F394E5BE&Options=ID|Text|&Search=.

[160] *See* New York City Broadband Advisory Committee, Blog, http://nycbroadband.blogspot.com/.

[161] The Committee on Technology in Government convened an oversight hearing on this topic on Oct. 28. 2005.

TESTIMONY OF ROBERT R. PUCKETT
ON BEHALF OF THE NEW YORK STATE
TELECOMMUNICATIONS ASSOCIATION

BEFORE THE

NYC COUNCIL COMMITTEE ON TECHNOLOGY IN GOVERNMENT

FRIDAY, NOVEMBER 20, 2009
10:00 A.M.

Good morning Chairperson Brewar and members of the Committee.

My name is Robert Puckett. I currently serve as President of the New York State Telecommunications Association (NYSTA). My 35 plus members include large carriers such as Verizon, AT&T, and Sprint and smaller carriers operating throughout the state. My member's networks represent the "central nervous system" of this state's telecommunications needs and of today's information based economy. They provide everything from pots (plain old telephone service) to networks capable of providing high speed data and internet services, and as well, video services in many markets in competition with traditional Cable-TV providers.

Thank you for the opportunity to testify before the Committee today on the Proposed Resolution No. 712-A - Resolution calling upon "the United States Congress to pass H.R. 3458 and the Federal Communications Commission to formalize strong network neutrality principles in order to ensure that the Internet

will continue to foster innovation, increase competition, and spur economic growth as well as making the Internet faster and more affordable for all."

NYSTA respectfully opposes the Council's resolution. After years of policy makers at all levels of government determining it is best to take a hands off approach to the regulation of the Internet, we firmly believe that now is not the time to reverse course regarding this issue. By cleverly framing this debate around the bumper-sticker term "net neutrality," those who want to regulate broadband Internet services like traditional telephone services have created a myth to bolster their pro-Internet regulation cause. This is a concept that absolutely has nothing to do with encouraging deployment of broadband or the competition in the Internet marketplace. As a threshold matter, the proponents of net regulation have simply not shown that there is a problem that needs fixing. Moreover, adoption of such Internet regulation policies will deter innovation and investment in the network infrastructure and the broadband services that evolve from those networks. Rather than continuing to foster innovation, increase competition, spur economic growth, and making the Internet faster and more affordable for all, regulation of the Internet will do the opposite.

In short, NYSTA believes that acting on this resolution on net regulation is simply bad public policy. As NYSTA's members continue to deploy broadband across the state, more and more New Yorkers will be the real big winners. They will experience exciting new choices and a far superior customer experience. Not for

one moment are we suggesting that lawmakers not take an active role in this issue. On the contrary, there is a critical role for lawmakers, but we respectfully suggest that role should focus on encouraging broadband investment and telecommunications tax reform. Unnecessary and unwarranted regulation will only serve to slow the growth and deployment of new products and services.

Thank you for the opportunity to appear before you. I will be pleased to answer any questions you may have.

Before the
Federal Communications Commission
Washington, D.C. 20554

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

Reply Comments of the
Songwriters Guild of America

In response to the Commission's request for reply comments, the Songwriters Guild of America wishes to offer additional thoughts regarding the development of a national strategy to move the United States toward ubiquitous broadband. The comments below address Chairman Julius Genachowski's July 2, 2009 remarks.

The Chairman stated the following in his remarks:

> "...we must ensure that our broadband infrastructure and services advance national purposes, including job creation and economic growth."
>
> "We as a nation have faced challenges like this before -- with the railroad, telephone, electricity, and other networks that connect Americans, serve as platforms for commerce, and improve the quality of American lives. We are at a crossroads similar to one we have faced in the past. Can we as a country build a 21st century infrastructure to which all Americans have access."

SGA fully agrees with the Chairman's laudable objectives, but points out that they will never be accomplished if the basic rules necessary to encourage their realization are not in place. If the Commission decides to pursue the various "Net Neutrality" proposals, then these objectives will almost certainly not be fulfilled. Specifically:

(a) Economic Growth. In order for broadband networks to be as healthy a "platform of commerce" as the railroads and energy utilities were in the past, the standard rules of commerce must be acknowledged and protected. These standard rules of commerce include respect for private property, the discouragement of theft of the property by users of the platform, and meaningful remedies in the event that theft occurs.

The Internet does not currently recognize or enforce these standard rules of commerce, and so its commercial potential has not been realized -- and never will be until these deficiencies are addressed. Sources like the International Federation of Phonographic Industries (IFPI)[1] suggest that songs downloaded illegally may outnumber songs downloaded legally by a factor of some 20 to one worldwide.[2] Network experts have indicated that up to 70% of the volume of traffic on broadband networks is Peer-to-Peer, or P2P traffic relating to only 5% of the users – and easily 90% of such traffic is unlawful.[3]

Unfortunately, the proponents of many "Net Neutrality" principles simply ask for more of the same Internet, with perhaps even greater restrictions on the ability of network operators and users of the network to enforce the standard rules of commerce. The looting of copyrighted material is rampant. Indeed, the current security of the transmission of copyrighted material via broadband networks is worse than a train or stagecoach traveling through the most lawless portion of the old Wild West. The opposition to technologies that identify and discourage theft and looting is a principal tenet of many Network Neutrality proposals. For example, H.R. 5417 from the 109th Congress makes it an antitrust violation to fail to provide broadband network services on reasonable and nondiscriminatory terms and conditions, or to block, impair, or discriminate against, or interfere with the ability of any person to use a broadband network. While an exception exists for measures to manage the functioning of the network, to protect the security of such network, and to prevent violations of law, these measures themselves must be "reasonable and nondiscriminatory." The exception is far from clear, particularly in the area of actions taken to prevent copyright violations. When such an ambiguity exists, the likelihood that companies will spend money to develop technologies to deter broadband piracy falls precipitously. New anti-piracy technology could well be discouraged. Even if the exceptions in H.R. 5417 were determined to permit ISPs to ***discourage illegal*** copyright practices, the bill clearly would not allow ISPs to ***encourage*** their customers to patronize sites that adopt ***lawful*** copyright practices.

If the FCC allows similar network neutrality concepts to prevail, then the Commission's laudable economic goals will never be accomplished. If songwriters continue to be decimated by copyright piracy, and if the movie and television industry is the next victim, then lawlessness will have been victorious and this Commission will have presided over **economic decline**, not economic growth.

---

[1] IFPI represents the recording industry worldwide, with a membership comprising some 1400 record companies in 72 countries and affiliated industry associations in 44 countries. IFPI's mission is to promote the value of recorded music, safeguard the rights of record producers and expand the commercial uses of recorded music in all markets where its members operate.

[2] The Recording Industry 2006 Piracy Report: Protecting Creativity in Music, (International Federation of the Phonographic Industry, London, United Kingdom: July 2006) www.ifpi.org/content/library/piracy-report2006.pdf Accessed June 8, 2009.

[3] *See* Comments of NBC Universal, Inc., *In the Matter of Broadband Industry Practices*, FCC WC Docket No. 07-52, Feb. 13, 2008 at 2 (citing various sources).

The digital commerce at stake here is significant. According to a recent International Intellectual Property Alliance report[4] the core copyright industries:

- Accounted for nearly 23 percent of the U.S. economy's growth in 2006-2007;
- Grew at a rate more than twice that of the U.S. economy as a whole in each of the years 2004-2007;
- Added $899 billion to the U.S. economy in 2007 – approximately 6.4 percent of GDP;
- Exceeded $126 billion in foreign sales in 2007;
- Employed 5.6 million workers in 2007, more than 4 percent of the U.S. workforce.

Clearly, the copyright industry is not negligible and not one that should be exposed to preventable theft and looting.

(b) Proper Incentives for Private Sector Investment. Government money is important but alone is not sufficient to develop the desired infrastructure. In order to encourage the private sector to invest, it must have proper incentives to be able to manage its investment. The President's and the FCC's goals will not be reached without investment from the private sector. However, such essential investment will be deterred if there is excessive regulation on the terms and conditions upon which they may manage the networks crucial to the success of the National Broadband Plan.

The economic interests of those who would impose "Net Neutrality" regulation on further deployment of the National Broadband Network are contrary to the interests of creators. But most importantly they are also contrary to the goals of the President, Congress and the FCC. If the FCC wants investments to be made by people who are capable of building and running networks, the Commission cannot exclude the private sector. The proposed network management regulations would do just that.

If the FCC wants to make broadband access affordable, then the network operators must be allowed to engage in reasonable network management. For example, without reasonable network management, the small number of users of inordinate amounts of bandwidth could not be held accountable for monopolizing access in certain areas. To ensure equal access to all, as the FCC wishes to do, network providers would be forced to provide higher bandwidth than otherwise necessary to accommodate a few abusive users. This would clearly drive up the costs for users. In addition, this very same small percentage of users is among the most egregious offenders of copyrighted content on the Internet. The adverse consequences of imposition of many of the Network Neutrality principles would likely be significant, all to the detriment of the Commission's broadband access goals.

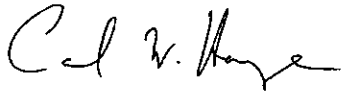
[4] The complete report can be viewed at www.iipa.com.

(c) Job Creation. In order for a robust broadband network to be an engine for job creation, those investing in the network, as well as those using the network, must be able to see an economic future where they will receive a healthy return on their investment. Excessive restrictions on the rules under which the network may operate always retard investor enthusiasm and could limit investment in the technological features that network operators would prefer to make available to users if the regulatory regime were less onerous.

Unfortunately, many Network Neutrality proposals constitute precisely this sort of onerous regulation and would discourage just this sort of robust investment. For example, regulations restricting the ability of ISPs to manage their networks would discourage the development of technologies that can identify and address unlawful content transmitted over the internet. Such restrictive regulations would eliminate the last bit of hope that songwriters have to survive the digital looting of our creations. More broadly, it would reduce rather encourage the creation of jobs in content creation, which the IIPA survey quoted previously demonstrates a robust engine of economic growth in the United States.

We therefore urge the FCC to proceed with extreme caution when asked to impose "Network Neutrality" regulatory requirements.

Respectfully submitted,



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October 2009

Barriers to Broadband Adoption

A Report to the Federal Communications Commission

The Advanced Communications Law & Policy Institute
New York Law School

BARRIERS TO BROADBAND ADOPTION:

A REPORT TO THE FEDERAL COMMUNICATIONS COMMISSION

THE ADVANCED COMMUNICATIONS LAW & POLICY INSTITUTE
NEW YORK LAW SCHOOL

OCTOBER 2009

About The ACLP at New York Law School

The Advanced Communications Law & Policy Institute (ACLP) at New York Law School is a public policy program that focuses on identifying and analyzing key legal, policy, and regulatory issues facing the advanced communications sector. ACLP's mission is to promote robust and solution-focused dialogues amongst state and federal policymakers, academe, service providers, the financial community, and consumers concerning changes to the state and federal regulatory regimes governing wireline, wireless, broadband, and IP platforms.

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I. INTRODUCTION

The Advanced Communications Law & Policy Institute (ACLP) at New York Law School submits this Report to the Federal Communications Commission (FCC) for use during the development of its national broadband plan.

This Report focuses on two demographic groups – Senior Citizens and People with Disabilities – and on four sectors of the economy – Telemedicine, Energy, Education and Government – that stand to benefit greatly from more robust utilization of broadband but, for the reasons discussed herein, face a number of barriers to further adoption of broadband and broadband-enabled technologies.

A. Report Context

Ubiquitous availability and usage of broadband is vital to continued innovation, social advancement, and economic development in the United States.[1] In order to realize these goals, however, broadband adoption rates must be maximized across all demographic groups and sectors of the economy. Yet, as discussed herein, there are a number of fundamental barriers to further adoption and use of broadband.

That broadband is a critical tool for the United States and its citizenry is undisputed. However, the dimensions associated with maximizing broadband usage in the United States are multiple and include not only additional network deployments to unserved parts of the country but also an understanding of the many factors influencing broadband adoption and usage among all user groups.

Broadband is available to the vast majority of Americans, and service providers continue to invest billions of dollars in enhancing and extending network infrastructure.[2] Indeed, the FCC has observed that many residents live in areas with multiple broadband providers,[3] and billions of dollars in stimulus funding have been allocated to spur the deployment of network infrastructure to those parts of the country that remain unserved.[4] Yet, in the areas where broadband is already available, a significant number of potential users have yet to adopt and actively use this technology.

While the adoption rate for all U.S. adults has steadily increased over the last few years, more than half of some demographic groups (e.g., senior citizens, people with disabilities, African Americans, and people earning less than $20,000) do not subscribe to broadband.[5] In addition, even though broadband is a dynamic platform that enables a wide range of cutting-edge applications and services, adoption and use remains relatively low in key sectors of the U.S. economy.

1. *Myriad of Broadband Adoption Barriers*

The factors impeding more robust broadband adoption among different demographics and sectors are numerous, varied, and substantial. Throughout the following analysis, major themes regarding non-adoption will emerge for each of this Report's six focus areas. As an overview:

- For **senior citizens**, a general lack of adequate education and training are key contributors to a relatively low broadband adoption rate;
- For **people with disabilities**, widespread negative perceptions regarding the accessibility of broadband impedes further adoption and use of this technology;
- In the **telemedicine** sector, a number of outdated legal and policy frameworks hinder more robust adoption and use of broadband-enabled telemedicine services by patients and healthcare providers;
- In the **energy** arena, the highly regulated and conservative nature of many energy utilities challenges the dynamic nature of broadband and the ecosystem of innovation that it fosters;
- In the **education** space, lack of targeted funding and inadequate training impede further adoption and usage of broadband and broadband-enabled educational tools in schools across the country; and
- For **government** entities, institutional inertia and a lack of cross-government collaboration regarding best practices has slowed the effective integration of broadband into many government processes.

With regard to forging policies that spur broadband adoption in each sector, one size will not fit all. Indeed, as discussed throughout this Report, each sector faces a unique set of barriers to further broadband adoption. Overcoming these barriers will likely require carefully tailored policies that target the distinctive needs of each discrete group. In addition, promoting widespread awareness of the many benefits that can flow from a broadband connection, including an array of cost savings and economic opportunities, is critical to spurring adoption.

2. *Importance of Promoting Broadband Adoption*

The cost savings and positive benefits enabled by broadband have the potential to enhance individual lives, the country's economic performance, and how government governs. Examples, discussed in detail throughout this Report, include:

- Lower prescription drug bills for seniors who use broadband to conveniently comparison shop online;
- Using broadband to access a growing universe of educational and employment opportunities for people with disabilities;
- Millions if not billions in potential cost savings associated with using real-time broadband-enabled monitoring services that track vital signs and allow patients to age at home for longer;
- More reliable, affordable, and efficiently-used energy via a broadband-enabled smart grid;
- Wider availability of online and distance learning courses for students of all ages and in all parts of the country; and
- More transparent, interactive, and streamlined administration of government services.

3. *Key Role of Wireless Broadband*

A key enabler of broadband is the continued deployment of advanced network infrastructure across all parts of the United States. In particular, wireless broadband is quickly emerging as a vital platform for services and applications in each of the six sectors discussed in this Report.[6] Specific examples of the role that wireless broadband is playing in these segments are provided herein. As an overview, wireless broadband is increasingly being used to:

- Support in-home monitoring systems and other mobile healthcare applications for all patients, including senior citizens[7];
- Enable advanced smartphones, which are being used by healthcare providers to enhance the quality of care and by students to access cutting-edge educational tools and services; and
- Facilitate the rapid deployment of the smart grid, which uses a number of wireless sensors to transmit usage data in real-time.

Unlike wired broadband, however, the deployment of wireless broadband is impacted by factors other than investment levels. The major distinguishing factor is that wireless broadband requires ample spectrum to be deployed on the scale needed to enable the services and benefits described below.[8] Many stakeholders, including the FCC,[9] agree that additional swaths of spectrum are needed to support the robust types of services discussed in the Report. However, this is a "complex challenge" for a number of reasons.[10]

First, there is generally a lack of information regarding how some spectrum bands are being utilized. Swaths of spectrum are owned by a large number of diverse stakeholders for both federal and non-federal uses. Most owners are required to use their allocated spectrum in specific ways according to rules the FCC attaches to each band.[11] Yet, despite these rules, some feel that there is uncertainty regarding how each band of spectrum is being used, whether it is being fully utilized or under-used, and whether a particular band of spectrum could be utilized for more innovative purposes. In response, policymakers are actively reevaluating spectrum allocation and usage policies and considering methods for reallocating some portions of the airwaves.[12] How to effectively bolster spectrum allocation and reallocation, however, remains a point of some debate – including some arguments designed to delay any process. *That said, the debate on spectrum uses should not in and of itself become a barrier to making more spectrum available in the near term.*

Second, mobile broadband deployment is impacted by policies related to the construction and usage of towers, poles, and other aspects of the wireless infrastructure. As the FCC has observed, these components are "the backbone of [the] wireless infrastructure, supporting both commercial and private wireless services, in addition to critical public safety and homeland security wireless communications."[13] However, since wireless infrastructure-related policies are largely local in nature, carriers face a patchwork of policies that may create inefficiencies and delays in network deployments. This patchwork of policies represents another major barrier for innovators in the wireless broadband space.[14]

Going forward, wireless broadband will play an increasingly invaluable role in extending the reach of new services and applications and sustaining an ecosystem of innovation across all sectors of the economy. As a result, implementing forward-looking policies that support continued network deployment and innovation is imperative to spurring broadband adoption in the sectors discussed herein.

B. Report Structure

This Report is composed of six substantive sections, each of which consists of two primary parts.

Part A of each section discusses the adoption, use, and impacts of broadband on

- Senior citizens (**Section II**);
- People with disabilities (**Section III**);
- Telemedicine (**Section IV**);
- Energy (**Section V**);

- Education (**Section VI**); and
- Government (**Section VII**).

Part B of each section sets forth the key policy and non-policy barriers to further broadband adoption and usage. These barriers encompass a broad range of impediments flowing from outdated laws, antiquated policies, and a general unawareness by many stakeholders regarding the true value of adopting broadband.

As the FCC moves forward with its national broadband plan, understanding the many policies that directly and indirectly impact demand for and adoption of broadband will ensure a comprehensive and effective plan that stimulates awareness and usage of this vital technology.

******

II. SENIOR CITIZENS

For senior citizens, broadband enables a wide range of life-enhancing social, economic, and health-related benefits.[15] It allows them to stay in better touch with family, to obtain relevant and timely health information, to work from home or start a small business, and to use the growing universe of telemedicine tools enabled by broadband. These impacts are discussed in Part A. However, for the many reasons set forth below, a significant number of older adults remain offline. Part B identifies key policy and non-policy barriers to further broadband adoption and usage by senior citizens.

A. An Overview of Broadband & Senior Citizens

This part provides: (1) an analysis of current levels of broadband adoption among senior citizens; (2) an overview of the impacts of broadband on this demographic; and (3) a summary of potential key cost savings enabled by this technology.

1. *Broadband Adoption Among Senior Citizens*

According to recent data, there were nearly 38 million people over the age of 65 living in the United States in 2007, representing just over 12 percent of the population.[16] The number of seniors grew by 11 percent between 1997 and 2007[17] and is poised to double by 2050, at which time seniors will make up nearly 20 percent of the population.[18] The senior population will also grow significantly as "baby boomers" begin to retire in 2011.[19] According to the U.S. Census Bureau, there are over 78 million boomers in America, making it the largest generation in history.[20]

While broadband is already available to "most of us,"[21] a majority of seniors have yet to adopt broadband. Currently, only 30 percent of adults over the age of 65 have adopted broadband at home.[22] However, two trends are illustrative of increasing adoption of broadband among this demographic group.

First, as depicted in Table 1, broadband adoption by adults over 65 has increased more than any other age group over the last several years.

Table 1 - Trends in Broadband Adoption by Age Group

Age Group	% Change in Broadband Adoption 2005-2008
18-29	84.2
30-49	91.7
50-64	85.5
65+	137.5

Source: Pew[23]

This trend continues. The percent change in broadband adoption between 2008 and 2009 among adults over 65 was 58 percent.[24] Similarly, senior use of mobile Internet grew by 67 percent between 2008 and 2009.[25] Senior growth rates for both broadband and mobile Internet adoption outpaced all other age groups over the past year.

Second, younger seniors are more likely to adopt broadband than older seniors, creating a "gray gap": 58 percent of people age 55-59 have home broadband; 48 percent of those between age 60-64, 42 percent of those age 65-69, and 31 percent of those age 70-75 have adopted broadband, while 16 percent of those over 76 have home broadband.[26] Anecdotal evidence, however, suggests that targeted training efforts are successful in closing this gap and bringing all seniors online.[27]

2. *The Impacts of Broadband on Senior Citizens*

Those seniors already online via broadband are benefitting from an array of positive impacts enabled by this technology. Table 2 provides an overview of these impacts.

Table 2 - Overview of Broadband's Impacts on Senior Citizens

Social Impacts	*Economic Impacts*	*Impacts on Healthcare & Well-Being*
▪ Broadband increases connectivity with family and friends. ▪ Broadband fosters feelings of relevance and provides seniors with an interactive outlet to the world. ▪ Enhancing personal communications can decrease feelings of depression and isolation.	▪ Individual economic gains include: e-commerce; managing personal finances online; savings on prescription drugs; and enhanced employment opportunities. ▪ Economy-wide gains include increases in: small business creation; seniors in the workforce; senior-oriented content and applications; and healthcare savings.	▪ Broadband is enhancing senior wellness and preventive care. ▪ Broadband is enabling lifesaving and life-enhancing telemedicine services like in-home, real-time monitoring. ▪ The potential for cost savings flowing from increased usage of broadband-enabled healthcare services and applications is tremendous.

With some 30 percent of non-institutionalized seniors living alone,[28] broadband is a key tool for combating feelings of disconnectedness, which can lead to depression or a host of other debilitating diseases. Studies have found that seniors who master computer skills appear to have fewer depressive symptoms than those who remain technologically unconnected[29] and that increased integration through social support services can protect against some mortality risks and lead to better mental health.[30]

In addition, the nation's current economic crisis has further underscored the value of broadband as an employment tool for older adults. Unemployment levels for adults aged 65 and over rose from 3.4 percent in 2007 to 6.8 percent in 2009, reaching "the highest level recorded since the federal government began computing reliable unemployment rates in 1948."[31] Similarly, the unemployment rate for those over age 55 increased from 2.7 percent in 2007 to 5.9 percent in 2009.[32] In particular, low-income older workers have been profoundly impacted by the recession, as nearly half of those over age 55 must continue working in order to keep their homes, and 68 percent report that their retirement income is inadequate to support them.[33] Experience Works recently found that 45 percent of low-income older workers had planned to be already retired, and 38 percent need to leave retirement and return to work.[34] Broadband-enabled telework options and increased online training opportunities may allow many of these low-income seniors to work past retirement age (see Barrier #7 for further discussion).[35]

3. *Cost Savings Enabled by Broadband*

The many life-enhancing impacts of broadband enable enormous cost savings for senior citizens. Table 3 provides a summary of some of the actual and potential savings.

Table 3 - Overview of Cost Savings Enabled by Broadband for Seniors

e-Commerce Generally	*Prescription Drug Savings*
▪ The fastest growing sector in the U.S. marketplace, e-commerce provides significant financial benefits for those utilizing broadband to purchase goods and services online. A recent report observed that "[b]usinesses and consumers that use e-commerce benefit from a reduction in costs in terms of the time and effort required [to search] for goods and services and complete transactions."[36] ▪ Use of the Internet enables buyers to find products or sellers with the lowest prices, thereby benefitting from an immediate financial gain.[37] ▪ Shopping from home has a number of other impacts, including lower transportation costs and less physical exertion for seniors.	▪ Broadband facilitates the easy comparison of prescription drug prices and lowers costs for older adults. For example, *Checkbook* magazine has found vast price differences among prescription drugs within the same metropolitan areas and concluded that online retailers often offered lower prices for certain drugs.[38] ▪ A wide array of online resources has been developed for seniors who are looking for affordable prescription drugs. AARP, for example, has partnered with Walgreens to provide seniors with an online portal to purchase discounted drugs.[39] In addition, one organization helped a group of seniors use the Internet to save over $19,000 on their prescription drugs via the Medicare Part D website.[40]
Total Healthcare Related Cost-Savings	***Remote Monitoring Cost Savings***
▪ It has been estimated that broadband-based health resources can save some $927 billion in health care costs for seniors and people with disabilities.[41] ▪ Broadband-enabled technologies lower healthcare costs through early intervention and preventative techniques, less need for physician visits, and the decreased distance required for physician and patient travel, among others.[42]	▪ The average cost for a private room in a nursing home is $213 per day or $77,745 annually.[43] The average monthly cost of living in an assisted living facility is $2,969 or $35,628 annually.[44] And the average hourly rate for a certified home health aide is $32.37.[45] In-home health monitoring systems allows seniors to age at home longer, reducing or eliminating many of these costs. ▪ A recent study estimated that "a full embrace of remote monitoring alone could reduce healthcare expenditures by a net of $197 billion (in constant 2008 dollars) over the next 25 years with the adoption of policies that reduce barriers and accelerate the use of remote monitoring technologies."[46]

A variety of other cost savings are possible via broadband. These include the elimination of fees to a money manager by personally managing retirement savings online and reduced communications costs by using email and more affordable telephony services (e.g., Skype) to stay in touch with family and friends. The amount and variety of cost savings could help offset the monthly subscription price of broadband for a senior living on a fixed income.

B. Barriers to Broadband Adoption

A wide array of policy and non-policy barriers hinders more robust broadband adoption and usage by senior citizens. These barriers include:

1. Lack of awareness or skepticism regarding the value of broadband
2. Usability concerns
    a. Computer hardware & software
    b. Online content
3. Low rate of computer ownership
4. Affordability of broadband for seniors who live on fixed incomes
5. Online security concerns
6. Unique living conditions
    a. Rural seniors
    b. Non-traditional living arrangements
7. Disincentives for using broadband to work past retirement
8. Lack of training and core computer competencies
9. Systemic lack of coordination among government entities regarding funding of senior-oriented training programs

* * * * * *

1. *Lack of awareness or skepticism regarding the value of broadband*

Seniors have a much lower broadband adoption rate than any other age group.[47] This low adoption rate stems largely from inadequate value propositions (or perceived inadequate value propositions) and a general lack of awareness of the benefits of broadband.

Seniors are more likely than any other age group to cite low interest or lack of relevance to their lives as a reason for not adopting broadband. *Among seniors without broadband access, 44 percent state that they are not interested in broadband, nothing could get them to switch, or they are just too busy;*[48] only eight percent of adults ages 18 to 29, and 26 percent of those 50 to 64, made such claims.[49] Further, one study from 2003 found that eight in ten off-line seniors do not think that they will ever go online.[50] Moreover, in

2006, adults over the age of 65 were less than half as likely as those aged 18 to 29 to consider home computers and high-speed Internet access a necessity.[51]

Lifestyle factors, limited awareness, and lack of relevant web content may prevent many seniors from appreciating the full value of broadband. Seniors are a group who did not grow up using computers and the Internet and may also not have been in the workforce when computers became standard.[52] Indeed, according to a study from 2004, seniors "often live lives far removed from the Internet, know few people who use email or surf the Web, and cannot imagine why they would spend money and time learning how to use a computer."[53] A lack of understanding of what broadband is and what it can do thus remains a large obstacle.[54] And once online, senior-specific content is relatively sparse (see Barrier #2). These various factors combine to lessen the value proposition being offered to senior citizens, creating a formidable barrier to further adoption of broadband among this age group.

2. *Usability concerns*

Senior citizens, as a group, have a number of unique needs vis-à-vis effective broadband use. For example, many seniors suffer from age-related vision degradation, making it more difficult to read some online content.[55] In addition, age-related physical impairments (e.g., hand tremors) may make it difficult for some to accurately maneuver a mouse or other computer hardware. These and other such conditions thus make the design of hardware, software, and online content critically important for facilitating further adoption and use of broadband among seniors. However, many of these issues remain unresolved. This section focuses on barriers to broadband adoption associated with (a) the usability of computer hardware and software and (b) the design of online content for seniors.

a. *Computer hardware & software*

Age-related changes in perceptual, cognitive, and psycho-motor abilities pose a number of barriers to further broadband adoption and use by many senior citizens.[56] For example, in addition to the challenges of developing technology skills generally, many seniors have trouble reading small fonts, distinguishing certain colors, and remembering information in the short term.[57] Vague or overly complex wording on computer error messages and websites can also be difficult for seniors to understand.[58] Further, mobility impairments from arthritis and hand tremors make basic computer use problematic for some seniors.[59] As a result, many seniors perceive the Internet and related technologies to be unusable.

A recent study found that 59 percent of seniors cite a lack of usability as a major reason for not adopting broadband at home, compared to just four percent of adults aged 18 to 29.[60] Significantly, this perception is often matched by reality. To this end, a 2002 study,

which examined the ability of adults over age 65 to complete basic tasks online, found that adults aged 21-55 significantly outperformed seniors in terms of success rate for task completion, time taken to complete the task, number of errors and subjective rating. The normalized overall usability rate for seniors was 100 percent, compared to 222 percent for participants age 22-55.[61]

Negative perceptions regarding usability, along with high levels of frustration with trying to learn these new technologies, represents a formidable barrier to further adoption and usage of broadband among many older adults.

b. *Online content*

Much online content is not designed with the senior user in mind.[62] Web designers often assume that users have full physical and mental capabilities, as well as developed technological skills.[63] However, a number of innovators in this space have begun to accommodate the special needs of older adults, and web content accessibility is improving.[64] To speed along this process, many organizations have begun publishing web usability guidelines. The National Institute on Aging (NIA), for example, has published guidelines pertaining to site organization, text formatting, navigation, and media use.[65] Usability.gov serves as the primary government source for usability and user-centered design resources.[66] Nonetheless, one study found that there is a lack of consistency in accessibility for websites designed for older adults. Most of the examined websites complied with NIA guidelines regarding basic navigation and content style, but not for text size, text weight, or site map availability.[67]

Concerns with web content usability are further pronounced with regards to senior-oriented government information found online. A recent study by the University of Miami regarding the usability of the Medicare website by senior citizens is instructive. Results showed that the site is difficult for older adults to use, and that many find it confusing and overly complex.[68] While enrolling in the Medicare Part D prescription drug program, 72.3 percent of participating seniors had difficulty navigating to the necessary Web pages, locating information, and following the steps necessary to select a plan.[69] Such senior web-based services are often not sufficiently intuitive and may prevent many older adults from obtaining the information they need.[70]

Several government agencies, however, have developed senior-friendly tools. The IRS, for example, has increased the usability of IRS.gov in order to spur the usage of online paper filing. Ongoing usability tests, online surveys, and focus groups have been used to understand customer needs and improve the site's usefulness and flexibility.[71] The IRS also relies on the American Customer Satisfaction Index, an independent organization, to benchmark customer experiences on the website.[72] As a result of these efforts, the IRS saw record numbers of site visits in 2008[73] and a 19 percent increase in e-filings from home computers in 2009.[74]

Improvements in accessibility and usability of some government services have proven to be effective in spurring usage of these services by the general public (see Section VII) and may likely be critical to ensuring that older adults become active online participants.[75]

3. *Low rate of computer ownership*

Owning a computer is an essential prerequisite to adopting and using broadband at home. Those without a home computer have lower levels of demand for broadband. To this end, a recent study of homes in Tennessee found that 36 percent of residents with no home broadband connection attributed their non-adoption to the lack of a home computer. Lack of a computer outweighed both price and availability as a major deterrent to broadband adoption.[76]

Senior citizens are less likely than any other age group to own a computer.[77] As the Consumer Electronics Association has observed, "[a]dults over the age of 65 are 21 percent less likely to own a home computer than adults under the age of 30."[78] Owning or having access to a computer is essential to using wire-based broadband and is essential for developing technology skills and overcoming initial cost-barriers to broadband adoption. Continued low computer ownership among seniors represents a formidable barrier to broadband adoption.

4. *Affordability of broadband for seniors who live on fixed incomes*

While broadband prices have decreased over time, many seniors live on fixed incomes and find the service to be unaffordable.[79] The median income for seniors in 2007 was $24,323 for males and $14,021 for females.[80] For households containing families headed by someone over the age of 65, median income in 2007 was $41,851.[81] By way of comparison, the median income for households headed by someone under the age of 65 was $56,545 in 2007.[82] Income levels impact broadband adoption. Indeed, the vast majority of homes with incomes above $75,000 have adopted broadband, compared to 35 percent of households with annual incomes below $20,000.[83]

With the average price of broadband service estimated to be $39 per month, compared to $26.60 for dial-up,[84] many seniors are opting for the slower but cheaper alternative. While spending an additional $10-15 per month may be worthwhile and could potentially be offset by cost savings enabled by their broadband connection (see above), many seniors have not done so. However, once seniors experience the difference between dial-up and broadband, anecdotal evidence suggests that many opt to pay more for broadband service.

While the Universal Service Fund (USF) assists many low-income individuals in obtaining basic telephone service, such an option does not currently exist for

broadband. The Lifeline and Link-Up programs currently offer up to $30 for installation fees and $10 per month to offset phone costs to help many low-income Americans access the technology they need.[85] Lack of similar funding for broadband services may prevent many older adults from utilizing such technologies. A growing number of organizations and entities support expansion of USF subsidies to include broadband services.[86] Legislation was introduced in the U.S. House of Representatives in September 2009 that would devote a percentage of Lifeline funds for broadband purposes.[87]

However, in the absence of policy reforms and of effective outreach initiatives to educate seniors on how to use a broadband connection to save money, many seniors will likely remain off-line because of the perception that the cost of the service is too high.

5. *Online security concerns*

Older adults tend to be wary of providing personal information online. Pew found that 82 percent of senior Internet users did not like sharing their credit card number or personal information online, compared with 71 percent of those aged 18 to 29.[88] While 46 percent of Internet users ages 30 to 49 are online shoppers, only six percent of those over 65 have ever purchased a product online.[89] Anxiety over Internet use stems largely from the many reports of identity theft, viruses, malware, Internet fraud, and technology breakdowns.[90] A 2008 study found that older adults are afraid of venturing into chatrooms, where they might fall victim to predatory conduct.[91] In addition, many seniors doubt the trustworthiness of online information sources.[92] Moreover, some seniors express a fear of having their financial information or e-mail address to fall into the wrong hands.[93]

Senior citizens may be more at risk for Internet fraud than other demographics. A study by the American Psychological Association found a strong correlation between memory problems and vulnerability to scams.[94] The study found that older adults are ten times more likely to remember false information than younger adults.[95] Further, a lack of technical expertise and knowledge of Internet safety can put individuals at greater risk for online ploys.[96] Among common Internet crimes, seniors are at greatest risk for financial exploitation.[97] As a result, many seniors are wary of even venturing online for fear of having their identity stolen or otherwise being manipulated. Entities like AARP have sought to educate older users about how to safely surf the Web,[98] but concerns about online security are still prevalent.

6. *Unique living conditions*

This barrier examines two types of living conditions that are prevalent among older adults: (a) living in rural areas and (b) living in non-traditional housing.

a. *Rural seniors*

According to the FCC, competition for customers has driven broadband deployment to most parts of the country.[99] The U.S. Internet Industry Association has also found that "the deployment gap between metropolitan and rural areas is closing."[100] According to the U.S. Department of Agriculture (USDA), Internet adoption rates are similar in urban versus rural areas when income factors are accounted for.[101] However, the gap between broadband adoption in rural and urban areas remains, regardless of income level.[102]

This digital gap holds considerable implications for the senior demographic since older adults are more likely than the average U.S. resident to live in a rural part of the country. According to the USDA, some 15 percent of seniors live in rural areas, compared with just 12 percent of the general population.[103] In addition, the USDA has observed that, compared to their more urban counterparts, rural seniors "generally have less income, lower educational attainment, and a higher dependence on social security income."[104] Adoption of broadband by rural seniors is especially important because of the many social, economic, and healthcare-related benefits it can deliver.

b. *Non-traditional living arrangements*

Seniors living in nontraditional institutions are less likely to be exposed to broadband than those in traditional homes. Even though a majority of adults over the age of 65 live at home, 4.4 percent live in nursing homes.[105] However, these numbers vary widely among generations of seniors. Only 1.3 percent of seniors between 65 and 74 are in nursing homes; this number rises to 15.1 percent for those over age 85.[106] Thirty percent of seniors live alone.[107]

These trends are important because second-degree Internet access is a key aspect of broadband adoption.[108] Indeed, a study of a Navajo farm community found that such a "social infrastructure" is critical to bridging gaps in adoption and usage.[109] For seniors in particular, the traditional household is a valuable source of information about computers and the Internet, as children and grandchildren are likely to utilize such technologies. Data shows that broadband use is positively correlated with marital status, or living with a partner, and whether one is the parent of a minor child in the household.[110] If seniors are not around others who use the Internet, and thus do not observe its benefits, then it will be difficult for older adults to understand the true value of broadband.[111]

7. *Disincentives for using broadband to work past retirement*

Broadband can enable seniors to extend their careers past retirement age or begin new careers via the Internet. This is critical, considering the recent rise in unemployment levels for those over age 55 and the increasing number of older adults who are looking to return to the workforce after retirement (see above).

According to AARP, older adults are poised and willing to work past retirement: "69 percent of workers [between the ages of] 45 to 74 plan to work during retirement years."[112] While 29 percent of low-income older workers plan to work just to stay active, 68 percent must work because their retirement income is not enough to live on.[113] Further, many older adults hope to work on different terms, with more flexibility and autonomy than during earlier careers. Seventy percent of older workers say they are looking for ways to balance work and their personal lives, and 41 percent report that the ability to work from home is an absolutely essential part of their ideal job."[114] A recent report issued by the Taskforce on the Aging of the American Workforce (TAAW) observed that the supply of seniors in the workforce will increase significantly over the next decade, rising by 74 percent between 2004 and 2014.[115] AARP has noted that broadband will play a major role in extending the careers of seniors.[116]

Broadband-enabled telecommuting will be important for older workers. Indeed, the TAAW has recommended that employers promote telework and flexible retirement options for older workers in order to retain them[117] and continue benefiting from their managerial experience and expertise.[118] *However, disincentives stemming from Medicare and Social Security program requirements may deter many seniors from utilizing broadband to work past retirement.*

Clauses in the Medicare laws, for example, create unnecessary obstacles for seniors who wish to use broadband to bolster their income. For instance, the cost of some Medicare benefits increases if a senior returns to work and earns over a certain amount in income per year.[119] Likewise, Social Security benefits may be reduced if an individual works part-time before retiring.[120] Moreover, those who attempt to return to work after receiving Social Security funds may face benefit reductions if they earn over a certain amount in income each year.[121] Thus, for older adults who wish to use a broadband connection to work past retirement, these types of rules may deter those who do not wish to have to ultimately pay more for benefits they have earned.

8. *Lack of training and core computer competencies*

Many baby boomers and younger seniors typically develop computer and Internet skills in the workplace, carrying those skills into retirement.[122] However, many older seniors likely left the workforce before computers were regularly used.[123] Thus, many now lack the requisite skills to use broadband to enhance their lives.[124] To this end, a

survey of older adults participating in a SeniorNet computer-learning course found that personal frustrations, functional limitations, and time constraints were among the most significant barriers to Internet use.[125] Many of the participants had experienced frustration with their own perceived limitations during the learning process.[126] Mental and physical limitations include their perceived lack of knowledge of computer skills, loss of mental acuity, and mobility limitations. Other seniors feared that they lacked enough time to learn how to effectively use the technology.[127] Another study found that barriers identified by older adults include the complicated nature of computer and Internet applications, too much technical jargon, and a lack of support both during the learning process and with on-going use.[128]

Anecdotal evidence, however, suggests that, even though learning to use the Internet can be a very confusing process for some seniors, the opportunity to learn in a supportive educational environment helps to overcome this barrier.[129] Moreover, once seniors are able to acquire the necessary computer-literacy skills, they become avid users and increasingly incorporate broadband into their daily lives.[130] However, many seniors simply remain offline because they lack basic computer and Internet skills.

9. *Systemic lack of coordination among government entities regarding funding of senior-oriented training programs*

Senior-specific training efforts have been deployed across the nation by private actors such as AARP, SeniorNet, and the Alliance for Public Technology. In addition, local efforts like that of the Older Adults Technology Services (OATS) in New York City[131] are increasingly prevalent. These types of programs have been very effective in enabling seniors to develop the skills they need to incorporate broadband into their lives. However, many of these organizations lack funding to expand their efforts.

Public funding provides the lifeline for many of these senior-specific education programs. While some local nonprofits like OATS in New York are able to attract private support, many programs, like Computers4Seniors in Georgia, rely entirely on public funding.[132] There is an overall lack of funding and coordination among many local state governments regarding how to effectively target and fund broadband and Internet-related training programs. Also, many local and state governments do not even consider the funding of senior technology training programs a priority, focusing instead on traditional senior care services, such as senior recreation centers. Stimulus funding has been allocated to support "sustainable adoption programs," but additional funding is likely needed in order to support proven training approaches to spurring broadband adoption among senior citizens.

* * * * * *

III. PEOPLE WITH DISABILITIES

For people with disabilities, broadband is a transformative tool that enables a number of life-enhancing impacts and facilitates wider availability of educational and employment opportunities. These impacts are analyzed in Part A. Many people with disabilities, though, remain offline. Part B identifies key policy and non-policy barriers to further broadband adoption and usage by people with disabilities. These range from negative perceptions that broadband technologies are inaccessible to a variety of affordability concerns.

A. An Overview of Broadband & People with Disabilities

This part provides: (1) an overview of broadband adoption among people with disabilities; (2) a broad survey of how broadband is impacting the lives of people with disabilities; and (3) a summary of the educational and economic opportunities enabled by this technology.

1. *Broadband Adoption Among People with Disabilities*

There are approximately 50 million people with disabilities living in the United States;[133] 41.3 million are non-institutionalized people over the age of five.[134] Of those between the ages of 16 and 64, 7.1 percent reported an employment disability.[135] Older Americans report a higher rate of disability than any other age group. According to a 2007 report, the prevalence of disability among those over age 75 was 52.9 percent, compared to 12.8 percent for persons between the ages of 21 and 64.[136]

In order to appreciate the various types of broadband-enabled impacts and challenges among people with disabilities, understanding the vast spectrum of individual disabilities is crucial. Table 4 provides a broad survey of recent statistics regarding the number of people with physical, sensory, cognitive, developmental, and a number of other disabilities. This Table is by no means exhaustive but is representative of the diversity in the current population of people with disabilities in the United States.

TABLE 4 - **A Survey of Statistics re People with Disabilities**

Physical[137]	Sensory[138]
▪ Nearly 26 million adults in the United States report some form of physical disability.[139] ▪ The number of people with spinal cord injuries was estimated to be 259,000 as of April 2009.[140] ▪ Over 32 million adults report some sort of physical functioning difficulty.[141] ▪ 15.4 million adults are unable to walk a quarter of a mile.[142]	▪ In 2006, 21.2 million non-institutionalized Americans reported "vision loss," which includes "individuals who reported that they have trouble seeing, even when wearing glasses or contact lenses, as well as individuals who reported that they are blind or unable to see at all."[143] ▪ In 2006, 37 million adults in the United States reported being deaf or hard of hearing.[144]
Cognitive[145]	**Developmental, Learning, Speech, etc.**
▪ Over 20 million people in the United States have a cognitive disability.[146] ▪ An estimated 57.7 million people over the age of 18 suffer from a diagnosable mental disorder in a given year, while nearly 6 percent of the population suffers from a serious mental illness.[147] ▪ Over 5 million people in the United States have Alzheimer's disease. Ten million baby boomers will develop Alzheimer's.[148] ▪ Over 500,000 people in the United States have some degree of cerebral palsy.[149]	▪ Between 30 and 50 percent of the United States population has undiagnosed learning disabilities.[150] ▪ As many as 1 out of every 5 people in the United States has a learning disability, with nearly 3 million public school children (ages 6 through 21) having some form of a learning disability and receiving special education in school.[151] ▪ Over 14 million Americans have some sort of speech/communication disability not associated with hearing loss.[152] ▪ 1.5 million Americans are living with the effects of autism spectrum disorder.[153]

As discussed below, broadband is an essential tool for people with disabilities. It empowers them to live more independent lives, to stay in better contact with family and friends, to work from home, to start a small business, and to participate in a wide array of educational activities. However, even though broadband is widely available,[154] a significant number of people with disabilities have yet to adopt broadband.

According to one study, less than a third of people with disabilities – 24 percent – had adopted broadband by 2008.[155] Moreover, just 51 percent of people with a disability or chronic illness went online in 2007, compared to 74 percent of those with no chronic condition. This number rose by 46 percent for people with a disability or chronic illness between 2002 and 2007, compared to just 21 percent for those with no chronic condition.[156]

Rising computer ownership rates[157] coupled with more widespread Internet usage[158] by people with disabilities suggests that this demographic group, as a whole, is increasingly aware of, demanding, and adopting broadband. As set forth in Part B below, however, robust adoption of broadband by people with disabilities is inhibited by a number of barriers.

2. *The Impacts of Broadband on People with Disabilities*

Broadband enables a wide array of social, economic, and health-related impacts for people with disabilities. Table 5 provides an overview of these impacts.

Table 5 - Overview of Broadband's Impacts on People with Disabilities

Social Impacts	*Economic Impacts*	*Health-Related Impacts*
▪ Broadband increases connectivity with family and friends. ▪ Broadband provides many people with disabilities with an interactive outlet to the world. ▪ Family, friends, and caretakers use broadband for support and for the exchange of critical care information.	▪ Individual economic gains include: enhanced education opportunities; e-commerce; and enhanced employment opportunities. ▪ Economy-wide gains include increases in: small business creation; workforce participation; productivity; and innovation vis-à-vis tailored content, services, and applications.	▪ Broadband is generally enhancing the wellbeing of people with disabilities. ▪ Broadband enables life-enhancing telemedicine services like in-home monitoring and other remote services. ▪ Cost savings associated with widespread usage of broadband-enabled healthcare services and applications among people with disabilities could be enormous.

An important impact of broadband for many people with disabilities is its use in enhancing communications among family, friends, and care givers. A number of recent surveys have found that well over 80 percent of people with disabilities who are online use the Internet to send and receive emails.[159] Chat services (e.g., instant messaging programs) are also popular[160] and represent another important social outlet for people with disabilities, particularly those with speech and hearing disabilities, liberating them from dependence on a telephone.[161] Broadband also enables more personal and interactive communications via video, which has recently emerged as a critical medium for people who are hard of hearing or deaf. To this end, Video Relay Services enhance traditional text-based telephone communications by making interpreter services widely available and convenient for people who are deaf. A deaf person with a web-cam or other broadband-enabled video device can call an interpreter via the Internet, who then facilitates communication with a hearing person.

Broadband also allows for more real-time transmission of important health information. For people with disabilities, accessing information related to their individual healthcare needs is particularly empowering because it increases a sense of independence and self-determination.[162]

3. *Educational & Economic Opportunities Facilitated by Broadband*

The educational and economic opportunities enabled by broadband are vitally important to people with disabilities since this demographic, as a whole, (a) has a higher unemployment rate than people without disabilities, (b) earns less than people without disabilities, and (c) has completed less schooling than people without disabilities. Table 6 provides a summary of these metrics.

Table 6 - Employment, Income & Educational Attainment Comparison

	Employment Rate	Median Annual Household Income	% Attaining a Bachelor's Degree
People with Disabilities	37%	$38,400	12.5
People without Disabilities	80%	$60,000	31

**All data as of 2007*

Source: Cornell University Rehabilitation Research & Training Center on Disability Demographics and Statistics, *2007 Disability Status Report* [163]

Broadband is essential to this demographic group as it facilitates an array of economic opportunities that might otherwise be impossible or difficult to realize. Table 7 summarizes these opportunities.

Table 7 - Overview of Educational & Economic Opportunities Enabled by Broadband

Educational Opportunities
▪ Broadband enables a wide array of distance education programs and other educational applications. In addition, many universities now offer online classes, enabling people with disabilities to earn undergraduate and advanced degrees (see Section VI).
Employment Opportunities
▪ Broadband can help level the playing field between employment opportunities available to people with disabilities and people without disabilities. For example, there are a number of websites that provide job listings that specifically target people with disabilities. These and other such resources are a boon to this demographic. ▪ Telework options are also increasing for all workers, including people with disabilities. Approximately 42 percent of employers currently offer employees a telework option, up from 30 percent in 2007.[164]
Entrepreneurial Opportunities
▪ Broadband is a fertile medium for small business creation and can reduce or eliminate a number of overhead costs associated with traditional businesses. This is especially important for people with disabilities since this demographic "[has] a higher rate of self-employment and small business experience than people without disabilities."[165]

Notwithstanding the opportunities and other positive impacts enabled by broadband, a large number of people with disabilities remain offline.

B. Barriers to Broadband Adoption

This part identifies key policy and non-policy barriers to further adoption and usage of broadband by people with disabilities. These barriers include:

1. Availability of broadband for people with disabilities living in remote areas
2. Low levels of computer usage and ownership
3. Limited access to public computers
4. Low levels of exposure to the benefits enabled by broadband
5. Negative perceptions regarding the accessibility of broadband
6. Affordability concerns related to subscription price and costs of assistive technologies
7. Interoperability of assistive technologies

8. Lack of training and expertise among people with disabilities and among educators
9. Lack of data regarding the individual needs of people with disabilities vis-à-vis broadband
10. Lack of best practices for spurring awareness, demand, adoption, and use of broadband
11. Uncertainty regarding the relationship between legislation, innovation, and access to new technologies and services

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1. *Availability of broadband for people with disabilities living in remote areas*

Despite increasing availability of broadband, the FCC has concluded that more needs to be done to deploy networks to unserved areas of the country.[166] This is of particular consequence for the large number of people with disabilities living in rural areas.

People with disabilities are more likely than most other demographic groups to live in less densely populated areas. It is estimated that upwards of 20 percent of people with disabilities – roughly 11 million people – live in rural parts of the country,[167] compared with just 12 percent of the general population.[168] Though rural broadband access and adoption have increased in recent years,[169] individuals living in rural locations are much less likely to have home broadband. Over the past year, broadband adoption rates in rural areas increased from 38 percent to 46 percent, which is still lower than the 63 percent adoption rate for the entire United States.[170] Among people with disabilities, Internet use rates for people in non-metro areas remains significantly lower than that of people with disabilities in urban locations.[171]

2. *Low levels of computer usage & ownership*

Owning a computer is a necessity for individuals utilizing wire-based Internet connections. Moreover, those with a home computer are much more likely to demand broadband than those without one.[172] However, computer ownership, though rising, remains low among people with disabilities. A 2000 study found that only 24 percent of people with disabilities had a computer at home, compared to nearly 52 percent for people without a disability.[173] By 2006, the number of people with disabilities who had a home computer had risen substantially, to nearly 40 percent, but this number was still lower than for people without disabilities.[174] In 2008, slightly more than half of people with disabilities – 51 percent – reported having a computer at home.[175]

Concerns regarding the accessibility, price, and awareness of assistive technologies may prevent many people with disabilities from purchasing a home computer to enable broadband use (see Barriers #5 and #6). Many types of disabilities render computers on their own inaccessible, requiring the identification and purchase of additional hardware (e.g., a certain type of mouse or keyboard) and software (e.g., a screen-reader program). The vast number of products available may overwhelm many people with disabilities who are unfamiliar with these types of assistive technologies. In addition, the initial cost of computers and necessary assistive technologies may be unaffordable for a large number of people with disabilities, as this demographic as a whole earns less than people without disabilities.[176] Further, there is a general lack of awareness of assistive technologies for computer and Internet use, as a 2007 survey discovered that just 3 in 10 people with disabilities were aware of all of the services available to them.[177]

3. *Limited access to public computers*

Public computers are an important resource for some people with disabilities who wish to get online. Libraries, public computing centers, and other such places that offer free access to computers and the Internet may be "viable alternatives" for some people with disabilities who do not have a computer at home.[178] Frequently, however, access to public sites that provide public Internet access and computers are structurally inaccessible to people with certain types of disabilities, representing a significant barrier to computer use.[179] Despite accessibility mandates for places of public accommodation, many libraries, community centers, and other locations may still lack ramps or elevators leading to computer terminals.[180] And even when adequate physical access to public computers is provided, necessary assistive technologies and custom configurations to utilize computers and the Internet are often unavailable.[181]

Stimulus funding has been allocated to bolster public computer and Internet access for people with disabilities, among other groups.[182] This includes, for example, using funding to purchase assistive technologies to make a computing center more accessible to people with certain types of disabilities.[183] The $50 million in stimulus funding available for these purposes, however, is likely inadequate to enhance computer access for people with disabilities in the more than 17,000 public libraries and thousands of other public computing centers in the United States.[184]

4. *Low levels of exposure to the benefits enabled by broadband*

A significant number of adults, including people with disabilities, remain offline and cite a lack of interest in the Internet as the primary reason for not adopting broadband.[185] According to one study, "Some people may not express interest in Internet use because they do not realize the wealth of information and social connections use of the medium would make possible."[186] There continues to be a gap

between those people with disabilities who recognize and appreciate the life-enhancing benefits of broadband and those who are unaware of the benefits.

Exposure to broadband is a critical component to adoption, as it tends to stimulate demand among potential users.[187] When individuals are not around others who use broadband, they are unable to witness, first-hand, its benefits or receive help from others, thus negatively impacting broadband adoption.[188] Indeed, "Most Internet users have many years of online experience," while the amount of users with less than one year of experience accounts for just six percent of the overall adult Internet population.[189]

Broadband users garner critical computer and Internet skills through education and work environments, to which many people with disabilities are not exposed. Lower levels of employment and educational attainment mean that people with disabilities, as a whole, have less exposure to computers and the Internet in formal settings.[190] Indeed, a 2007 study found that people with a disability or chronic illness are much less likely to go online from work than those without chronic conditions (31 percent compared to 54 percent).[191] Further, just 30 percent of adults with less than a high school degree have broadband access at home, compared to 83 percent of those with a college degree or more.[192] More generally, a recent study found that 64 percent of people without a disability access the Internet "anywhere," compared to 31 percent of people with disabilities.[193]

Low levels of experience and exposure to broadband may contribute to a diminished value proposition and perceived relevance of broadband among people with disabilities. A significant portion of people with disabilities generally view the Internet as unnecessary and do not recognize or appreciate the many benefits associated with a broadband connection.[194] One recent study found that 22 percent of offline adults cite a lack of interest as their primary reason for not using the Internet or email.[195] The study also found that just one percent of all non-Internet users report being "physically unable" to use these types of technologies.[196] Many people with disabilities may fail to see the benefit of broadband simply due to a lack of exposure and awareness.

5. *Negative perceptions regarding the accessibility of broadband*

Lack of exposure to broadband, along with a number of other factors, contributes to a general perception among many people with disabilities that broadband and broadband-enabled technologies are inaccessible.

Accessibility concerns tend to stem from problems operating hardware and software. Moreover, various types of disabilities make it physically difficult to use a computer or broadband connection. According to one organization, "broadband equipment and multimedia applications often require vision and/or hearing to manipulate functions

and controls, creating barriers for people who do not have one or both of these senses."[197] For example, advanced user interfaces may be an issue for people with certain types of disabilities.[198] Touch screens, soft-buttons, or graphical interfaces are growing in popularity but present significant challenges to people with vision loss.[199] In addition, the miniaturized keypads found on numerous portable electronic devices are difficult to use by many people with vision impairments or limited manual dexterity.[200]

Some online content also raises accessibility concerns among people with disabilities.[201] In response, a number of organizations have developed accessibility standards, including the World Wide Web Consortium,[202] and an increasing number of websites have begun to incorporate these standards into their sites. In addition, many websites are engaging users to build accessibility into existing services. For example, YouTube recently announced that it will allow users to embed closed captioning in its videos.[203] This enables people with hearing disabilities to view more accessible video content on this site. Other sites, like Hulu, have pledged to expand their libraries of captioned content.[204]

Emerging and more developed assistive technologies help address many of these barriers.[205] These include screen readers for use by people who are blind, speech recognition technologies to facilitate navigation and writing (e.g., email), and mouse devices that are controllable by eye or head movements.[206] Yet, as noted, many people with disabilities are unaware that assistive technologies are available to help them access the Internet and broadband-based applications.[207] This unawareness, combined with lower levels of exposure to broadband, may contribute to the perception that advanced technologies are inaccessible to people with disabilities.

6. *Affordability concerns related to subscription price and costs of assistive technologies*

While broadband prices have generally declined over the past several years,[208] the adoption rate among people earning less than $20,000 per year, which includes a substantial number of people with disabilities, continues to lag behind all other income groups.[209] Since many people with disabilities earn substantially less than people without disabilities, many potential users are unable to afford broadband access. Indeed, a 2007 study found that working-age people with disabilities earn approximately $6,500 less per year than people without disabilities.[210] The same study also found that, in 2007, the poverty rate of working-age people with disabilities in the United States was 24.7 percent, compared to only 9 percent for people without disabilities[211] (the poverty rate for the entire U.S. population rose to 13.2 percent in 2008).[212] In September 2009, the unemployment rate of people with disabilities reached 16.2 percent, compared to 9.2 percent for people without disabilities.[213]

Another cost factor for people with disabilities vis-à-vis broadband adoption is the price of assistive technologies that may be necessary for effectively using a computer and an Internet connection. One organization has observed that "[the] hardware and software needed to make computers and broadband service accessible to people with disabilities can be very costly – and most definitely enough to turn people away from these services."[214] Such technologies might include an adaptive keyboard to facilitate typing for people with motor disabilities, screen readers for people who are blind or visually impaired, speech recognition software, and a wide array of similar types of hardware that make navigation easier.[215] The two most common screen readers, JAWS or Window Eyes, can cost around $1,000 each.[216] Added costs include the installation, maintenance, and upkeep of these assistive technologies.[217]

The multiple cost components for people with disabilities who wish to adopt broadband have had a discernible impact on broadband adoption. Individual components – e.g., a broadband subscription – may be affordable, but when combined with expensive ATs and the cost of purchasing a computer, broadband adoption becomes beyond the means of many people with disabilities.[218]

7. *Interoperability of assistive technologies*

The interoperability of various components of the broadband ecosystem is a major challenge facing device and application manufacturers today. With regard to people with disabilities, major issues concern the interoperability of different generations of technology (e.g., compatibility between first-generation TTY devices and next-generation IP-based services). When "off-the-shelf" interoperability amongst applications and platforms is not an option, people with disabilities are unable to enjoy the benefits that assistive technology and broadband-enabled devices can offer.[219]

Lack of interoperability among assistive technologies is thus a significant barrier to further broadband adoption. Customers may invest in a device with certain accessibility features that are incompatible with their other devices due to generational and technical differences among the devices.[220] Considering the high cost of many ATs, this issue may prevent many people with disabilities from utilizing computers and other devices to access the Internet (see Barrier #6). Indeed, according to the Telecommunications Industry Association, "[This is] a continuing challenge because a product has generations to it and it's just the nature of how we deliver a product to the marketplace."[221]

As an example of interoperability concerns in this space, consider the compatibility issues arising from older TTY technologies and new IP technologies. Unlike newer VoIP technologies, a consistent and reliable protocol has yet to be developed for the delivery of real-time interactive text over IP data networks.[222] This poses significant problems for deaf users in emergency situations since messages can be dropped, overlap one another,

and appear out of order.[223] According to one group, "The lack of a...uniform standard could also produce a lower quality of service than that which is provided for the conveyance of voice over IP technologies, resulting in the loss of text calls in times of heavy Internet usage."[224] While TTY use is declining among people with hearing disabilities, those in rural areas or with low income still rely on TTY as their primary mode of communication.[225]

A more recent example concerns hearing aid compatibility with cell phones. The Hearing Aid Compatibility Act,[226] a 1988 law, required the FCC to ensure that "telephones manufactured or imported for use in the United States after August 1989, and all "essential" telephones, are hearing aid-compatible."[227] Over the past several years, as the market for wireless telephony has evolved, the FCC has revisited its compatibility rules and "set benchmark dates by which digital wireless handset manufacturers and service providers had to gradually increase the number of hearing aid-compatible digital wireless phones available to consumers."[228] In response, the industry has developed and made available a number of phones that are interoperable with hearing aids.[229]

Manufacturers continue to pursue a range of accessibility and design solutions. For example, representatives from a variety of private sector companies have begun to work with disability advocates to develop recommendations for approaching accessibility and interoperability issues. These stakeholders recently joined together to form the Telecommunications and Electronic and Information Technology Advisory Committee (TEITAC), which provided the federal government's Access Board with recommendations for enhancing accessibility of new and existing technologies.[230] Many individual companies have also announced plans to enhance accessibility and interoperability. Microsoft, for example, designs its products to be interoperable with third-party ATs and other products that enhance accessibility.[231] Adherence to universal design principles, which "intends that products – especially software and computers – provide an interface that is suitable for all potential users, including persons with disabilities,"[232] is also increasingly common among innovators.[233]

8. *Lack of training and expertise among people with disabilities and among educators*

Because many people with disabilities have unique needs when using a computer and accessing the Internet, broadband adoption may be especially difficult for some without proper education, training, and technical support. Indeed, a 2003 study found that 21 percent of people with disabilities remained offline because they thought it was confusing and hard to use.[234] Moreover, a 2007 Pew study found that 31 percent of people with a disability or chronic illness felt frustrated during their online search for health information, compared to 20 percent of people with no chronic condition.[235] Other studies have shown a general lack of awareness and understanding of the

Internet and assistive technologies.[236] A general lack of training for people with disabilities, their family members, and caregivers, and more targeted training for specific types of disabilities, is a major barrier to expanded technology and broadband use.[237]

Lack of expertise among educators and trainers is also a formidable barrier. Many people with disabilities rely on the knowledge of educators to teach them the requisite skills for using an assistive technology or new device. However, a number of studies have found that these skills are lacking in a variety of settings. For example, the National Center on Education Statistics found that a lack of adequate teacher training was the most prevalent barrier to computer adoption for students with disabilities.[238] In addition, many computer programs in public libraries are unable to select appropriate ATs or provide support to disabled users.[239] A 2005 study found that a number of librarians expressed concerns over a general lack of expertise with computer accessibility and listed failed attempts to increase accessibility resources in their libraries.[240]

Although anecdotal evidence suggests that local education and training programs are increasingly available across the nation, there appears to be a continued lack of information and expertise for training people with various types of disabilities to effectively use ATs and broadband connections.

9. *Lack of data regarding the individual needs of people with disabilities vis-à-vis broadband*

Comprehensive data is necessary to fully understand the diverse needs of people with certain types of disabilities vis-à-vis broadband adoption and use. To date, there has been a lack of properly disaggregated information pertaining to broadband adoption, computer ownership, and technology usage among people with various types of disabilities.[241] This has resulted in imprecise measures of actual usage of Internet technologies. For example, the RTC Rural Institute has found that survey estimates of national Internet access and use by people with disabilities have ranged from 10 to 80 percent.[242] According to another influential study, "Lack of consistency in defining exactly what constitutes a disability makes comparison across studies difficult."[243] In addition, many statistics currently available are only descriptive in nature, and therefore cannot point to the independent effects of different factors on low levels of adoption.[244] Moreover, disability status has been excluded entirely from the widely cited and respected Pew Internet Home Broadband Adoption reports.[245] Further, studies regarding broadband adoption by people with disabilities largely focus on the prevalence of disability status rather than on the differences and challenges faced by individual disability types.

More precise data would enable more targeted and effective outreach and training programs to be developed and deployed. Moreover, such data would help organizations and service providers to more fully understand the implications of broadband adoption for people with disabilities. The absence of such granular data creates a barrier to more targeted initiatives.

10. *Lack of best practices for spurring awareness, demand, adoption, and use of broadband*

The diverse needs of people with disabilities underscores the need for the development and promulgation of best practices to increase broadband adoption. The dearth of comprehensive disability literature on this subject and low levels of educator expertise (see Barrier #8) are further compounded by a shortage of exemplary research. Though progress has been slow, public and private organizations have begun compiling such data in order to spur broadband adoption among people with disabilities. For example, the Bill and Melinda Gates Foundation published recommendations for computer and assistive technology education at public libraries.[246] The National Council on Disabilities (NCD) has also released policy papers aimed at addressing legal issues concerning broadband and people with disabilities.[247] Other stakeholders have also added to this growing body of research, including the American Association of People with Disabilities and Office on Disability housed within HHS. However, these various efforts have yet to provide best practices for spurring broadband adoption by people with disabilities. Thus, individuals and groups that wish to bolster their disability services face a significant lack of information and have few resources for best practices regarding broadband and people with disabilities.

11. *Uncertainty regarding the relationship between legislation, innovation, and access to new technologies and services*

In general, the ever-evolving nature of technology presents significant challenges for lawmakers. Laws implemented today regarding certain technologies will likely become obsolete or ineffective a short time later. In the disabilities context, a number of new technologies continue to challenge existing accessibility policies. Moreover, some existing policies may not provide disabled users with ample incentives to adopt and use new technologies since these innovations may be beyond the scope of established laws. An example is instructive.

Among many other applications it enables, the iPhone supports text-to-speech applications that are increasingly popular among people with speech impairments. In particular, many find the iPhone to be much more portable and affordable and less ponderous than most existing standalone text-to-speech devices.[248] However, despite this preference among disabled users, insurance companies and plans (e.g., Medicare) do not cover these devices. The reason cited for this lack of coverage is that the iPhone

is not a medical device and can be used for a number of non-medical purposes.[249] As a result, many people with speech impairments have to "spend 10 to 20 times as much for dedicated, proprietary [text-to-speech] devices that can do far less."[250]

Insurance laws have generally been slow to recognize the impact of new technologies like broadband and smartphones on healthcare. Many agree that these laws need to be updated to reimburse for the use of efficient and effective new technologies (see Section IV).

With regard to accessibility laws, there is much disagreement over whether similar legislative change is required.

On the one hand, some argue that formal legislation will ensure a minimum level of accessibility in new technologies and services. To this end, legislation has been introduced to address issues like the accessibility of video content online.[251] The basic premise of those supporting legislation is that such laws are needed to "modernize disability accessibility mandates in the Communications Act."[252] However, this may create an expectation among some people with disabilities that, without legislation, new technologies will be inaccessible.

On the other hand, some argue that the dynamics of innovation and legislation dictate that formal laws will likely become outdated after a few years as networks, devices, and systems change, or that such laws will in fact stifle technology-based solutions to accessibility issues.[253] In its report to the Access Board, TEITAC observed that "The pace of technological advancement in [information and communication technology] is rapid and the level of innovation is high. In this environment, a static standard consisting of design specification and fixed checklists would tend to stifle innovation and to delay the availability of technology advancements to people with disabilities."[254] Thus, according to this view, market dynamics will push innovators to increasingly build accessibility into their products. However, this approach may create unrealistic expectations regarding the speed at which accessibility issues will be addressed by innovators.

These various perspectives evidence a tension between whether and how to update laws that directly and indirectly impact technology use among people with disabilities. This tension creates a general uncertainty that may contribute to the perception among people with disabilities that new technologies like broadband are inaccessible. This uncertainty may represent another barrier to further broadband adoption and use among people with disabilities.

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IV. TELEMEDICINE

For the purposes of this discussion, "telemedicine" refers to "the use of electronic communications and health information technology (HIT) to provide clinical services" for remote patients.[255] Telehealth, which encompasses a "broader application...of electronic communications and information technologies" that is used to "support healthcare services,"[256] is also implicated in this discussion.

Telemedicine is a rapidly emerging field of healthcare that provides doctors with a growing universe of tools for treating patients remotely and that enables a number of benefits for patients, including:

- The storing and forwarding of critical health information for analysis and diagnosis (e.g., MRI results) [257];
- The delivery of specialized care over long distances;
- The provision of always-on monitoring services both in and away from home; [258] and
- Expanded availability of health information to patients and care givers.

Part A provides an overview of how broadband is being used in the telemedicine sector and a discussion of its impacts.

Part B details key policy and non-policy barriers to further adoption and usage of broadband in the telemedicine sector. Barriers range from a lack of incentives (e.g., insurance reimbursement) for healthcare providers to use these tools to privacy concerns among patients who worry that their personal health information is vulnerable when placed on the Web.

A. An Overview of Broadband & Telemedicine

This part provides: (1) an overview of the impacts and uses of broadband-enabled telemedicine services and applications and (2) a summary of the cost savings enabled by these tools.

1. *Impacts and Uses of Broadband-Enabled Telemedicine*

Broadband is playing an increasingly important role in healthcare by enabling a universe of telemedicine services that, in turn, provide a number of life-enhancing, and potentially lifesaving, benefits. Among other benefits, broadband-enabled telemedicine and HIT services (e.g., electronic health records or EHRs) enable enhanced services in rural parts of the country, streamline the administration of healthcare, enable a wide

array of cost savings, and empower individuals to have more control over medical decisions.[259] Table 8 provides an overview of the wide range of impacts that broadband has on telemedicine.

Table 8 - Overview of the General Impacts of Broadband-Enabled Telemedicine

Increases the Range of Healthcare	*Facilitates In-Home Care*	*Streamlines the Administration of Healthcare*	*Enhances Care for Children, Seniors & People w/ Disabilities*
▪ Broadband-enabled telemedicine tools extend the range of healthcare to rural and unserved parts of the country. ▪ Telemedicine tools assist in leveling the playing field vis-à-vis quality of care across all demographics and geographies. These tools can, for example, help to compensate for a lack of physicians in some rural areas.[260]	▪ The wide availability and increasing affordability of broadband enables the use of effective in-home diagnostic, monitoring, and treatment services. ▪ Seniors in particular will benefit from these tools by having the ability to receive more care at home.	▪ HIT systems, especially EHRs, create efficiencies in back-office operations and enable a number of cost-savings. ▪ Telemedicine, telehealth, and HIT services have proven to increase the quality of care[261] and decrease costly medical errors.[262]	▪ Broadband-enabled telemedicine provides effective and affordable care to rural and low-income children. ▪ Tools and services have been crafted for use by senior citizens and people with disabilities, leading to vast savings.

Actual usage of broadband-enabled telemedicine services continues to increase across the healthcare sector. Indeed, utilization of these tools has grown among rural and urban patients and healthcare providers even though many telemedicine deployments and a significant portion of federal funding have primarily targeted rural areas.[263] In addition, innovators across the private sector are increasingly using broadband – in particular wireless broadband – to enable and deliver a range of cutting-edge telemedicine services and applications. Table 9 provides an overview.

Table 9 - Overview of Current Broadband-Enabled Telemedicine Uses

Patients	*Healthcare Providers*	*Innovators*
▪ In 2000, more than half of all Internet users had used the Web to obtain medical or health information.[264] That number rose to 75% by the end of 2007.[265] Increased use of the Internet for health-related searches could spur demand for additional healthcare services delivered via the Web. ▪ A recent study of *patient satisfaction* with remote neurotology care found that patients held more positive perceptions of telemedicine interactions after receiving care.[266] Exposure to the direct benefits of broadband-enabled telemedicine may also increase demand.[267] ▪ Example: One study projects the market for *remote monitoring services* will become a $2 billion per year industry by 2010.[268] The same study estimates that 3.4 million seniors will be using networked sensor applications to monitor and improve their health by 2012.[269]	▪ By 2006, 46% of community hospitals reported moderate or high use of HIT, compared to 37% in 2005.[270] ▪ According to the U.S. Department of Health and Human Services, 4%of physicians have adopted fully functional EHR systems.[271] However, financial incentives (e.g., reimbursement bonuses), have worked to spur use of services like e-prescribing.[272] ▪ Example: American Well – a web-based physician consultation program – provides patients with the opportunity to have scheduled and unscheduled teleconsultations with doctors. An e-nurse application "triages" a patient and recommends a doctor.[273] Once the patient speaks remotely with a doctor via Web-cam, the patient has the ability to forward the results of the consultation – notes, test results, diagnoses, etc. – to his or her primary care physician.[274]	▪ A recent study estimated that "the market for telemedicine devices and services will generate nearly $3.6 billion in annual revenue within the next five years."[275] As a result, many innovators in the private sector are increasing their investment in broadband-enabled telemedicine tools. ▪ The market for mobile telemedicine applications, which use wireless broadband, appears to be the locus of much innovation. A recent survey found that nearly 80 percent of consumers expressed interest in these types of mobile health solutions.[276] ▪ Example: Over 2,000 mobile health applications are available for use on Apple's iPhone or iPod touch devices.[277] An example is the Mobile MIM Application for the iPhone, which "allows a referring physician or patient to view medical images remotely, without being tied to an imaging workstation."[278]

Despite these many gains and a general upward trend in use of broadband-enabled telemedicine services, a number of cultural, psychological, and cost barriers to further adoption and usage of these tools.

2. *Cost Savings Enabled by Telemedicine*

With healthcare costs soaring,[279] broadband-enabled telemedicine offers policymakers, healthcare providers, and patients a set of tools that have the potential to drastically cut

costs and enhance the quality of care. Table 10 provides an overview of the potential cost savings facilitated by broadband-enabled telemedicine.

Table 10 - Overview of Cost Savings Enabled by Telemedicine

Remote Monitoring Reduces Healthcare Expenditures
▪ A recent study estimated that "a full embrace of remote monitoring alone could reduce healthcare expenditures by a net of $197 billion (in constant 2008 dollars) over the next 25 years with the adoption of policies that reduce barriers and accelerate the use of remote monitoring technologies."[280]
In-Home Chronic Disease Management Creates Efficiencies
▪ In 2002, the U.S. Veterans Affairs found that in-home chronic disease management tools (e.g., teleconsultations, remote diabetes monitoring) resulted in 40% fewer emergency room visits and a 63% reduction in hospital admissions.[281] ▪ In 2009, a U.S. Veterans Affairs telehealth pilot saw a 19% decrease in hospitalizations, a 25% decrease in bed days of care, and a 27% decline in 4-year diabetes mortality rate. The decrease in hospitalizations, alone, totals $2.2 billion per year in cost savings.[282]
Early Disease Detection Can Save Money in the Long Term
▪ Using remote monitoring tools to recognize and intervene in the early onset of diseases like Alzheimer's and other dementia could delay their development. It was recently estimated that "interventions that could delay the onset of Alzheimer's disease by as little as one year would reduce prevalence of the disease by 12 million fewer cases in 2050."[283] ▪ Early intervention for people at risk of congestive heart failure (CHF) (the leading cause of hospitalization in the U.S.), could save from $5 to $7 billion per year.[284]
Reduction of Unnecessary or Redundant Consultations, Tests & Transfers
▪ A recent study estimated that broadband-enabled real-time video consultations could replace upwards of 45% of in-person visits regarding heart-related matters.[285] ▪ Computerized physician order entry could save up to $1.1 billion nationally through a 13% decline in duplicate tests.[286] ▪ One study estimates that telemedicine "could save the U.S. healthcare system $4.28 billion [annually] just from reducing transfers of patients from one location, such as a nursing home for medical exams at hospitals, physicians' offices, or other caregiver locations."[287]
EHR-Related Cost Savings Have the Potential to be Enormous
▪ Studies have estimated that EHRs could lead to annual cost savings of between $77 billion[288] and $80 billion.[289]

Broadband-enabled telemedicine services are expected to provide enormous benefits to rural users and to user groups that require more acute care. *For example, one study estimates that broadband-enabled health and medical services can save some $927 billion in healthcare costs for seniors and people with disabilities over the next few decades.*[290] With the senior population expected to double by 2050,[291] and with senior care accounting for nearly 60 percent of healthcare spending,[292] broadband-enabled telemedicine holds much immediate and long-term promise for this user group in particular. However, further adoption and usage of broadband-enabled telemedicine services is poised to increase rapidly as the many barriers discussed in the next part are eliminated by policy and cultural changes.

B. Barriers to Broadband Adoption

This part outlines the wide array of policy and non-policy barriers to further adoption and usage of broadband in the telemedicine sector. As an overview, these barriers include:

1. Inadequate reimbursement mechanisms for most telemedicine services
2. Outdated and fragmented privacy policies for the electronic transmission of health data
3. Lack of security standards for data generated from telemedicine services
4. Patchwork of state-by-state physician regulation
    a. Licensing
    b. Credentialing
5. Uncertainty regarding the scope of tort laws
6. Negative perceptions and inadequate value propositions for using telemedicine services by patients
7. Inadequate value propositions and high costs associated with telemedicine applications for physicians
8. Concerns related to the outsourcing of certain medical functions
9. Limited scope of federal telemedicine funding
10. Lack of standards to guide the interoperability of new telemedicine services
11. Lack of available spectrum for the deployment of new telemedicine services and applications
12. Institutional inertia among some physicians

1. *Inadequate reimbursement mechanisms for most telemedicine services*

An antiquated set of reimbursement mechanisms in many public and private health plans do not provide adequate economic incentives for healthcare providers to adopt and use broadband-enabled telemedicine services.[293] A reimbursement scheme that fails to compensate doctors for both "real" and "virtual" medical consultations and procedures will likely keep healthcare rooted in traditional face-to-face encounters and preclude the realization of many of the cost savings and benefits previously noted (see Section IV.A).[294]

Healthcare in the United States is financed by two streams of funding: (1) the collection of money for healthcare (e.g. insurance premiums and taxes), and (2) the reimbursement of health service providers for healthcare (e.g., money to doctors from insurance carriers or the government).[295] Telemedicine cost issues are primarily concerned with the latter. The mechanics of most private health plans typically mirror those of government at both the state and federal level, especially on issues of reimbursement.[296]

Government healthcare is largely disbursed via Medicare and Medicaid. Medicare is a single-payer program that covers some 44.7 million Americans - 37.4 million of whom are "aged" and 7.3 million of whom are "disabled."[297] It is financed by federal income taxes, a payroll tax shared by employers and employees, and individual enrollee premiums.[298] Medicaid, on the other hand, is operated at the state level and covers approximately 62 million low-income Americans.[299] Medicaid programs are financed jointly by the states and federal government through taxes so that every dollar spent by a state on Medicaid is matched by the federal government by at least 100 percent.[300]

Given the broad reach of these programs, Medicare and Medicaid account for substantial percentages of healthcare providers' revenues. However, under the current reimbursement structure for these programs, many advanced telemedicine services generally are not reimbursable. Further, Medicaid funding has historically favored the use of institutionalized care for the elderly, thereby discouraging in-home treatment.[301] States are required by federal law to provide nursing home services, but no law mandates community or home-based care.[302] As a result, healthcare providers often lack a financial incentive to adopt and use alternative types of services like in-home monitoring or other such telemedicine services.[303]

Over the past few years, however, Medicare has begun to alter its reimbursement structure vis-à-vis telemedicine services, but its scope remains limited.[304] For example, Medicare recently announced a pilot program in Arizona and Utah that allows beneficiaries to maintain and manage electronic health records (EHRs).[305] Beneficiaries, though, can only choose from among a limited list of participating EHR providers.[306] In

addition, Medicare will only pay for telemedicine services that are provided via videoconference.[307] Medicare has a much narrower and less inclusive view of in-home telemedicine; it does not cover in-home medical service provided via a telecommunications service.[308] "Store and forward" services like teleradiology are covered but only certain certified healthcare facilities are eligible to provide Medicare-supported telemedicine services.[309]

Medicaid has also changed its policies to potentially facilitate telemedicine. To this end, it recently began working with 29 different states to finance remote care for the elderly.[310] The program, called Money Follows the Person, allows older adults to age in place, potentially saving costs associated with institutionalized care.[311]

Some private insurers have also begun providing reimbursement to some patients utilizing telemedicine services. United Healthcare, for example, updated their reimbursement policy to include a variety of telehealth services.[312] United Healthcare defines telehealth services somewhat narrowly as, "live, interactive audio and visual transmissions of a physician-patient encounter from one site to another [site] using telecommunications technology."[313] Asynchronous telemedicine services, such as those utilizing store-and-forward technologies, are not included, however, as they do not provide direct, in-person contact.[314] This excludes a number of telemedicine services, such as on-line medical consultations and evaluations that do not use videoconference technology.[315]

While there are a number of other examples where private insurers are beginning to cover broadband-enabled telemedicine service (e.g., the American Well program described above[316]), most insurance plans still do not reimburse for the full range of telemedicine and do not provide adequate incentives for the provision of alternative services.

2. *Outdated and fragmented privacy policies for the electronic transmission of health data*

An outdated set of privacy policies that may not provide adequate protection to sensitive medical information is a challenge to more robust adoption and use of telemedicine services. Indeed, the security of personal health information is paramount to doctors and patients as more advanced telemedicine services and devices collect and transmit an increasingly large volume of medical data over the Internet. Although transferring personal health information electronically via e-mail or an EHR may be efficient, it raises important issues regarding the confidentiality of patient data and the possibility of private medical information being illegally viewed or stolen by a third-party.[317] Privacy laws, however, have largely failed to keep pace with technological change and afford suboptimal protections for patients.

Patient medical data is protected by both state and federal law. To this end, most states have enacted laws of general applicability regarding the electronic transmission of health information. However, these were crafted in response to the mostly intrastate nature of many modern telemedicine services that have been launched and may be inadequate in a world where broadband-enabled telemedicine services allow for the transmission of health data in real-time manner across state lines and international borders. This patchwork system of privacy standards forged to address intrastate services increases compliance costs in a borderless digital world, and it decreases the incentive for doctors to share data with healthcare providers in other states.[318] As a result, usage of telemedicine services may be negatively impacted by inconsistent state-level privacy laws.

With regard to the federal component, the current set of health privacy policies is largely out of date as it relates to telemedicine. In 1996, Congress passed the Health Insurance Portability and Accountability Act (HIPAA) to, among other things, streamline electronic medical record systems while protecting patients, improving healthcare efficiency, and reducing fraud and abuse.[319] HIPAA requires healthcare providers, health plans, and business associates to adopt security and privacy standards for electronic communications, medical records, and medical transactions.[320] Prior to HIPAA, a "comprehensive personal right to privacy in one's medical affairs did not exist."[321] The HIPAA privacy component, which creates standards for maintaining the integrity of protected health information, is applied to information that is transmitted for healthcare operations, as well as financial or administrative purposes.[322] Covered entities, which include all health plans, healthcare clearinghouses, and healthcare providers who conduct electronic healthcare transactions, are responsible for ensuring HIPAA compliance from their business associates who receive protected health information in the process of providing services to the covered entity.[323]

HIPAA, however, does not address all of the privacy concerns related to broadband-enabled telemedicine services, which raises several privacy issues that are not typically encountered during conventional medical practice.[324] First, there is a concern that some telemedicine services could be regarded as a healthcare operation and therefore fall under the "treatment, payment, or healthcare operations" categorization, which permits the use and disclosure of protected health information without patient consent. Second, teleconsultations may require additional non-clinical personnel (e.g., technicians, camera operators, etc.) who do not participate in traditional healthcare but who nonetheless would be required to comply with all HIPAA regulations.

Third, in traditional healthcare scenarios, providers typically have existing relationships with the medical specialists whom they consult. However, in the telemedicine arena, patients and their on-site medical providers often will not know which clinical and non-clinical personnel will be involved at the distant site. HIPAA

does not directly address this or many other situations arising from the use of broadband-enabled telemedicine tools.

3. *Lack of security standards for data generated from telemedicine services*

In addition to outdated privacy protections vis-à-vis telemedicine, there is a general lack of standards to ensure the security of medical data being transferred via the Internet.

The amount of data generated from telemedicine services is substantial. Indeed, telemedicine enables the use of devices such as video, audio, sensors, and various health meters to send patient information over a broadband network in real time.[325] At a time when harmful content like spam and malware continues to threaten the general user experience,[326] more robust policies that protect sensitive medical data are especially needed.

In addition, enhancing the security of networks could increase more regular usage of these services. Issues continue to arise when data is sent over an unencrypted network or is accessed by unauthorized personnel. A string of cyber-attacks against epileptic patients in 2008 is illustrative of how certain parts of the Web remain vulnerable to criminals who use networks to inflict harm. In one case, a group of hackers "descended on an epilepsy support message board...used JavaScript code and flashing computer animation to trigger migraine headaches and seizures in some users."[327] At first, the hackers "used a script to post hundreds of messages embedded with flashing animated gifs."[328] However, subsequent attacks used a similar tactic to "redirect users' browsers to a page with a more complex image designed to trigger seizures in both photosensitive and pattern-sensitive epileptics."[329] Other such attacks have targeted visually impaired users.[330]

Other security concerns arise from the increased use of Wi-Fi networks for in-home monitoring. These types of networks tend to be less secure than wire-based ones, but their relative affordability and ability to interact with other wireless technologies (e.g., wireless sensors) have made them very attractive to researchers and patients.[331] As one article recently observed, "If patients are not confident that their information is acquired, transmitted and stored in a secure and confidential way, they will probably not be keen to reveal accurate and complete information."[332] Consequently, the overall quality of telemedicine care may diminish as a result of improper data security controls.[333]

The Civic Research Institute has found that four key factors determine electronic data security. These include: (1) the authentication of users requesting access to data, (2) the authorization of users before providing access, (3) the confidentiality of data while it is

sent over the network, and (4) the integrity of the sent data.[334] These factors protect the network from service disruptions (denial of service), the destruction or changing of data (viruses or worms), and the theft of data (copying from the network or server).[335] Passwords, cryptography, and biometrics are used for the authentication and authorization of users, and log files track user access to data files.[336] Unauthorized communications can be filtered out through the use of firewalls, and secure networks, such as Virtual Private Networks, are utilized to protect data confidentiality and integrity.[337] While such technologies provide enhanced network security from external threats, the risks arising from internal negligence are another critical concern.

Internal threats resulting from employee and patient activity may also compromise network security.[338] The Computer Security Institute and the FBI recently found that half of all security breaches are the result of internal errors.[339] Employees may unintentionally expose networks to attack by misplacing passwords, leaving confidential files open, failing to update the list of authorized employees, opening unsafe email attachments, and losing critical data.[340]

Training of personnel is an often neglected aspect of system implementation, and may result in complications if employees are unprepared to properly operate the network and secure patient data.[341] A 2005 survey of computer security practitioners found that the vast majority of participants believed security awareness training was important.[342] However, respondents from all industry sectors believed that their organization failed to invest enough resources in it.[343] When security measures are overly complicated and difficult to use, both employees and patients may have difficulty complying with the system requirements. For example, if safety alerts are provided too frequently, users may ignore the warnings and become unresponsive.[344] Older adults in particular may experience difficulty when operating complicated interfaces and may abandon the system all together.[345]

Security threats vary significantly by type of network and the requirements of users. However, a lack of data security standards for telemedicine services, for telemedicine practitioners, and for other stakeholders creates an important barrier towards further usage of these services.

4. *Patchwork of state-by-state physician regulation*

The practice of medicine has traditionally been local in nature. Individual states have implemented discrete regulatory requirements for resident medical practitioners, meaning that doctors must be licensed to practice medicine in a state before they can provide medical services. Similarly, more fragmented policies exist for credentialing. These regulations were devised in a world characterized by the intrastate practice of medicine. Broadband-enabled telemedicine, however, enables doctors and specialists to be available to patients regardless of geographic location. Thus, the state-by-state

regulation of doctors is a formidable barrier to realizing the full potential of broadband-enabled telemedicine services.

a. *Licensing*

Physician licensure requires that physicians be licensed by the individual state in which they practice. According to the American Medical Association, "Licenses are granted to ensure the public that the physician who presents himself/herself for licensure has successfully completed an appropriate sequence of medical education... and has demonstrated competence through successful completion of an examination or other certification demonstrating qualification for licensure."[346] The historical basis for state regulation of the practice of medicine is rooted in the Tenth Amendment, which delegates to states the power to, among other things, preserve the public health, welfare and safety of their residents.[347] As a result, states have created licensing requirements and oversight boards to monitor health and medical practices across their territories. But in the modern healthcare marketplace, such laws are not reflective of the borderless nature of many telemedicine services.[348] Thus, licensure laws that limit the practice of medicine to one state might unduly decrease the reach of telemedicine.

In 1997 and 2001, Telemedicine Reports to Congress identified licensure as a major barrier to the development and use of telemedicine services.[349] Additional reports also recommended a more consistent framework to encourage interstate telemedicine.[350] Thus far, only incremental progress has been made as a number of alternative licensure models have been offered and considered. Many of these proposals are based on the notion of reciprocity, a system that permits one state to recognize a license in good standing that a practitioner holds in another jurisdiction.[351] These and other models limit the pool of doctors who are allowed to use telemedicine services in the treatment of patients regardless of geographic location. Having to comply with myriad licensure rules could delay treatment and deny a patient the services of a specialist who does not reside in an eligible state under the home state's reciprocity rules.[352]

b. *Credentialing*

Credentialing refers to the process of verifying a physician's "license, experience, certification, education, training, malpractice and adverse clinical occurrences, clinical judgment, technical capabilities, and character by investigation and observation."[353] In addition, credentialing "defines a physician's scope of practice and the clinical or review services she may provide, and ensures that physicians provide services within the scope of privileges granted."[354] Established credentialing methods create uncertainty when applied to the practice of telemedicine.[355]

The traditional model requires that medical facilities gather "information regarding a physician's qualifications for appointment to the medical staff."[356] Credentialing

traditionally falls under the responsibility of the hospital where medical services are provided.[357] However, since telemedicine enables physicians to deliver services to multiple hospitals across the country, there is a potential for confusion as to whether the remote facility where services are provided or the physician's originating site is responsible for the credentialing.[358] Traditional credentialing requirements may create potential difficulties for physicians and, thus, diminish the use of telemedicine.[359]

In 2001, the Joint Commission (JC) presented institutional credentialing standards for telemedicine providers.[360] These standards proposed that a physician credentialed in a JC facility could provide telemedicine services to any other JC facility.[361] The JC also specified that the originating site be provided evidence of internal review of the practitioner's performance of services delivered.[362] However, the Centers for Medicare and Medicaid Services (CMS) have specified that the JC credentialing rules are not sufficient to ensure compliance with the Medicare "conditions of participation."[363] Further, the CMS has stated that any physician who provides a "medical level of care" should be credentialed by the facility providing the care.[364] According to the Center for Telehealth and E-Health Law, "This means that telehealth providers might be forced to be credentialed by multiple hospitals nationwide, creating an administrative challenge for hospitals and providers."[365]

The tension between two major medical standards institutions – the JC and the CMS – has created much uncertainty among practitioners regarding the credentialing process for telemedicine, which could be slowing further usage of these services.

5. *Uncertainty regarding the scope of tort laws*

The number of medical malpractice suits and settlements continues to increase each year. Indeed, the cost of medical malpractice torts, which include expenses related to formal litigation, jury awards, and settlements, had the largest growth among U.S. tort costs, totaling $28.7 billion in 2004, having increased an average of 11.7 percent annually since 1975.[366] In 2008, the Congressional Budget Office estimated that "health care providers likely spen[t] more than $30 billion to defend against and pay medical malpractice claims."[367] Telemedicine, by its nature an emerging and innovative medical service, expands the reach of healthcare and thus increases the possibility of medical malpractice suits.[368] As a result, many physicians are hesitant to adopt broadband-enabled telemedicine applications for fear of exposing themselves to greater liability.

As with licensure, tort laws are largely state-specific. And in tort cases, an important jurisdictional determination is where a tort occurred.[369] Telemedicine complicates this determination because the doctor and patient are physically separated, which muddies the traditional perception of the doctor-patient relationship.[370] While federal tort law generally holds that the law of the patient's home state controls the determination, telemedicine injects some uncertainty because doctor and patient are connected only by

a broadband connection.[371] The possibility exists that a telemedicine provider could be exposed to a number of different tort laws should a claim of negligence occur. The uncertainty regarding the application of tort law in the telemedicine context may discourage healthcare providers from adopting broadband-enabled telemedicine devices and services and using them to provide interstate care.

6. *Negative perceptions and inadequate value propositions for using telemedicine services by patients*

A significant number of patients, many of whom are older adults, remain wary of telemedicine services generally. This skepticism often stems from an unawareness of the true value of using these types of tools or a preference to continue using traditional healthcare methods (e.g., face-to-face consultations).[372]

Studies have shown that, while patient satisfaction with telemedicine services is generally positive, patients express negative concerns both before and after receiving treatment. A recent study of remote monitoring patients found that "[a]lthough the response to the home telehealth service [for congestive heart failure] was overwhelmingly positive, respondents remained undecided regarding the perceived benefits of telehealth versus in-person care."[373] Though the majority of patients advocated its future use, most still favored the in-person visit over the tele-visit.[374] Moreover, while significant advantages were identified by patients, the most common disadvantages cited include confusion with the technology, the monotony of repetitive processes, and disruption of activities.[375] In addition, research suggests that patients are more willing to use telemedicine services as a supplement to, rather than a replacement for, traditional face-to-face consultations "as long as privacy safeguards are maintained."[376]

The current baby boomer and senior populations are especially wary of one type of telemedicine application: in-home health monitoring services.[377] Two-thirds of both groups currently see little to no value in such technologies.[378] According to AARP, "Older adults often find little of interest to convince them of the value of making the change, and very frequently, poor design makes technology products very hard to learn or use."[379] More specifically, many older adults fear that remote home health monitoring will reduce the personal relationships they have built with their doctors and their social interaction overall.[380] Indeed, many older patients see "aging in place" with the help of home health monitors as a negative aspect of telemedicine and would rather "age in community" without losing social interaction.[381] Sufficient interpersonal contact is not only beneficial to an older patient's health, but also a critical aspect to an older adult's quality of life.[382] In addition, a perceived stigma towards aging and disease may cause seniors to resent the monitoring devices and view them as a constant reminder of their poor physical condition.[383] Wearing a health monitor in public may cause older adults to feel old and weak in the eyes of others.[384] Anecdotal evidence also

supports the observation that many older adults may resent the lack of privacy afforded by in-home monitoring technologies,[385] and they may dislike ceding authority over their medical state to their children, who often assume control over the monitoring system.[386]

Thus, a primary barrier to further adoption and utilization of these services by all patients, especially older adults, is overcoming initial negative perceptions associated with telemedicine, shifting preferences away from traditional medical care, and providing adequate value propositions to spur use.

7. *Inadequate value propositions and high costs associated with telemedicine applications for physicians*

High costs and administrative burdens deter many physicians from making initial investments in telemedicine and health IT (e.g., EHRs). Implementing an EHR system, for example, can cost anywhere from $20,000[387] to $33,000 per doctor, with an additional monthly cost for maintenance.[388] In addition, the time required for integrating existing in- and outpatient data can be a daunting task for many organizations.[389] At a time when many healthcare providers are struggling to cut costs, such an investment may seem unnecessary. Smaller practices, in particular, are faced with higher implementation costs and have difficulty justifying the risk in making an investment that has little support for a positive short-term return.[390] According to the U.S. Department of Health and Human Services, "the most-commonly cited barrier [to adoption of EHRs] is insufficient resources and a perceived lack of evidence for a positive return on investment. Non-financial issues like training demands and changes in working practices are especially important."[391] Further, many small medical practices lack the technical expertise to invest confidently.[392] One study found that larger healthcare organizations (i.e., those with 500 beds or more) are more likely than smaller organizations to have begun planning for the implementation of unified communications technologies by a margin of 66 percent to 50 percent.[393]

Despite the initial burden and negative perceptions of implementing EHR systems, the long-term benefits may outweigh the costs. One study found that the net benefit of implementing a full electronic medical record system totals $86,400 per provider for a 5-year period.[394] Sources of cost savings include: savings in drug expenditures (33 percent), decreased radiology utilization (17 percent), decreased billing errors (15 percent), and improvements in charge capture (15 percent).[395] One study found that hospital EHR use could reduce costs by $394,000 per year, recouping the initial $484,577 investment in the first 16 months.[396] Further, net benefits may potentially total one-half trillion dollars over the next five years, in addition to the societal benefits of lower mortality and increased quality of life.[397]

The healthcare industry, as a whole, has been slow to adopt many HIT tools. According to the American Consumer Institute, hospitals have little incentive to implement EHR systems due to a perception of limited short-term benefits for health care providers.[398] Most of the initial cost savings flow to patients and payers, rather than to healthcare providers. This results from more successful and efficient treatment. To this end, one study found that the benefits of computerized ordering provided physicians with only 11 percent of the benefit.[399] Moreover, the full cost benefits to both physicians and payers can only be realized in the event of widespread adoption of health IT in the healthcare industry. Thus, negative perceptions of the potential for cost savings abound among healthcare providers and represent another barrier to further adoption of broadband-enabled telemedicine services.

8. *Concerns related to the outsourcing of certain medical functions*

Broadband enables the instantaneous transmission of critical medical data for processing and diagnosis to almost anywhere in the world. In addition, outsourcing certain functions to foreign countries via broadband has become widespread in an effort to drive down costs and speed the delivery of healthcare. However, even though researchers have found that the outsourcing of healthcare services has helped to increase efficiency, service quality and competitiveness, while maximizing the return on IT investment,[400] a host of concerns regarding legal liability, quality control, and privacy, among others, may hold back further outsourcing of medical services via broadband.

The increasing popularity of teleradiology services (i.e., outsourcing x-rays for diagnosis) provides a useful case study regarding the barriers to further utilization of these tools and the benefits that these tools can enable.

A number of potential liability issues are associated with teleradiology. For example, the misreading of x-ray images could result in delayed prognosis and serious physical harm for the patient and [401] extensive damages for the radiologist since courts often hold the radiologist liable, as the treating physician relies on the radiologist's expertise. Despite the increased liability of radiologists, jurisdiction loopholes make it very difficult to file a lawsuit against radiologists practicing outside the United States.[402] As a result, hospitals are likely to be sued since they are responsible for selecting the radiologist.[403] These types of suits and the uncertainty of the scope of liability could increase costs for healthcare providers and for patients (see also Barrier #5).

Other concerns related to the outsourcing of medical services (e.g., IT services like EHR management) via broadband include quality control, adequate training of non-U.S. technicians, and possession of proper licenses.[404] Privacy issues and concerns regarding compliance with U.S. laws and regulations also abound.[405] And patient consent may be difficult to attain since many "have traditionally regarded healthcare as intensely

personal, making them wary of the relative anonymity of outsourcing."[406] Yet despite these concerns, outsourcing, especially of radiology services, remains popular among a growing percentage of healthcare providers.

By one estimate, at least 300 hospitals in the U.S. and some two-thirds of radiology practices use some form of teleradiology.[407] As a result, "Remote reading of radiology images is now the most widespread, economically successful model for global telemedicine in the United States."[408] Since many hospitals in the United States are required to staff radiologists in emergency departments at all hours, and since there is a general shortage of radiology experts, a growing number of hospitals employ "nighthawking" models, which involve outsourcing diagnostics to U.S.-trained physicians in time zones that are eight to ten hours away.[409] Hospitals are also offshoring radiology data for diagnosis by U.S. born and trained radiologists residing in countries such as India, Australia, Israel, and Lebanon.[410] This model, however, increasingly involves the use of physicians not licensed in the U.S., who charge much lower prices.[411] This model significantly lowers the cost of specialists, but such cost-savings may be offset by the previously discussed risks of increased medical malpractice liability.[412]

Overcoming these perceptual, administrative, and legal barriers is important since more robust usage of medical outsourcing services could help to drive down America's rising healthcare costs and create efficiencies through increased price competition.[413] However, continued uncertainty regarding the scope of legal liability, quality assurance, and the propriety of outsourcing certain medical functions could impede further adoption and use of these services, thus delaying the realization of the cost savings and efficiencies described above.

9. *Limited scope of federal telemedicine funding*

Federal funding for telemedicine deployments is generally allocated to projects that seek to bring medical services to rural areas. As a result, federal funding mechanisms may be underfunding or ignoring promising pilot projects for enhancing broadband-enabled telemedicine services in other areas of the country, potentially limiting the scope of innovation and slowing more robust adoption and use of these services.

To date, the federal government has played an important role in spurring innovation and use of telemedicine services. Hundreds of millions of dollars have been allotted over the past few decades to a variety of agencies and programs that support state and local telemedicine initiatives.[414] The FCC Rural Healthcare Pilot Program, HHS's Office of Health IT Adoption, and the USDA Rural Development Telecommunications programs, in particular, have recognized the critical role that broadband plays in the delivery of advanced telemedicine services and actively encouraged the deployment and use of high-speed networks in order to expand their reach.[415]

The FCC's Rural Healthcare Pilot Program, for example, is a key driver of telemedicine innovation. The Pilot Program is designed to facilitate the creation of a nationwide broadband network dedicated to "healthcare, connecting public and private non-profit healthcare providers in rural and urban locations."[416] Under this pilot project, "selected participants [are] eligible for universal service funding to support up to 85 percent of the costs associated with the construction of state or regional broadband healthcare networks and with the advanced telecommunications and information services provided over those networks."[417] This initiative will help to spur the development and deployment of statewide broadband networks dedicated to facilitating the delivery of broadband-enabled telemedicine applications.[418] These systems can also be used to create a robust healthcare network among hospitals, clinics, and other care providers within the state and among different states in a region. The pilot will also increase the availability of quality healthcare to patients, regardless of geographic location or socioeconomic background.

Despite these many gains, federal telemedicine funding is generally restricted to rural deployments. Indeed, while telemedicine was originally developed, and is still primarily used, for the provision of healthcare to remote patients, these types of services are increasingly being used in, and hold much promise for, urban and suburban communities as well. Limiting federal funding to telemedicine providers serving rural areas has created a barrier to greater telemedicine adoption in non-rural markets.

10. *Lack of standards to guide the interoperability of new telemedicine services*

Telecommunications systems often operate on networks that do not facilitate the interoperability of telemedicine services.[419] In particular, interoperability is a significant issue for EHRs, the vast majority of which do not interoperate well with other applications.[420] If advanced telemedicine applications (e.g., various proprietary EHR programs) are unable to work with one another, then their value will be limited.[421]

A variety of standards-setting bodies have been established to help ensure interoperability. HHS, for example, launched the Healthcare IT Standards Panel (HITSP) in 2005. This panel "serve[s] as a cooperative partnership between the public and private sectors for the purpose of achieving a widely accepted and useful set of standards specifically to enable and support widespread interoperability among healthcare software applications, as they will interact in a local, regional, and national health information network for the United States."[422] A number of other such efforts have been launched in recent years, including the Nationwide Health Information Network,[423] the National Institute for Standards & Technology,[424] and the Certification Commission for Health IT,[425] among others. As doctors and hospitals across the country migrate from paper-based medical records to EHRs, and as innovative new broadband-

enabled telemedicine tools like the Microsoft HealthVault continue to be deployed, these efforts will be essential to ensuring that these new services are interoperable and thus of value to all stakeholders.[426]

However, until robust and widely accepted standards are developed and adopted by the vast array of service providers, innovators, and other stakeholders in the market, broadband-enabled telemedicine tools may remain fragmented in nature and unable to leverage true economies of scale to provide efficient and effectives services.

11. *Lack of available spectrum for the deployment of new telemedicine services and applications*

With telemedicine services increasingly using wireless broadband for transmission, service providers must have ready access to ample spectrum to facilitate the deployment of these services. Additional swaths of spectrum are needed to support the range of wireless broadband-enabled services that are available and emerging in a number of sectors. A number of stakeholders, including FCC Commissioners and members of Congress, have noted that spectrum allocation and usage policies need thorough reexamination.[427] In addition, other policies (e.g., tower siting) may need to be readjusted in order to speed the deployment of these services (see Section I.A.3). To this end, the FCC has committed itself to spectrum policy reform.[428] Congress has also acted by passing a spectrum inventory bill that would catalogue current spectrum availability and use.[429] However, the pace of innovation in the telemedicine sector will likely move faster than legislative or regulatory efforts to modernize spectrum allocation policy. Thus, there is risk that innovators in the telemedicine space (e.g., wireless carriers and third-party application developers), who rely on wireless broadband to transmit services and applications, may face a spectrum shortage.

Ensuring that ample spectrum is available to innovators is essential since wireless broadband will be a key component of many advanced telemedicine services. For example, in-home monitoring systems that track the vital signs of patients will depend on robust wireless connections to upload patient information in real-time. In the near-term, text messaging is being used to provide a primitive platform for the transmission of personal health data like blood sugar to a doctor for monitoring purposes.[430] Wireless broadband is also being used to enable a variety of systems and devices for use in hospitals.[431] Uses include providing real-time test results to doctors and nurses working in different parts of a hospital.[432]

In the long-term, wireless telemedicine services are poised to become seamlessly integrated into everyday life. According to a recent report issued by OfCom, the British regulator of communications, wireless telemedicine applications will likely include services that can monitor personal information in real-time and automatically send

emergency alerts when a person gets into an accident or suffers a sudden health event like a heart attack.[433]

Additional spectrum is needed to accommodate such rapid innovation. Yet current spectrum allocation methods create a significant barrier to freeing up additional portions of the airwaves.

12. *Institutional inertia among some physicians*

HIT adoption among healthcare providers has been slow, owing largely to the low perceived value of these systems (see Barriers #1 and #7). However, a number of less quantifiable but persistent cultural barriers exist to further adoption of these advanced services by healthcare providers.

The reluctance of many physicians to adopt HIT systems and other broadband-enabled telemedicine services may stem from three key non-monetary factors: (1) resistance to change, (2) complexity of information, and (3) fear.[434] The implementation of EHRs and other health IT applications greatly reshape the work environment, disrupting daily routine and forcing physicians and office personnel out of their comfort zone.[435] Older physicians in particular, who may be ready to retire in coming years, do not see the value in putting forth the large-scale effort to convert from the traditional way of doing business, which has been successful throughout their careers.[436] Moreover, many physicians believe that "writing with pen and paper still accomplishes [most] tasks better than electronic systems."[437]

In addition, the complexity of new systems is a major concern. There is a general lack of expertise among physicians with regards to implementing and using HIT systems.[438] Both the implementation and maintenance processes are often time consuming and complex, demanding significant technical expertise from office staff.[439] Concerns related to the complexity of these new systems gives rise to numerous fears for healthcare providers. Many physicians fear being unable to choose the right vendor, and that the vendor might go out of business, cutting them off from their patients' data.[440] In addition, some providers fear that if technology overtakes medicine, it will become impersonal and automated.[441] Finally, the fear that undertaking a risky investment with emerging applications might result in failure leads to significant physician resistance.[442]

For these and other reasons, and despite numerous success stories and supporting research, physicians are generally unwilling to invest the necessary time, money, and effort into HIT and telemedicine implementation.

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V. ENERGY

This section focuses on the energy sector and barriers to further adoption and usage of broadband in this space.

Broadband is emerging as a key platform for innovation and the delivery of new services in the energy sector. Its ability to transmit data in real-time provides energy companies with a number of ways for integrating this technology into various aspects of the energy business. Indeed, broadband can play an important role in transforming the traditional patterns of energy generation, transmission, distribution, and consumption. In addition, broadband is being used by individuals and companies to conserve energy, reduce carbon footprints, and make consumption more efficient. At a time when energy and environmental policy reform top the agendas of many state and federal policymakers, broadband is poised to be a critical element of innovation in the energy sector.

Part A provides an overview of the uses and impacts of broadband in the energy sector, particularly on enhancing the electric grid and driving innovations centered on energy conservation and efficiency.

Part B identifies key policy and non-policy barriers to further adoption and usage of broadband in the energy sector. These range from a variety of regulatory challenges at the state and federal levels to a lack of focused policies to guide continued innovation.

A. An Overview of Broadband & The Energy Sector

Broadband is a vehicle for enabling energy-saving activities and a platform for launching wide-scale improvements across the energy distribution network. This Part provides an overview of two areas where broadband is already being used to affect change: (1) modernizing the electric grid and (2) enhancing energy conservation and efficiency efforts.

1. *Electric Grid Enhancements*

There is widespread agreement that the electric power grid in the United States is in need of modernization. Increasing demand for energy has put enormous strain on an infrastructure that is antiquated in many respects, leading to, among other things, inefficient transmission and distribution. Indeed, according to the U.S. Department of Energy, "electricity losses in the transmission and distribution systems exceed 10 percent of total energy generated."[443] These losses cost rate payers hundreds of millions of dollars per year; reducing them via a smart grid could result in better energy efficiency and cost savings (see below).

Outdated electric grid infrastructure can also result in power outages, which have devastated small towns and, on occasion, large swaths of the country. Over the past forty years, five massive blackouts have occurred, three of which have taken place in the past nine years.[444] These blackouts have had enormous economic impacts. For example, the Northeast blackout of 2003 resulted in $6 billion in economic losses in the region.[445] A single blackout in Silicon Valley resulted in $75 million in losses.[446] In 2000, a one-hour outage that hit the Chicago Board of Trade resulted in $20 trillion in trades delayed.[447] With energy demand continuing to outstrip energy transmission capacity growth,[448] policymakers are examining a number of ways to upgrade the grid and create efficiencies in both the demand for and supply of energy. A key focus of policymakers and market participants is on using broadband technologies to modernize the grid and make it "smart."

A broadband-enabled "smart grid" would provide a number of benefits to energy companies, customers, and the economy. Table 11 summarizes key impacts.

Table 11 – Impacts of a Broadband-Enabled Smart Grid

Reduces Energy Consumption & Carbon Emissions
▪ The real-time transmission of usage data accommodates generation and storage options that avoid productivity losses of downtime. As a result, energy will be used more efficiently. A Congressional Report estimated that a 4% peak load reduction could be achieved using Smart Grid technologies.[449] Reduction of energy consumption will also translate into lower bills for consumers, saving about $135 billion.[450]
▪ The U.S. Department of Energy estimates that robust use of the smart grid could equate to eliminating fuel and greenhouse gas emissions from 53 million cars.[451]
▪ Use of the smart grid will save between 60 and 480MM tons of carbon emissions per year, while annually creating $6 to $40 billion in value.[452]
Enables New Ranges of "Smart" Technologies
▪ A smart grid enables new innovations like plug-in hybrid electric vehicles. According to the Pacific Northwest National Laboratory, existing U.S. power plants could meet the electricity needs of 73% of the nation's light vehicles (i.e. cars and small trucks) if the vehicles were replaced by plug-ins that recharged at night. Such a shift would "reduce oil consumption by 6.2 million barrels per day, eliminating 52% of current imports."[453]

Facilitates Incorporation of Renewable Fuel Sources into Fuel Supply
▪ An intelligent grid that can monitor and react to changes in consumer usage in real-time will enable the incorporation of key renewable energy fuel sources – e.g., wind and solar – that are also intermittent in nature. This will boost the energy supply and cut carbon emissions.[454]
▪ According to one study, "integrating wind or solar power into the grid at scale – at levels higher than 20% - will require advanced energy management techniques and approaches at the grid operator level. The Smart Grid's ability to dynamically manage all sources of power on the grid means that more distributed generation can be integrated within it."[455]
Enhances Reliability
▪ The smart grid is capable of meeting increased consumer demand by shifting resources in real-time in order to reduce distortions of power supply. The U.S. Department of Energy estimates that "Smart Grid enhancements will ease congestion and increase utilization (of full capacity) sending 50% to 300% more electricity throughout existing energy corridors."[456]

2. *Energy Conservation & Efficiency*

Broadband is also being used in a variety of ways to conserve energy and to make energy use more efficient. In combination with other "holistic" approaches "executed at scale," *widespread and coordinated energy efficiency programs, which would include broadband-enabled smart grid services and devices, could result in over $1.2 trillion in gross energy savings thru 2020.*[457] This approach is expected to "reduce end-use energy consumption in 2020 by 9.1 quadrillion BTUs, roughly 23 percent of projected demand, potentially abating 1.1 gigatons of greenhouse gases annually."[458]

A broadband-enabled smart grid will play a key role in energy efficiency and conservation efforts going forward for the more than 140 million residential and small-business electricity customers in the United States.[459] For example, the smart grid enables a variety of services and devices that will help consumers decrease their energy consumption. Table 12 provides an overview of some of these tools.

Table 12 - Overview of Smart Grid-Enabled Consumer Tools

Consumer Empowerment	*Smart Meters*	*Smart Appliances*	*Smart Buildings*
▪ The smart grid enables a variety of *Demand Side Management* tools. The constant flow of real-time usage data, and a consumer's ability to access that data via an online portal, will allow the customer to alter usage patterns, lower their bills via responsive pricing programs,[460] and decrease their carbon footprint. ▪ FERC estimates that the potential reduction in consumption due to demand-response programs is approximately 41,000 MW per year.[461] ▪ An example of this type of service is the Tendril Residential Energy Ecosystem service, which "empower[s] consumers to better understand their energy usage, impact and control their cost of consumption and actively promote the health of the electricity grid."[462]	▪ The smart meter is the primary information conduit between energy consumer and energy provider. It relays transmission and usage information in real-time to the consumer and provider, allowing for instantaneous adjustments to transmission and usage patterns. ▪ Eventually, smart meters will allow customers to "set temperature preferences for their thermostats…or opt in or out of programs that let them use cleaner energy sources, such as solar or wind power."[463] ▪ Deployment of smart meters is rapidly increasing, with penetration estimated to be around 5% at the end of 2008.[464] Deployments are likely to rise from the current level of 8 million meters to 80-141 million by 2019.[465]	▪ Appliances and a number of other in-home devices will soon communicate with smart meters and the smart grid in order to adjust energy usage and become more efficient.[466] In theory, smart appliances will allow consumers to set their appliances to respond to energy pricing fluctuations and allow them to "temporarily shut[] off [a] hot water heater or rais[e] the thermostat slightly on hot days."[467] ▪ GE has entered into a partnership with Tendril whereby GE will "incorporate monitoring and reporting capabilities into its consumer appliances and ensure that they communicate properly with Tendril's software."[468]	▪ Buildings contribute 43 percent of the carbon emissions in the U.S.[469] One study found that typical heating, ventilation and air conditioning systems are only half as efficient as fully integrated systems.[470] ▪ The smart grid could allow buildings to be fitted with technologies that allow internal systems (e.g., heating and cooling) to seamlessly communicate with the electric grid.[471] ▪ Cisco provides a number of smart building services, which have been installed by Boston Properties (BP) in a number of their buildings. These tools allow BP to remotely monitor 40 buildings at once.[472]

Some have estimated that "better use of this sort of real-time information across the entire electrical grid could allow at least a 20 percent improvement in energy efficiency in the United States."[473] With energy demand expected to increase by 30 percent by 2030, and with electricity prices projected to increase by 50 percent over the next several years, widespread adoption and use of smart grid-enabled consumer tools is critical to more

efficient energy distribution and more affordable consumption for both individual customers and large institutions.[474] For example, President Obama recently issued an Executive Order that, among other things, established a preference for energy efficient products and services in the federal government's procurement process.[475]

Another example of how broadband can be used to conserve energy is telecommuting. Telecommuting is increasingly popular among many public and private sector entities. Gartner estimates that 12 million people telework more than eight hours per week, double the amount in 2000.[476] By the end of 2009, Gartner expects this number to reach 14 million.[477] With regard to its impact on energy conservation, one study estimates that "[e]ach Internet telecommuter saves about... 3500 kilowatt hours a year."[478] Another study has found that "[t]elecommuting will reduce greenhouse gas emissions by 247.7 million tons due to less driving, 28.1 million tons due to reduced office construction, and 312.4 million tons because of energy saved by businesses."[479]

There are a number of other ways that broadband can assist in energy conservation. For example, companies can use broadband to shift a portion of their operations online, thus saving on corporate building energy consumption. One study has estimated that "[b]usiness-to-Business and Business-to-Consumer e-commerce is predicted to reduce greenhouse gases by 206.3 million (U.S.) tons."[480] A comparison of online book retailers and bricks-and-mortar book sellers, based on a report of Amazon.com's operations, suggests that the bricks-and-mortar seller consumes 16 times more energy per book sold than the online seller.[481]

An important ancillary benefit of deploying new infrastructure, retrofitting existing infrastructure, and otherwise investing in national-scale energy efficiency is job creation. *McKinsey estimates that, "assuming roughly $290 billion is invested in deployment of labor-intensive efficiency measures in residential and commercial sectors between 2009 and 2020," approximately 500,000 to 750,000 jobs could be created.*[482]

B. Barriers to Broadband Adoption

This part identifies key policy and non-policy barriers to further adoption and usage of broadband in the energy sector. These barriers include:

General Barriers to Broadband Adoption in the Energy Sector

1. Lack of better coordination among stakeholders and regulators in the energy and advanced communications sectors
2. Lack of an "ecosystem of innovation" due to prevailing regulatory paradigm and resulting business model
    a. Prevailing regulatory paradigm

b. Resulting business model

3. Fragmented nature of energy regulation

Barriers to Broadband Adoption for Smart Grid Deployments

4. Lack of consumer awareness of and demand for smart grid applications and devices
5. Lack of generally applicable, consensus-based standards for the development of interoperable smart grid technologies
6. Spectrum needs for the deployment of smart grid technologies
7. Unresolved security concerns
    a. Network security
    b. Network reliability
8. Uncertainty regarding the privacy and storage of customer data collected via the smart grid
    a. Privacy
    b. Data storage

Barriers to Using Broadband for Energy Efficiency Initiatives

9. Lack of incentives for employers to encourage telecommuting
10. Lack of clear policies regarding sharing and usage of consumption information

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General Barriers to Broadband Adoption in the Energy Sector

1. ***Lack of better coordination among stakeholders and regulators in the energy and advanced communications sectors***

There is wide agreement among many stakeholders, policymakers and regulators, in both the energy and advanced communications sectors, that broadband is an essential platform for enabling the smart grid and other energy efficiency initiatives.[483] However, while there has been much discussion of and work towards deploying a broadband-enabled smart grid, there has been a lack of meaningful coordination among stakeholders and regulators in the energy and advanced communications sectors.

Collaboration among stakeholders (i.e., utilities, broadband providers, policymakers, regulators, innovators, etc.) from both sectors is critical to the development of a smart grid that is interoperable, reliable, and national in scope. A number of task forces, working groups, and other such efforts have been organized and launched over the past few years to work towards this goal. The Smart Grid Task Force, composed of members from the U.S. Department of Energy (DOE) and the Federal Energy Regulatory Commission (FERC), among others, is one example of interagency collaboration. Despite this initiative, however, a number of agencies and organizations have launched their own programs for smart grid development, raising the possibility of conflicting, redundant, and inefficient policymaking.

For example, the Federal Communications Commission, as part of its mandate by Congress to develop a National Broadband Plan by February 2010, has included smart grid issues within the plan's purview.[484] To this end, the FCC issued a notice seeking comment for ways to support communication networks and technologies suitable for smart grid applications and to determine whether wireless spectrum can be used for smart grid applications.[485] In addition, the FCC has hosted a workshop on smart grid issues in order to explore how broadband can contribute to the rollout of this technology.[486] This marked one of the first times when representatives from both the energy and advanced communications sectors, under the aegis of an official federal gathering, spoke about the developments in their fields and how each sector might work together.

Another effort is the standard-setting initiative being spearheaded by the National Institute of Standards and Technology (NIST). NIST has the responsibility of identifying and evaluating existing standards, measurement methods, technologies, and other support in service to smart grid adoption.[487] Over the past year, NIST has examined the potential use of broadband and supporting standards as the network infrastructure for proposed smart grid applications.[488] Its "Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0" was released in September 2009.[489] The Framework "identifies 77 initial standards as the basis for utilities and vendors to follow as they deploy smart grid projects. The standards should support interoperability of a smart grid system from utilities to individual homes and electronic devices."[490] The public will have 30 days to comment on the report, after which time the final framework will be presented to FERC for approval.[491]

FERC is also pursuing a number of smart grid issues. In July 2009, it issued a Policy Statement that set out the parameters for the development of smart grid standards.[492] In particular, the Policy Statement proposed key priorities for standard development including two cross-cutting issues – system security and inter-system communication – and four key grid functionalities: (1) wide-area situational awareness, (2) demand response, (3) electric storage, and (4) electric transportation.[493] FERC also made clear that, by adopting these standards for smart grid technologies, it will not interfere with a

state's ability to adopt whatever advanced metering or demand response program it chooses.[494] It has also announced an intention to implement "incentive rates" for utilities to incorporate advanced technologies, including those that facilitate smart grid deployment, into new transmission projects.[495] The goal of these policies is to ensure that 50 percent of new transmission projects include advanced technologies by 2014.[496]

In addition to its proclamation regarding federal-state jurisdictional concerns, FERC has entered into a Smart Grid Collaborative with the National Association of Regulatory Utility Commissioners (NARUC).[497] The collaborative is a forum for state and federal regulators to jointly learn about the technologies that currently support the smart grid and how these will benefit consumers.

In the private sector, most major smart grid deployments, including two of the largest – the "Smart Grid City" in Boulder, Colorado[498] and the "Pecan Street Project" in Austin, Texas[499] – are collaborative efforts among energy companies and technology vendors. Advanced communication companies have not yet played a significant role even though they have deployed and have experience in maintaining broadband networks that could speed deployment.

Each of these efforts demonstrates that stakeholders and regulators are actively working towards advancing the deployment of a smart grid. However, without structured, purposeful collaboration amongst existing stakeholders and working groups – and without collaborating with advanced communications companies and availing themselves of existing broadband networks and existing expertise in managing a communications infrastructure – the impacts of existing efforts will be limited.[500]

2. *Lack of an "ecosystem of innovation" due to prevailing regulatory paradigm and resulting business model*

The energy sector lacks, in many respects, the type of innovative ecosystem that characterizes other sectors – like the advanced communications market. The heavy regulation of the energy sector, which requires close scrutiny and regulatory approval of most infrastructure investments, rate adjustments and an array of other business decisions, means that change will be largely incremental. Many aspects of the regulated energy sector are unable to support or foster the type of rapid innovation that broadband makes possible.[501]

A useful counterpoint is the market for wireless telephony and related services, where each major link in the "value chain" has been strengthened by a relatively hands-off regulatory approach.[502] As a result of this approach, an ecosystem of innovation has been created, allowing innovators in a variety of market segments – handset manufacturers, network owners, application developers, etc. – to contribute to the overall robustness of the sector.[503] In the energy sector, however, the prevailing

regulatory paradigm has resulted in a business model that is, in many respects, based on regulatory mandates rather than primarily on market dynamics.

a. *Prevailing regulatory paradigm*

The prevailing regulatory paradigm for much of the energy industry in the United States is one that requires exacting regulatory scrutiny of virtually all aspects of a utility's business. State public utility commissions (PUCs) have primary jurisdiction over the state's investor owned utilities. PUCs are tasked with reviewing and approving an energy company's rate structure and many other aspects of its business before rates are implemented. Rates are based on a number of factors, including investment in new and existing infrastructure and the cost of inputs (e.g., fuel sources). The value of many of these factors (e.g., property and infrastructure) constitutes the "rate base", which is a benchmark that regulators use to determine a reasonable rate of return for a particular company.[504] Energy companies will typically invest in new services and infrastructure only if they are able to recoup their costs via an approved rate of return schedule. This approach, which is commonplace in many states, parallels the regulatory framework for basic telecommunications services that was used until the early 1980s. A brief overview is instructive.

For most of the twentieth century, the regulatory approach to telecommunications centered on ensuring that a regional monopolist provided affordable, basic telephone service to every consumer across the country. This regulatory *quid pro quo* recognized that the goal of universal service required a market leader that was willing and able to deploy its network to under-served and unserved areas.[505] This approach was largely successful in spurring network deployment and increasing household penetration,[506] yet competition was limited because of the federally-approved monopoly model of regulation. As a result of a carefully managed regulatory relationship, which facilitated its ability to acquire or merge with many of its competitors, "Ma Bell" was relatively undisturbed by new entrants or new technologies.[507] Such an environment, while superficially beneficial to consumers who were guaranteed stable rates and reliable service, was not conducive to innovation outside of the Bell Laboratories. Indeed, for most of the twentieth century, basic telephone service remained just that: *basic.* Innovation is generally stifled in a highly regulated, monopoly market.[508] However, once the telephone monopoly was dismantled and new competitors entered the market, competition flourished, creating a vibrant ecosystem of innovation that has driven advancements all along the value chain of various segments of the market.

A highly regulated, monopoly-based approach in the energy sector has a direct impact on the incentives for, and ability of, many energy companies to innovate. Even though there are already a large number of smart grid partnerships and deployments, only a very few have been widely scaled out. *Thus, there is a tension between where energy companies are willing to go and where broadband can take them.*

b. *Resulting business model*

The prevailing regulatory paradigm has a direct impact on many energy companies' business models, which are the key determinants of levels of investment and innovation across the sector.

The U.S. Department of Energy has observed that the traditional regulatory paradigm in the energy sector "can discourage [investments in] energy efficiency, demand reduction, demand response, distributed generation, and asset optimization."[509] More specifically, the DOE states that "expanded peak demand has driven the need for additional capital projects, which increase the rate base. As energy sales grow, revenues increase. Both factors run counter to encouraging smart grid investments."[510] In other words, since energy companies are usually unable to make the case for a rate increase in order to save energy, they may be reluctant to invest in smart grid technologies that will reduce consumption of the product they sell.[511]

The current regulatory approach may also explain why many energy companies are endeavoring to build their own broadband networks to support the smart grid instead of collaborating with established network providers. Rather than outsource these functions to companies with a proven track record, many energy companies are opting to include these costs in their rate base and thus increase revenues. As a general matter, however, utilities lack the expertise and a demonstrated ability to build and maintain broadband-enabled networks. Moreover, it may be more affordable (and more reliable) to use an existing broadband infrastructure (and another company's expertise for network management) than it is to start from scratch.[512] Yet the lack of clear incentives to collaborate with advanced communications companies, which flow in large part from a rigid business model, deters further innovation and experimentation in the sector.[513]

3. *Fragmented nature of energy regulation*

The fragmented federal-state nature of regulation in the energy sector challenges smart grid innovations.

The various components of the energy business – from generation to transmission to distribution – are regulated by a variety of regulatory bodies. States generally oversee distribution networks, retail rates, cost recovery, and installations, while interstate power transmission falls under federal jurisdiction. *The multiple layers of regulations lead to overlapping obligations and potential conflicts between federal energy statutes and rules, on the one hand, and state statutes and results, on the other hand.* One possible conflict that might arise during the deployment of the smart grid is which regulatory entity – FERC or state PUCs – will determine which costs should be considered transmission related and which should be considered distribution related.[514] Recently introduced federal legislation on this point, which would give federal regulators the authority to override

states and mandate new transmission lines,[515] could deepen the tension between the federal government and the states.

Regulatory federalism - shared regulatory oversight between states and the federal government - has long been a major issue of contention in both the energy and advanced communications sectors.[516] The intersection of these two sectors in the smart grid context presents a fundamental policy challenge, namely how to marry the less regulatory and more federal regime in the advanced communications sector with the more regulatory and more heavily state-centric regime in the energy sector. Broadband and wireless services are generally regulated at the federal level; states usually retain oversight of purely intrastate aspects of traditional voice service.[517] In view of the interstate nature of such technologies, a national approach to regulation has helped to spur competition and innovation across the sector. The provisioning of electric service is local in many respects and is highly regulated. Yet the shift towards a smart grid, which could become a national, interoperable network that connects many different individual networks across state lines, will entail an enhanced level of state and federal cooperation and oversight of an array of issues. Thus, a fundamental reassessment of the state-federal regulatory dynamic may be necessary in order to provide innovators along the smart grid "value chain" with guidance regarding the scope of regulation. Extracting what works from both regulatory models - and avoiding what does not work - will be critical as policymakers move forward.

Barriers to Broadband Adoption for Smart Grid Deployments

4. *Lack of consumer awareness of and demand for smart grid applications and devices*

Traditionally, energy consumption has been considered a passive purchase. With respect to add-on services like the smart grid and other smart devices, it remains to be seen whether consumers are demanding these services on a large scale. Indeed, the mechanics of the smart grid are complex, and with devices and software continuing to evolve, it may be difficult for consumers to grasp what these new technologies can deliver to them.[518]

Consumers generally are amenable to adjusting usage patterns in order to decrease their energy bills. A recent survey by IBM found that nearly 80 percent of consumers "would change the times at which they do energy-consuming housework in exchange for [halving their energy bill]."[519] However, a significant percentage of consumers - 45 percent - are unaware of renewable energy programs offered by their energy provider.[520] In addition, IBM found a correlation between demand for many of these types of conservation services and income level.[521] Moreover, recent economic turbulence has greatly reduced demand for "green" services that cost more in the short-term.[522] Usage rates of the current generation of demand response tools, which allow

customers to dynamically alter energy consumption, are low. A 2008 FERC survey found that only eight percent of "U.S. energy customers have any form of time-based or incentive-based price structure that would enable customers to reap the benefits associated with load shifting behavior," up from five percent in 2006.[523]

Even assuming that consumers become more aware of smart grid technologies, addressing concerns regarding the high upfront costs of deploying these services will be a challenge. For example, a smart meter can cost upwards of $125 and can require several hundred dollars more to install once the necessary communications network and data-management software at the utility is taken into account.[524] Moreover, U.S. Secretary of Energy Steven Chu recently highlighted the negative impact of high initial costs for consumers regarding the deployment and implementation of smart grid infrastructure.[525] For these reasons, consumer education will be important to facilitating the deployment of these broadband-enabled devices and services.

One group has begun to consider potential impacts on consumers The National Association of State Utility Consumer Advocates (NASUCA) recently adopted a resolution that advocates for a reliable smart system that improves the efficiency, reliability and security of the electric grid.[526] Among other things, NASUCA recommends that state and federal agencies conduct a detailed analysis of the costs and benefits of smart grid proposals to make sure the benefits outweighs the costs before going forward with projects. This type of approach could ultimately provide essential information to customers and, thus, help spur additional demand for cost-effective smart grid services.

In the near term, consumer awareness of and demand for these services appears to be minimal.

5. *Lack of generally applicable, consensus-based standards for the development of interoperable smart grid technologies*

In light of the increasing number of smart grid deployments across the country and the high volume of innovation in this space, generally applicable, consensus-based standards are needed to ensure interoperability. Otherwise, as NIST has observed, "Without standards, there is the potential for these investments to become prematurely obsolete or to be implemented without necessary measures to ensure security."[527]

Failure to adopt meaningful standards for smart grid technologies raises a number of concerns. First, lack of identifiable standards hinders the development of smart grid technologies. Companies need to manufacture, buy, sell and utilize devices, services, and software with the knowledge that they work together.[528] Moreover, companies may be hesitant to "commit resources to design something that is not anchored into a technology that has some stability to it."[529]

Second, some technologies currently being developed may soon become obsolete.[530] Since the smart grid brings together a number of technologies (e.g. communications, power electronics, and software) at different stages of the technology maturity lifecycle, failure to standardize will lead to confusion and will risk interoperability. Limited interoperability also translates into limited choices for companies that want to install a particular type of technology.[531] The challenge then becomes to allow flexible regulation that leverages developing technology through policy that promotes positive economic outcomes.

A variety of federal entities are working to develop smart grid standards (see Barrier #1), and the Obama administration has such made standard-setting a priority.[532] Yet in the absence of a clear set of standards, company-specific deployments are continuing to increase. As a result, the possibility exists that these various deployments and initiatives will be unable to interoperate and thus fail to provide the type of national-scale benefits that a truly interoperable smart grid can produce.

6. *Spectrum needs for the deployment of smart grid technologies*

The expansive infrastructure of the smart grid, which includes generating stations, transmission lines, water pumping stations, gas pipelines and electric substations, requires maintenance, remote control, and remote monitoring to be effective, cost efficient, and reliable. Wireless broadband may be best positioned to enable many of these functions. *However, a lack of ample spectrum could slow the deployment of those smart grid components that operate most efficiently and cost effectively via wireless broadband.* Indeed, failure to allocate additional spectrum on a timely basis and without undue bureaucracy could lead to problems with interference, congestion, and interoperability at the network level.

As a result, a number of stakeholders have advocated for the allocation of additional swaths of spectrum to manage the increasing demands placed on smart grid networks.[533] Others, however, argue that existing commercial wireless networks should suffice since they are already widely deployed and are more robust than the wireless mesh networks that many utilities currently use to support some smart grid deployments.[534] More generally, federal policymakers, including FCC Commissioners and members of Congress, have recently noted that additional spectrum is necessary and that current spectrum allocation policies need a thorough reexamination.[535] While Congress has acted by passing a spectrum inventory bill that would catalogue current spectrum availability and use,[536] the lack of readily available spectrum in the near-to-medium term could slow the speed of smart grid deployment.

7. *Unresolved security concerns*

A number of concerns have arisen recently regarding the (a) security and (b) reliability of the smart grid network. This part examines both concerns.

a. *Network security*

The smart grid, by virtue of its ability to collect real-time information at a large number of points throughout the energy network, will produce enormous amounts of proprietary corporate and customer data. As a result, concerns regarding the security of this data will inevitably arise.[537] To this end, a number of commentators and researchers have observed that the smart grid and the smart meters it enables are vulnerable to attack from hackers.[538] Indeed, in their current form, smart meters require little authentication to carry out key functions, such as disconnecting customers from the power grid. These concerns are widespread. The White House has recognized the importance of implementing security standards for the smart grid in order to avoid opportunities for hackers to penetrate these systems or to engage in large-scale attacks.[539] The Department of Energy is also now requiring that grant applications for smart grid deployments take steps to prevent cyber attacks. The requirements come amid concern that many existing smart grid efforts do not have sufficient built-in protections against computer hacking.[540]

Network security expertise, however, is readily available. Advanced communications firms – i.e. broadband providers – have experience in managing and securing large, nationwide networks for a number of entities in both the public and private sectors. For example, the U.S. Department of Defense uses the broadband networks of advanced communications companies to transmit highly sensitive and classified material on a daily basis.

b. *Network reliability*

Closely related to network security issues are network reliability concerns. If a smart grid network is attacked by a hacker, energy services could be interrupted or caused to fail. As previously discussed, blackouts can have devastating human and economic impacts. Indeed, one study found that a hacker with $500 of equipment could take over an entire smart grid network and have free reign to manipulate its performance.[541] More generally, even slight interruptions in service, either as a result of a hacker or due to normal network congestion, could be problematic for end-users who rely on a constant flow of electricity. Uncertainty regarding the reliability of a smart grid network could chill demand for these services and ultimately slow deployment.

Companies are responding. For example, in order to make the smart grid more secure and reliable, defense contractors like Boeing and Raytheon are being brought into smart

grid collaborations. Boeing, for instance, was named as a security partner on Southern California Edison's $60 million request to connect a 32-megawatt wind storage battery to the grid, and Raytheon plans to help Tucson Electric Power get a $25 million grant to link solar panels and in-home energy management systems.[542] These types of multi-sector collaborations are an important step forward but also underscore the need for collaboration with expert network managers (see Barrier #1).

8. *Uncertainty regarding the privacy and storage of customer data collected via the smart grid*

Customer usage data generated by the smart grid will provide utilities with a clear profile of individual energy usage patterns. While this data would be useful in helping to cut costs for the utility and the customer, policies regarding how this data will be kept have yet to be developed and adopted. Customer usage data may seem innocuous at first glance, but users may be wary of allowing an energy provider, and potentially third-party innovators (see Barrier #11), to know specific details of use. This section examines two related concerns stemming from this accumulation of user data: (a) privacy and (b) storage of this information.

a. *Privacy*

In general, if consumers believe that the smart grid is abusing (or could abuse) personally identifiable data, or that the utility accesses personal information that the customers deem unacceptable, then they are likely to refuse installation of smart grid applications in their homes. Utilities may also face potential customer liability claims or regulatory fines if eavesdroppers or hackers use smart grid data to the customer's detriment.[543] At present, a patchwork of state and federal privacy laws may contribute to uncertainty among utilities regarding adequate levels of compliance and could make this information vulnerable.[544]

A number of stakeholders have offered recommendations for addressing these concerns. NASUCA, for example, has suggested that federal and state policies be adopted to protect private information concerning a consumer's specific usage of electricity.[545] The Obama Administration, as part of its general cybersecurity strategy, has singled out "high-value activities" like the smart grid for the implementation of "an opt-in array of interoperable identity management systems to build trust for online transactions and to enhance privacy."[546] Despite these positive advancements, neither set of recommendations have yet to be formally adopted. With smart grid deployments increasing, a robust set of privacy policies is likely needed to assuage the concerns of customers and policymakers.

b. *Data storage*

Properly storing the vast amounts of data generated via the smart grid will also likely pose a problem for utility companies since many lack the requisite expertise and resources to effectively house this information. Indeed, most utility companies are accustomed to generating information at the one-month level (e.g., the data used to compile a customer's monthly bill). However, with smart grids able to capture user data in real-time, the amount of information coming into the utility will exponentially increase and likely overwhelm storage resources. The possibility exists that this mountain of data could cause data systems to crash, thus disrupting various components of the networked smart grid. A number of vendors, including Cisco, have developed network equipment to handle these storage tasks.[547] However, the cost of developing proprietary systems is likely prohibitive for some utilities and could potentially increase the upfront cost for customers. Moreover, high costs could deter some utilities from investing in these types of technologies, thus imperiling certain networks as the amount of data collected increases.

Barriers to Using Broadband for Energy Efficiency Initiatives

9. *Lack of incentives for employers to encourage telecommuting*

Historically, state and federal government have used a variety of incentives to spur employers to encourage the use of public transportation and other alternative transportation methods in order to reduce traffic congestion and pollution levels. Indeed, the U.S. Department of Transportation has issued a fairly comprehensive guide for employers to use in educating employees on the virtues of carpooling and other such alternative transport modes.[548] Incentives have included tax breaks to employers and other similar approaches that allow the employer to reimburse an employee for using public transportation.

Broadband-enabled telecommuting programs provide policymakers with a more effective and direct method for reducing traffic congestion and carbon emissions. But, to date, only a handful of states have provided employers with financial incentives for encouraging telecommuting.[549] There has yet to be widespread modernization of the system of incentives that previously encouraged alternative transportation at the state and federal levels. Unless and until these incentives are updated, most employers will continue to encourage carpooling and public transportation rather than broadband-enabled telecommuting.

10. *Lack of clear policies regarding sharing and usage of consumption information*

Utilities own the electricity meters and thus the data they generate. Moreover, utilities only share information about customer consumption once a month, with little concept or analysis that might help customers understand their home energy consumption.[550] Utilities are generally unwilling to use customer consumption information for other purposes, thus foreclosing opportunities for third-party innovators to access this information and use it to enable "smart" services. If this practice continues, smart grid deployments and educating consumers about energy use and energy savings will be hindered.[551]

A number of innovators are eager to tap into consumption data in order to provide consumers with new services. Google, for example, has created the PowerMeter, which gives consumers access to more detailed home energy data.[552] This service contains a graph that shows how the data can be used to help consumers identify the source of major power drains.[553] Another company – Opto – has created devices that bypass the meter and connect consumption monitoring tools directly to a customer's energy utility panel, allowing for the remote control of appliances via its Web portal.[554] These and other innovative approaches to using customer usage data exemplify the nearly limitless ways that this information can be transformed into something of value to customers and to utilities. Even though energy companies are reluctant to open customer consumption data to third-parties, Google has been successful in forging partnerships with an array of energy companies.[555] However, such a fragmented approach could slow the speed of similar deployments. In the absence of clear policies regarding the propriety of customer usage data, the development and deployment of "smart" devices and applications like the PowerMeter may stall.

* * * * * *

VI. EDUCATION

This section discusses key impacts of broadband on education in the United States and identifies major barriers to further adoption and usage of broadband in this space.

Broadband holds much potential for transforming the educational experiences of the approximately 56 million students enrolled in either a public or private primary or secondary school,[556] the 57 percent of children aged three to five currently enrolled in some sort of education program,[557] and the 54 percent of adults aged 16 to 64 who have participated in a formal educational class or program.[558] Indeed, with a significant number of Americans enrolled in some type of educational program at any one time, broadband has the potential to radically alter both where and how students learn. Broadband empowers students, teachers, and parents to take more control over the educational experience and to create increasingly individualized learning experiences. However, as discussed below, a number of barriers challenge more robust adoption and usage of broadband-enabled educational tools.

Part A provides an overview of how broadband is being used by educators, students, and parents to enhance the quality of the educational experience from pre-school through continuing education for adults.

Part B details the array of policy and non-policy barriers to further adoption and usage of broadband in the education space. These range from a variety of cost issues stemming from outdated funding mechanisms to organizational barriers among educators. Most schools are already connected to the Internet but, for a variety of reasons, many schools have not fully integrated broadband and broadband-enabled technologies into the classroom.

A. An Overview of Broadband & Education

This part provides an overview of (1) the impact of broadband on education and (2) current uses of broadband for educational purposes.

1. *The Impacts of Broadband on Education*

Broadband positively impacts the traditional education paradigm in a number of ways. Table 13 provides an overview.

Table 13 – Overview of Broadband's Impacts on the Traditional Education Paradigm

Distance Learning	*Online Learning*	*21st-Century Skill Development*
▪ Broadband facilitates a variety of distance learning programs, which provide valuable educational resources to rural students. ▪ Many schools are also using broadband-enabled distance learning programs to expand their catalogue of courses and cater to the unique needs of diverse student populations.[559] ▪ According to the U.S. Department of Education, 37 percent of public school districts and 10 percent of all public schools nationwide had students enrolled in technology-based distance education courses in 2004-2005.[560] ▪ In Alabama, for example, high school students are able to use the Internet to participate in distance learning programs including advanced placement courses and electives to which they may not otherwise have access.[561]	▪ Broadband enables a growing universe of online learning programs, tools, and other applications. These include courses, supplementary resources, research materials, and tutoring services, among many others. ▪ A recent survey estimated that more than 1 million K–12 students took online courses during the 2007-2008 school year.[562] ▪ Nearly 3.9 million students were taking online courses in the fall of 2007, 80 percent of whom undergraduates. According to the most recent data, the total number of students enrolled in higher education institutions that are taking online classes is increasing by nearly 13 percent annually.[563] ▪ A recent report by the U.S. Department of Education concluded that "On average, students in online learning conditions performed better than those receiving face-to-face instruction."[564]	▪ The Partnership for 21st-Century Skills has observed that "profound and accelerating changes in the [globalized] economy make it imperative for the [U.S.] to be much more strategic, aggressive and effective in preparing students to succeed and prosper."[565] Not only is the economy now global, but education has become global as well, and broadband enables education to reach resources overseas. ▪ Core skills include digital literacy and fluency in using basic and advanced Internet tools. Empowering students with these skills could have positive impacts on U.S. economic output.[566] ▪ Individual states have begun to implement programs focused on skill development. Maine, for example, is addressing 21st century skills statewide through its newly formed 21st-Century Skills Advisory Council, which brings together educators, business and government.[567]

Broadband is being used in a variety of other ways to bolster the administration of education and to empower students, teachers, and parents. For example, broadband facilitates a number of *administrative functions* for educators. Indeed, 89 percent of public schools use the Internet to provide data regarding instructional planning, while 87 percent "reported using the Internet to provide assessment results and data for teachers to use to individualize instruction."[568] Broadband also *enables professional development tools* for educators, which allow teachers to conveniently stay abreast of developments in various curricula and teaching methods.[569] In particular, broadband enables

professional development to advance from the traditional method of lectures to a more two-way interactive model.

Broadband enhances the classroom experience by enabling a variety of advanced educational tools. For example, schools are using broadband to stream video, enable web 2.0 applications like blogs, facilitate collaborative learning, collect more granular data regarding student performance, and encourage a more individualized learning experience.[570]

Students are also using broadband as a supplement for in-class learning and as a resource to assist with assignments. Indeed, one study found that, in households with broadband connections, "children ages 6-17 reported that high-speed access affected both their online and offline activities, including schoolwork. *According to these children, since getting broadband, 66 percent spent more time online, 36 percent watched less TV, and 23 percent [improved their] grades."*[571] Broadband Internet access and regular computer access are also having positive impacts on overall student performance. To this end:

- Children who utilized the Internet more in general had higher scores on standardized tests of reading achievement and higher grade point averages than did children who used it less.[572]
- Additional studies have found a positive correlation between computer ownership and student performance, and have affirmed that computer use during early childhood is linked to cognitive development and school readiness.[573]

2. *Current Uses of Broadband for Educational Purposes*

Table 14 provides an overview of data regarding current levels of broadband adoption and usage for educational purposes.

Table 14 – Overview of Current Uses of Broadband for Educational Purposes

School Internet Connectivity
▪ Estimates of school Internet connectivity range from 98 percent[574] to 100 percent.[575]
▪ 94 percent of instructional rooms are currently online.[576]
▪ In 2005, 97 percent of public schools with Internet access used broadband connections to access the Internet. In 2001 and 2000, 85 percent and 80 percent of the schools, respectively, were using broadband connections.[577]
▪ 88 percent of school districts[578] and 96 percent of higher education institutions provide wireless networks to students.[579]
▪ 65 percent of schools without a wireless network are considering installation within the next year.[580]

Computers Access & Usage
▪ In the 2005-2006 school year, 14.2 million computers were available for classroom use, which provided one computer per every four students.[581]
▪ According to the U.S. Department of Education, in 2005, the average public school contained 154 instructional computers, compared with 90 in 1998.[582]
▪ A 2008 study found that over 54 percent of public school teachers reported having just two computers or less in the classroom.[583] Only 6 percent reported providing laptops to individual students.[584]
▪ Forty-four percent of students in higher education institutions report always getting a seat in a school computer lab.[585]
▪ Twelve percent of higher education institutions offer one-to-one laptop programs.[586]
Student Internet Usage
▪ 93 percent of teens aged 12-17 go online in general. 77 percent go online at school. 63 percent go online daily.[587]
▪ 55 percent of teens go online to search for information about colleges, while 27 percent maintain a blog or online journal.[588]
▪ 80 percent of parents say the Internet helps their children with schoolwork.[589]
▪ 71 percent of teens say the Internet has been a primary source for recent school project.[590]
▪ 95 percent of educators agree that "technology [e.g., computers; the Internet], when used properly, improved student learning."[591]
Teacher Internet & Technology Usage
▪ In 2005, 89 percent of public schools used the Internet for instructional planning, 87 percent used the Internet for assessment results and data for teachers to offer more individualized instruction, 87 percent provide digital learning materials to students through the Internet, and 51 percent used the Internet to provide professional development for teachers.[592]
▪ In 2008, 94.8 percent of K-12 educators reported using the Internet at school within the past 12 months.[593]
▪ In 2008, 76 percent of K-12 teachers reported using technology daily for administrative tasks, though less than half used technology for instruction-related tasks, and less than one-fifth use it to post student and class information online (16.9 percent) and to email parents (11.7 percent).[594]

Mobile Phones, Broadband & Education
▪ Cell phones are an increasingly important vehicle for getting online for many students. According to one estimate, "22 percent of young children own a cell phone (ages 6-9), 60 percent of tweens (ages 10-14), and 84 percent of teens (ages 15-18)."[595] Nielsen has observed that mobile Internet usage among teens aged 12-17 increased by nearly 50 percent in the year ending July 2009.[596]
▪ As an example, a program in North Carolina – Project K-Nect[597] – uses "smartphones with advanced mobile broadband technologies to deliver educational material to ninth-grade students...According to its project director, 75 percent of participating classes outperformed other cohorts in math subjects in the recently completed first phase of research. Students also displayed increases in average study time…[and] significant gains in parental involvement" were also reported.[598]
▪ 35 percent of teens have admitted to using a cell phone to cheat in class. Half admit to using the Internet to cheat.[599]
Online Degrees, Continuing Education & Professional Development
▪ 74 percent of higher education institutions offer distance learning programs.[600]
▪ According to a study by Vault.com, "85 percent of employers representing a variety of industries across the U.S. feel that online degrees are more acceptable today than they were five years ago."[601]
▪ A survey of several large corporations and organizations found that "technology was used to deliver 37 percent of formal training in 2005, up from 24 percent in 2003."[602]
▪ IBM's e-learning program, for example, "enables managers to learn five times as much material at one-third the cost of a classroom-only approach."[603]
▪ For a variety of reasons, including recent trends in the corporate e-learning market and the economic downturn, spending on formal e-learning programs decreased in 2008. According to one source, "the total amount of online training dropped from 30 percent of training hours in 2007 to 24 percent in 2008. This shift illustrates the industry's steady move toward informal learning and social networking."[604]

While data demonstrate a general upward trend in broadband usage for educational purposes, an array of barriers challenge more robust adoption and usage of broadband and broadband-enabled educational tools.

B. Barriers to Broadband Adoption

Barriers to further adoption and usage of broadband in education include:

1. Costs of comprehensive utilization of broadband and broadband-enabled technologies
2. Lack of computer access
3. Outdated components of the E-rate program

4. Lack of a more targeted strategy for allocating federal funding
5. Inadequate teacher training on incorporating broadband technologies into the curriculum
6. Limited access to supportive software and technical assistance by educators
7. Demographic disparities in technology literacy
8. Cultural and organizational barriers among educators
9. Lack of adequate bandwidth within schools
10. Lack of national curriculum standards regarding use and integration of education technology

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1. *Costs of comprehensive utilization of broadband and broadband-enabled technologies*

While broadband can facilitate cost savings and increase learning opportunities for educators and students, the costs of broadband-based programs and services is a barrier for many schools and universities. These costs include purchasing the technology, installation, retrofitting buildings to accommodate new systems, training, and maintenance.[605] According to one estimate, technology integration programs can cost $15,000 per classroom and have a four-year lifespan.[606] In a classroom of 25 students, this totals $150 per student per year.[607] Many schools see these initial development and delivery costs of these tools as a significant barrier.[608]

Institutions have implemented a number of strategies, which include adopting a slower installation pace, outfitting a smaller number of classrooms per year, and gradually replacing older equipment with newer technology. Many universities are now equipping campus buildings with wireless Internet in order to reduce installation and retrofitting costs and are charging student technology fees to offset investments. In addition, schools are purchasing transport bandwidth and Internet access separately from service providers to lower costs.[609] This "decoupling" of Internet access "has enabled many districts to tap into local, regional, or statewide networks and to purchase 'raw' commodity Internet at rates that have been decreasing rapidly in recent years."[610] Large blocks of aggregate Internet access currently cost between $9 and $20 per megabit per second per month, and can be purchased through a regional or state master contract.[611] Transport pricing, however, has risen in recent years, due to increasing construction and easement costs.[612] Depending on the location, the initial nonrecurring costs for broadband access can vary from a hundred dollars to hundreds of thousands of dollars.[613] Some schools have "managed to save additional funds by starting out with

minimal levels of broadband service and increasing bandwidth in the future as needed."[614]

In addition to the institutional costs of implementing education technology systems, students and their families also face significant financial constraints that are impeding more robust home adoption and use of broadband for educational purposes. Many online educational programs require a broadband connection, a computer, and other enabling technologies in order to complete Internet-based assignments. Though home broadband adoption has grown significantly in recent years, the adoption rate of low-income groups still lags behind the general population. [615] Many low-income families are unable to afford a monthly broadband subscription, particularly when combined with the costs of purchasing a home computer and any additional educational software.

2. *Lack of computer access*

Although computer availability and ownership rates have steadily increased over the past decade,[616] a significant number of students and schools remain unable to afford a computer.[617] In the 2005-2006 school year, 14.2 million computers were available for classroom use, which provided one computer per every four students,[618] up from a rate of 12.1 students per computer in 1998.[619] However, a 2008 study found that over 50 percent of public school teachers reported having just two computers or less in the classroom or primary work area for students, which prevented the effective integration of computers into teaching practices.[620]

A number of factors impact the ratio of students to computers. For example, "small schools had fewer students per computer than did medium-sized and large schools (2.4 to 1 compared with 3.9 to 1 and 4.0 to 1, respectively). Schools with the lowest level of minority enrollment had fewer students per computer than did schools with higher minority enrollments."[621] Further, certain demographics are more likely to use school computers for school-related activities. Low-income students, in particular, are more likely to restrict their Internet use to school computer labs.[622] African-American and Hispanic children ages 6-17 also utilize the Internet from school, versus from home, much more regularly than other children.[623] Indeed, one recent survey found that African-American households with children under the age of 18 were more likely to have used a public library in the past month for a school assignment than other ethnic households.[624] The same survey also found that African-American and Hispanic households were more likely than white households to go to the library to use a computer and the Internet.[625]

Many schools have begun implementing one-to-one laptop programs to overcome this technological barrier.[626] These programs allow students to use laptop computers during the school day and, in many cases, take the computers home as well.[627] As one commentator has observed, "[b]y eliminating obstacles of sharing computers,

scheduling computer use, bringing students back and forth to computer laboratories, and unequal computer access, laptop programs seek to achieve a more natural integration of technology into instruction."[628] These programs have had a discernible impact on student performance. A 2005 study found that students with personal laptops "tended to earn significantly higher test scores and grades for writing, English-language arts, mathematics, and overall Grade Point Averages."[629] Another study compared schools with 4:1, 2:1, and 1:1 student-computer ratios, and found that a 1:1 ratio had many advantages.[630] For example, students with a laptop used the computer more frequently at home for academic purposes and received less large group instruction in a one-to-one learning environment.[631]

Lack of robust computer access thus represents a significant barrier to broadband adoption, as a significant number of students lack access both at home and in the school.

3. *Outdated components of the E-rate program*

Administered by the Universal Service Administrative Company under the direction of the FCC, the E-rate program provides critical support to schools and libraries for telecommunications and Internet access.[632] Discounts of between 20 and 90 percent are given to public and private institutions in need of telecommunications services, Internet access, internal connections, and basic maintenance of internal connections.[633] The award structure gives priority to disadvantaged institutions with low-income students and/or rural residence.[634] Over the last ten years, more than $22 billion has been awarded to help schools and libraries pay telephone and Internet bills and install network wiring and components.[635] Since the program began, "schools and districts have come to rely heavily on telecommunications networks to deliver educational content and to administer student achievement tests."[636] However, despite the program's successes over the past decade, concerns abound regarding its funding structure, rural preference, and application process, all of which may limit E-rate's ability to meet the technology needs of educators.

The E-rate program's lack of adequate funding is a much-cited barrier to further adoption and integration of broadband into everyday education.[637] One major factor is the program's inability to adjust funding amounts for inflation or changes in demand over the past ten years.[638] Funding amounts have remained constant, at $2.25 billion,[639] though the amount of requested funding consistently exceeded the allotted amount from 1998 to 2007.[640] Moreover, nearly 40,000 applicants requested a total of $4.3 billion from the E-rate program in 2008, exceeding the available amount by $2 billion.[641]

The E-rate program also provides smaller awards to low-income schools not located in a rural area. The discount rate is ten percentage points higher for rural schools than for urban schools with one to 49 percent of students eligible for the National School Lunch

Program.[642] This structure may prevent low-income urban schools and libraries from applying for the technology funding and support they need.

The application process for the E-rate program may also reduce the size of the funding pool.[643] To this end, 63 percent of the 150,000 eligible schools in the U.S. are currently taking part in the program, with 13 percent of eligible private schools applying for funding.[644] Nonparticipants state that the complexity of program requirements is a key barrier, though the process is becoming easier.[645] Typically, between 35 to 50 percent of applicants are new to the E-rate process, and must devote large amounts of time and resources to receive funding.[646] Moreover, funding has been denied to some participants in the past due to mistakes in the application process.[647] In order to address these concerns, the program has attempted to make the application process more user-friendly.[648] A new format has been developed, which focuses on educating new applicants on the complex program procedures.[649]

4. *Lack of a more targeted strategy for allocating federal funding*

Although many schools benefit from federal funding, a limited scope and a lack of targeted allocation mechanisms could slow further adoption and usage of broadband among low- and middle-income schools.

In general, schools receive federal funding from a variety of sources. Examples include:

- *The No Child Left Behind Title II, Part D (NCLB IID) – Enhancing Education Through Technology (EETT) Program.*[650] Even though $600 million were awarded annually in the first few years of the program, funding has steadily decreased since 2004;[651] $254.2 million were allocated in 2006.[652] NCLB IID legislation requires that each state provide a competitive grant program to distribute at least 50 percent of the available funds. In 2006, 1,094 competitive grants, totaling $148 million, were awarded by the states. However, this decreased to 1,047 grants and $135 million in 2007.[653]
- *Broadband-specific Stimulus Funds.* Schools stand to benefit from the $7 billion that has been allotted to support broadband penetration through the American Recovery and Reinvestment Act (ARRA).[654] These funds will be distributed by the USDA's Rural Utility Service (RUS) and the U.S. Department of Commerce's National Telecommunications and Information Agency (NTIA).[655]
- *Education-Specific Stimulus Funds.* The U.S. Department of Education has over $10 billion in funding to dedicate to bolstering schools across the United States.[656] Approximately $3.5 billion is dedicated to improving failing schools; $4 billion will be disbursed to states that

"pursue specific initiatives."[657] Another $650 million is dedicated specifically to enhancing education technology over the next two years.[658] This is in addition to the EETT's annual budget of approximately $267 million.[659]

Despite this surfeit of funding, several challenges remain.

First, with respect to the ARRA funding, a significant portion of these funds will likely be allocated to rural schools. RUS will administer $2.5 billion in funding for organizations that lack sufficient broadband access.[660] Historically, this program has provided little financial support for schools and has been largely under-funded.[661] Moreover, 75 percent of the area served by each recipient must be rural and lack access to adequate broadband service.[662] This further limits the funding opportunities for schools in suburban and urban locations in need of financial support.

Second, only $200 million of the over $4 billion in funds administered by NTIA are allocated for grants "to expand public computer center capacity, including at community colleges and public libraries."[663] An additional $250 million will fund a competitive grant program that encourages sustainable broadband adoption.[664] Schools that do not currently receive E-rate funds may benefit from this program, which will help schools "(1) acquire equipment, instrumentation, networking capability, hardware and software, digital networking technology, and infrastructure and broadband services and (2) construct and deploy infrastructure related to broadband service."[665] However, the eligibility of schools under this program is unclear, as the statute states that an applicant must be "a State or political subdivision thereof," without directly stating that school districts are eligible.[666]

Third, a general lack of targeted allocation mechanisms could result in overlapping, redundant, or skewed funding. For example, the additional $650 million for education technology can be used by states to "pay for things such as professional development to help teachers learn how technology can improve their lessons, software programs to enhance lesson plans, and computer labs."[667] ARRA funding will also support computer labs. In addition, some have argued that general stimulus disbursements for educational purposes might serve to prop up failing schools rather than creating incentives to change by, among other things, effectively incorporating technologies (e.g., computers and the Internet) into the curriculum.[668]

Fourth, others have argued that more federal funding is needed in order to ensure that all schools, including lower-income schools, have the same opportunity to bolster their education technology. One commentator has estimated that it would take approximately $10 billion in funding to ensure that all schools are "technology rich."[669] Stimulus funding is only available in the short-term and thus does not represent a viable, long-term outlet for additional school technology funding.

Legislation introduced in 2009 would bolster federal funding for education technology implementation and professional development and would help "ensure that every student is technologically literate by graduation, regardless of the student's race, ethnicity, gender, family income, geographic location, or disability."[670] This bill has been endorsed by a number of stakeholders and is seen as a way to "focus[] resources on those practices known to best leverage technology for educational improvement."[671] In light of other funding cutbacks (see Barrier #3) and the various overlapping funding mechanisms described above, more targeted federal disbursements could enhance further adoption and use of broadband in a more efficient manner.

5. *Inadequate teacher training on incorporating broadband technologies into the curriculum*

Many educators have been slow to incorporate new information and communications technologies into their classrooms and to adjust their teaching methods in response to technological advances.[672] One commentator has observed that, "[w]hile policymakers, policy implementers, and education technology researchers have spared no effort in promoting the application of technology to teaching, teachers are relatively unwilling and unprepared to use computers within the classroom."[673] To illustrate, one study found that 57 percent of faculty members who teach in "smart" classrooms (i.e., classrooms outfitted with advanced information and communications technologies) fail to use the technology on a daily basis.[674] Moreover, even though most students state that technology is an important aspect of learning, only 33 percent of faculty members report that technology is fully integrated into the education experience.[675] While over 63 percent of students report using technology to prepare for class, just 24 percent actually use it during class.[676]

The low level of technology integration is due largely to a lack of relevant professional development for educators.[677] In 1999, half of public school teachers used computers or the Internet for class instruction and/or student assignments.[678] However, just one-third of teachers reported feeling "well or very well prepared to use computers and the Internet for instruction." [679] Further, in 2005, 83 percent of public schools with Internet access reported that their school or district trained teachers on how to integrate Internet technologies into the curriculum. Despite this, 34 percent of schools offering professional development had less than 25 percent of teachers attend the professional development courses within the previous year.[680]

The quality and effectiveness of technology-related professional development programs is also uncertain. A 2008 report by the National Education Association found that even when technology training is provided by school districts, educators believe that their training is more effective for administrative tasks, leaving them unprepared for instructional use.[681] Fifty-five percent of educators felt that their technology training prepared them for integrating technology into instruction, and 45 percent believed that

they were prepared to design individualized lessons.[682] The method of technology instruction for educators further compounds this issue, as training courses often fail to serve as examples of technology implementation.[683] Technology training courses may simply tell teachers about education technologies without providing specific information for implementing the technology into the curriculum. Thus, a lack of proper professional development may be discouraging further adoption and integration of broadband-enabled technologies and tools in the classroom.

6. *Limited access to supportive software and technical assistance by educators*

Access to appropriate supportive software is one of the most important factors affecting computer use in classrooms and, thus, adoption and usage of broadband-enabled education tools.[684] Studies have shown that software tools designed specifically for educator needs "enhanced the motivation of teachers to use computers and promoted the emergence of innovative teaching practices."[685] Such software tools also assist teachers in developing technology literacy skills and help with the performance of routine tasks.[686] However, funding for the software used for lesson planning, preparation, and individual instruction is not provided for in many federal funding programs and is thus the responsibility of individual school districts and states.[687] Urban schools, which rely heavily upon E-rate funds for technical support, must find additional sources of funding to maintain and update supportive technologies for instructional use.[688] Urban educators are more likely than rural educators to report that their software was inadequate and are less likely to be involved in technology purchase decisions.[689] A 2007 report found that, throughout the education industry as a whole, "little effort has been invested to promote the maturity of educational software products, especially software designed to fulfill the instructional requirements of teachers."[690]

In addition, maintenance capabilities and technical support may also be in short supply. According to one study, 70 percent of educators report having sufficient technical assistance for technology set-up and use in their school, and just 67 percent report adequate help for troubleshooting or fixing problems with school technology.[691] Further, a 2008 study found that educators in urban schools are more likely to report poor working conditions of school computers and less technical support to help with repairs.[692]

A number of innovative nonprofit programs have been launched to support educators in the effective use of broadband-technologies in the classroom. MOUSE, for example, provides "the basic level of computer troubleshooting and maintenance support needed to assist teachers in their work to integrate technology into teaching and learning."[693] MOUSE empowers students to become resources for technical support, which provides them with essential employment skills and provides schools with a lost-cost alternative

for computer-related troubleshooting.[694] This program has had discernible positive impacts on both students and schools. A Fordham University study of the MOUSE program found that participating students had higher rates of school attendance and increased academic performance.[695] A Citibank study found that "schools running the MOUSE program save an estimated $19,000 per year in technology support costs."[696]

According to the NEA, "technical personnel trained to assist teachers with setting up and troubleshooting computers and other equipment are essential to the successful implementation of school technology."[697] Innovative programs like MOUSE have proven to be successful in providing technical support to educators. However, a lack of widespread training and support systems represents a major barrier to further integration of broadband-enabled education tools for a majority of schools across the country.

7. *Demographic disparities in technology literacy*

Technology literacy skills are an essential prerequisite for nearly every profession and for effective usage of broadband-enabled educational programs.[698] The U.S. Department of Education recognizes that technology literacy "has become as fundamental to a person's ability to navigate through society as traditional skills like reading, writing, and arithmetic."[699] Information literacy is defined by the U.S. Department of Education as "computer skills and the ability to use computers and other technology to improve learning, productivity, and performance."[700] However, for a variety of reasons, there is a gap between those students with adequate technical literacy and those without.[701]

Certain demographic groups may experience varying levels of technology literacy due to the different levels of computer-based instruction received in school and the availability of broadband at home. The use of technology in classroom instruction varies significantly among different demographic groups. Rural educators are more likely than suburban and urban educators to complete administrative tasks, monitor student progress, and post class information with the use of computers.[702] Suburban instructors, on the other hand, are more likely to share information with other teachers and communicate with parents by email.[703] Urban educators, however, tend to use technology less frequently than rural and suburban educators for all four of the tasks.[704]

Since school computer access and classroom technology use are fragmented in schools across the country, many students are learning technology skills at home.[705] Studies have shown that children with home broadband access tend to spend more time online.[706] However, disparities in home computer and broadband adoption may prevent certain demographics from developing technology literacy skills. Though home computer and broadband adoption has grown significantly in recent years, the adoption rates of African-Americans and low-income families still lag behind the general population. Only 46 percent of African Americans and 35 percent of adults with

household incomes under $20,000 have home broadband, compared to 63 percent of all adults.[707] Further, just 41 percent of students in the eighth grade who take part in the free and reduced lunch program had home Internet access in 2003, compared to 72 percent for those not participating.[708] Disparities in Internet and computer access create inequities in technology literacy for students who are unable to garner the necessary technology skills at home.

In addition, the application of accepted standards for technology literacy has made little progress in recent years. The No Child Left Behind Act calls for all students to be technology literate by the end of the eighth grade, but provides no requirements or accountability measures to ensure literacy levels. While 48 states currently offer technology standards for students, only four states test the technology literacy skills of students.[709] The low prevalence of technology literacy tests is largely due to the absence of a universally accepted and measurable definition of technology literacy.[710]

8. *Cultural and organizational barriers among educators*

Broadband and broadband-enabled education technologies have the power to shift the education paradigm to a more individualized learning environment. According to one commentator, "America is moving from the old mass production model of schooling to a model that engages individual students by offering them the opportunity to personalize their work and pursue the interests they develop."[711] The use of information technology and broadband in the classroom not only enhances conventional education, but also enables and empowers students to actively participate in the learning process.[712] However, even though there is much support for a new "culture of learning,"[713] acceptance of technology-centered education remains a concern among many educators.[714]

A number of cultural and organization barriers currently prohibit widespread adoption of technology in many educational institutions. Cultural barriers include "teachers' beliefs about the nature of teaching and learning, recognition and awareness of their role as teachers based on this philosophy, and a perception of the vision that technology may produce as they engage in instruction or promote learning."[715] Researchers have found that some teachers are hesitant to use technology in the classroom since traditional classroom dynamics may become reversed if students have more familiarity with technology than the educator.[716] In general, as one study has observed, teachers may be "accustomed to teaching within the traditional education model and are simply satisfied with the status quo."[717]

Online education may also be hindered by a lack of faculty acceptance.[718] One-third of academic leaders believe that their faculty "accepts the value and legitimacy of online education."[719] This number has remained relatively constant in past years, rising from 28 percent in 2002 and 31 percent in 2004. However, 62 percent of academic leaders of

institutions already offering online education accept the value of online learning.[720] While institutions that currently offer online education do not see low value propositions as barrier for their organization, they do believe it will inhibit more widespread adoption of online education in general.[721]

9. *Lack of adequate bandwidth within schools*

Despite the fact that 97 percent of schools report having broadband access to the Internet,[722] the bandwidth associated with many of these connections is inadequate to support robust education applications.

The State Educational Technology Directors Association (SETDA) has found that most schools in the country are utilizing T1 (1.54 Mbps) connection speeds to accommodate the bandwidth-intensive needs of a school's many users.[723] This number is far below the national household average speed of 5 Mbps, which is shared only by a small group of Internet users in the home.[724] Further, one study estimated the national average access speed per student to be just 6.5 Kbps.[725] Many of the potential cost-savings, quality improvements and cutting-edge educational application are inaccessible at these speeds.[726]

School bandwidth needs continue to grow as new innovations in education technology become available. CoSN states that "demand on school networks...has never been greater."[727] For example, the size of an average web page grew by 233 percent between 2003 and 2008, and the average number of objects per page doubled over the same time period,[728] putting further strain on any school connections. According to the School 2.0 Bandwidth Calculator, email, web browsing, online learning, audio streaming, and online assessments currently require 100 Kbps each.[729] Student-created content and school portals need 150 Kbps each, and the bandwidth requirements for virtual field trips and TV-quality video streaming amount to 250 Kbps.[730] Further, interactive video at a desktop can total 300 Kbps.[731] Each of these applications would likely overwhelm current Internet connections in many schools across the country.

As demand for bandwidth continues to grow, many schools may be faced with overuse penalties to service providers, lose critical information, or deal with highly congested traffic.[732] Schools will either opt to manage their traffic through software or purchase additional bandwidth to meet their needs. America's Digital Schools 2008 found that 67 percent of school districts utilized a restriction policy that bars students and teachers from using certain online applications, such as streaming video to conserve bandwidth.[733] However, when broadband-enabled resources become limited or difficult to use, many teachers respond by reducing the amount of technology they incorporate into their lessons.[734]

10. *Lack of national curriculum standards regarding use and integration of education technology*

Some stakeholders in the education sector have argued that a lack of national curriculum standards for education technology has hindered or slowed wider adoption and use of broadband-enabled tools and applications in the classroom.

Oversight of educational institutions is largely local in nature.[735] Many states retain oversight of the schools within their boundaries, delegating primary oversight of day-to-day operations to local school districts. However, federal standards have been imposed as part of national funding efforts (e.g., the No Child Left Behind Act). Funding is usually tied to certain performance benchmarks.[736] In addition, the federal government does assess student progress via its National Assessment of Educational Progress (NAEP) program. NAEP is "the only nationally representative and continuing assessment of what America's students know and can do in various subject areas."[737] However, major curriculum changes usually flow from the state.

Several federal funding mechanisms include technology requirements. For example, the NCLB IID competitive grants call for "systematic changes in policies, practices, and professional learning that increase or enhance a school's ability to use technology effectively in teaching and learning."[738] However, some have argued that a piecemeal, state-by-state, and possibly district-by-district, approach may delay further integration of technology into the curricula of many schools across the country.

Yet others argue that education technologies like broadband should be free of formal requirements and standards in order to fully realize the potential of these tools: individualized learning. Indeed, two commentators have argued that "even today, with education technology in its earliest stages...Curricula can be customized to meet the learning styles and life situations of individual students, giving them productive alternatives to the boring standardizations of traditional schooling...Teachers can be freed from their tradition-bound classroom roles, employed in more differentiated and productive ways."[739] Indeed, one of the major benefits of using broadband to aid education is the way in which it facilitates individualized learning by "outlier" students, such as those who are "gifted," those who are disabled, or those who are learning in a second language. According to this view, national curriculum standards for technology could blunt these potential impacts.

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VII. GOVERNMENT

This section focuses on how broadband impacts government processes and identifies barriers to further adoption and usage of broadband in this space.

A large amount of government information is already online and accessible by the public. Moreover, an increasing array of government services are migrating online in order to provide easy public access and to streamline certain internal administrative functions. However, as discussed in this section, most government entities face a complex array of legal and policy hurdles to further leveraging broadband to enhance transparency, offer services online, and maximize public participation.

Part A provides an overview of how broadband is being used by government to enhance the efficiency of administrative functions, bolster transparency, promote more citizen participation in decision-making processes, and engage the citizenry in collaboration and innovation. This part also analyzes how the public is using broadband to monitor government.

Part B details the array of legal, regulatory, policy, and non-policy barriers to further adoption and usage of broadband by various government entities. While the focus is primarily on the federal government, many states and municipalities face a similarly complex series of broadband barriers. Barriers at the federal level range from a variety of outdated laws that govern transparency to a lack of expertise on how to effectively integrate broadband into government processes.

A. An Overview of Broadband & Government

Broadband has multifaceted impacts on government. First, broadband enables advanced information technologies (IT), which allow government entities to enhance administrative functions. Second, broadband greatly expands the universe of information that government can make public, which in turn increases the number of opportunities for civic engagement and collaboration. Third, broadband is used by citizens to oversee government functions, providing a public check on state and federal institutions and policymakers. In sum, broadband is a critical tool for enhancing the democratic processes of government.

This part provides an overview of: (1) how government is currently using broadband and broadband-enabled technologies and (2) how citizens are using broadband to interact with government.

1. *How Government Uses Broadband & Broadband-Enabled Technologies*

The federal government is currently using broadband to achieve a number of core goals. Table 15 provides an overview.

Table 15 - Overview of How Government Uses Broadband

Administrative Efficiencies	*Enhanced Transparency*	*Civic Engagement*	*Public Collaboration*
▪ Broadband enables a variety of advanced IT systems, which provide enormous efficiencies and cost savings. ▪ Example: The federal government recently announced that it intends to use increasing amounts of cloud computing services via a new portal – Apps.gov. This is expected to result in millions of dollars in cost-savings.[740]	▪ Broadband allows state and federal government to make large amounts of information available in a more real-time manner via traditional means (i.e., posting online) and via new social media (e.g., Twitter). ▪ Example: A number of federal agencies, including the FCC,[741] have made updates available via RSS[742] and Twitter,[743] among other tools.	▪ In addition to enhanced transparency, broadband enables the widespread use of tools like blogs to engage the public in government activities.[744] ▪ Example: The FCC recently announced that comments submitted on its blog dedicated to the national broadband plan – Blogband – would be included in the formal record of this proceeding.[745]	▪ Broadband is also being using to solicit the input and expertise of the general public during rulemaking and decision-making processes. ▪ Example: The U.S. Patent & Trademark Office has launched an initiative – Peer to Patent – that uses wiki technologies to engage the public in gathering information for use in the review of patent applications.[746]

These efforts are being implemented across all levels of government and for a wide array of purposes. For example, the IRS utilizes electronic filing to increase administrative efficiencies and lower costs.[747] *The IRS has found that the processing costs for electronic tax returns are about one-eighth of that for paper returns, and if mandated, widespread use of electronic e-filing could save over $66 million.*[748] In addition, the number of federal and state government websites utilizing public outreach services online (e.g. e-mail updates, personalization, PDA access) has increased substantially since 2005.[749]

Many new initiatives are being driven by a focus on using technology to make government more accountable to the public.[750] Examples of recent efforts that leverage broadband-enabled technologies to make government more open include:

- *The White House's Open Government Initiative.* This initiative calls for the development of an open government plan that "instructs executive departments and agencies to take specific actions implementing"

principles of openness[751] by collaborating directly with the public.[752] In particular, the Initiative consulted with the public during each of the plan's three phases – Brainstorming, Discussion, and Drafting.[753] Comments and feedback were solicited and organized via IdeaScale,[754] a community innovation tool.[755]

- *Open Government Innovations Gallery.* This gallery displays innovative programs and approaches for making government more open, transparent, and participatory.[756] Among the growing number of innovations is *Data.gov*, which provides the public with access to vast amounts of machine-readable government data and encourages the public to use the data to "build applications, conduct analyses, and perform research."[757]
- *E-Rulemaking.* Passage of the E-Government Act of 2002[758] signaled official recognition of the Internet as a primary means of communication between the government and the citizenry. In 2003, the federal government launched *Regulations.gov*, which is a centralized online repository of rules that invites the public to "search, view and comment on regulations issued by the U.S. government."[759] In addition to soliciting feedback from the public, e-rulemaking has the potential to engage the public in a dialogue regarding specific regulations and the regulatory process generally.[760]
- *Federal Register 2.0.* The White House recently announced the launch of the next generation of the Federal Register. Each day, the Federal Register publishes notices of new rules, rulemaking proceedings, and other announcements of the many Executive branch agencies. By the end of most years, nearly 80,000 pages of such announcements and notices are published.[761] However, the way in which these notices were published made them "more accessible in practice to avid government-watchers and experienced interest groups than the general public."[762] The 2.0 version will use XML, which is a "simple and flexible, machine-readable form of text that is easy to manipulate with software. By [using] XML, the federal government is for the first time allowing individuals to take control over how they want to read the Federal Register."[763] To this end, a new tool – *FedThread.org* – was recently launched that uses the new XML format to allow the public to annotate Register announcements, easily search the Register, and create customized news feeds.[764]

At the state level, a growing number of government entities are using similar broadband-enabled tools and approaches to make their processes more open and transparent. Indeed, a recent study found that three-quarters of responding cities and counties use RSS feeds to "provide news and updates to citizens," and "100

percent...are using wikis internally. Seventy-two percent are using, or will soon use, Twitter to push news -- especially emergency and safety alerts -- to citizens and the media."[765] Many of these tools allow government agencies to provide real-time information to the public in an affordable manner. For example, Twitter is increasingly popular among transportation agencies that want to alert residents of street closures.[766] In addition, many municipalities and states may follow the lead of the federal government in adopting and implementing new broadband-enabled applications and services.[767] However, much like the federal government, states and local municipalities face a number of barriers to further integrating broadband into everyday functions.

2. *How Citizens Use Broadband to Interact with Government*

An increasing number of people are using the Internet to participate in social discourse and avail themselves of online government services. A recent study found that nearly 20 percent of Internet users had "posted material about political or social issues or a used a social networking site for some form of civic or political engagement."[768] Of all Americans who have contacted a government official, signed a petition, or sent a "letter to the editor," 54 percent accomplished this online.[769] During the 2008 presidential campaign, nearly 75 percent of Internet users went online to "take part in, or get news and information" about the campaign.[770] Further, research shows that 31 percent of blogs have commented on political or social issues,[771] and that reading, commenting, and maintaining blogs have become one of the most popular online political activities.[772] In addition, the Internet became a primary conduit for campaign donations during the 2008 elections.[773]

Citizens are using broadband connections to the Internet for a number of other political activities. Table 16 provides an overview.

Table 16 - Overview of How Citizens Use Broadband to Interact with Government

News & Commentary	*Political Oversight*	*Political Organizing*
▪ Broadband enables an array of platforms for real-time political commentary. These include blogs, YouTube, news aggregating services, Twitter, and a variety of other services. Those who regularly participate in these types of activities are more likely to be involved in other civic-oriented activities.[774] ▪ Examples: Well-known examples of political blogs include *The Huffington Post* and *Politico.com*.[775] A search of "politics" via Technorati returns almost 300,000 blogs.[776] News aggregator sites like *Drudge Report* and *Real Clear Politics* provide users with a convenient forum for accessing political news. YouTube recently launched *CitizenTube*, which aggregates user-generated political videos.[777]	▪ Citizens are using broadband to contribute to political discourse and to monitor the actions of government. A growing number of "Watch" sites have been launched in recent years to provide checks on policymaker actions and on inaccurate information. ▪ Examples: *FundRace* tracks individual and corporate donations to political candidates.[778] *FactCheck* monitors "what is said by major U.S. political players" and filters what is true from what is not.[779] *Earmark Watch* tracks "spending provisions requested by individual members of Congress that target taxpayer dollars to specific projects and recipients."[780]	▪ Broadband enables social media tools for political organizing. *Facebook* is an increasingly popular service for aggregating "friends" and advancing political views. One recent poll found that nearly 40 percent of college students use Facebook to promote a political candidate.[781] ▪ Examples: Examples abound of formal and informal uses of broadband to facilitate political organizing. Candidates for office have successfully leveraged a variety of broadband-enabled tools to disperse information to local volunteers, who then circulated information via the web and via traditional means (e.g., door-to-door).[782] Similar tools also enable "flash crowds" to quickly gather and protest a given issue.[783]

The broadband-enabled tools described above provide citizens with a number of convenient outlets for participating in the processes of government. However, while these tools are increasingly relevant to the modern democratic process and to how government governs a number of barriers impede more robust and inclusive interactions between the citizenry and government.

B. Barriers to Broadband Adoption

This part identifies the key policy and non-policy barriers to further and enhanced broadband usage by government. These barriers include:

1. Inertia among many government agencies and government staff regarding the implementation of broadband-enabled e-government solutions

2. Lack of expertise regarding how to effectively use broadband for e-government purposes
3. Lack of coordination among federal agencies and departments regarding best practices for effectively using broadband
    a. Web design
    b. Interagency collaboration & information sharing
4. Cost concerns related to further integration of broadband into government functions
5. A complex array of laws and policies regarding transparency, administrative procedure, and e-government
6. Lack of public awareness regarding the value of using broadband to participate in deliberative e-government services
7. Unresolved privacy issues
8. Unresolved data security issues

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1. ***Inertia among many government agencies and government staff regarding the implementation of broadband-enabled e-government solutions***

Despite the wide array of statutes and policies regarding e-government at the federal level (see Barrier #5), many agencies have yet to comply with these mandates. *A 2007 study found that nearly 80 percent of federal agencies had failed to comply with all the statutory requirements set forth in the Electronic Freedom of Information Act Amendments (EFOIA) of 2006.*[784] Among the federal websites currently online, many are poorly designed, cluttered, and inaccessible to the average reader.[785] In addition, many federal and state website quickly become outdated for a number of reasons discussed below. For example, the THOMAS web site that tracks federal legislation was launched in 1995 but was "so out of date by 2004 that seven senators cosponsored a resolution to urge the Library of Congress to modernize it."[786]

These trends signal either a general inability or reluctance by many federal agencies to harness the true potential of broadband. Despite promising gains in e-rulemaking,[787] government decision-making remains firmly rooted in 20th-century notions of relying on internal expertise rather than on using digital tools to better inform the process and citizens. As one commentator has observed, "Innovation is not emanating from Washington; instead, the practices of government are increasingly disconnected from technological innovation and the opportunity to realize great citizen participation – and therefore more expert information – in government. At the very least, this means that

government institutions are not working as well as they might, producing declining rates of trust in government."[788]

Instances of institutional inertia abound at the local, state, and federal levels. For example, the New York City Council recently announced that it had webcast its first hearing in September 2009, two years after legislation was adopted that required such.[789] The main FCC website, though recently augmented by the addition of a series of interactive web 2.0 services, continues to frustrate users by being cluttered and lacking a number of features like a robust search feature.[790]

The Obama administration seeks to alter this mindset among federal institutions (see Section VII.A.1). Similar changes are also evident at the state and municipal levels. However, history has shown that, despite forward-looking laws and policies that seek to use broadband-enabled tools to open up government, institutional inertia is a powerful force that will likely impede more rapid adoption and use of these technologies in the short term.

2. *Lack of expertise regarding how to effectively use broadband for e-government purposes*

Lack of expertise regarding how to effectively implement and use broadband-enabled e-government tools at all levels of government is a key contributor to the institutional inertia described above. Indeed, the President tacitly acknowledged the absence of such expertise at the federal level with the appointment of a number of technology and innovation "czars" to ensure that the government is using these types of modern tools to hold government more accountable to the public. A federal Chief Information Officer (CIO) will "provide management and oversight over federal IT spending," and a federal Chief Technology Officer (CTO) will "provide vision, strategy and direction for using technology to bring innovation to the American economy. They will work together to support innovation inside and outside the Federal Government."[791]

A recent study by the Brookings Institution concluded that, "on most dimensions of technology innovation, the private sector outpaced the public sector."[792] Among the many reasons for this, the study noted that government agencies tend to lack the resources and incentives to implement the same type of interactive innovations that the private sector excels at.[793] In addition, even when the federal government has adequate resources, a combination of institutional inertia and lack of expertise stifles innovation. For example, even though the federal government owns the rights to a significant percentage of valuable wireless spectrum, much of it remains unused or underused.[794]

However, there is a growing consensus that public participation in the decision-making process, including in the formulation of policies for using technology for e-government purposes, could augment institutional expertise (see Barrier #6). Some have argued that

more robust public participation in the decision-making processes of regulatory agencies via interactive collaborative tools (e.g., wikis) could bolster the quality of data and enhance the number of "experts" involved in a given rulemaking process.[795] As noted above, a number of initiatives that employ this approach are already underway (e.g., the USPTO's Peer-to-Patent pilot). However, the centralized expertise of the federal CIO and CTO, though already successful in affecting change within the various offices of the White House, will likely take some time to diffuse across the many Executive branch agencies and offices. Thus, more robust adoption and usage of the broadband-enabled tools discussed above will likely be slow because of a lack of expertise regarding how to properly implement these tools in the various agencies.

3. *Lack of coordination among federal agencies and departments regarding best practices for effectively using broadband*

Notwithstanding that many federal agencies share common goals, some tend to operate independently of one another even though closer collaboration and consultation could result in a more cohesive usage of broadband-enabled e-government tools.[796] A recent study observed that *"the biggest barrier to innovation is unwillingness to work together. Too many agencies do not align their management structures and design teams in a way that encourages people to work together."*[797] Indeed, the FCC has observed that there is a lack of coordination and priority alignment among government agencies, resulting in inefficient and duplicative deployment and adoption programs and improper implementation of broadband policy.[798] Lack of coordination among the various agencies has raised barriers to (a) a more cohesive approach to federal website design and (b) more robust interagency collaboration and information sharing, both of which negatively impact broadband adoption and usage efforts.

a. *Web design*

Even a review of various federal agencies' websites demonstrates a lack of a cohesive, overarching approach to web design. Websites are largely inconsistent with regard to readability, organization, and the number and type of services available.[799] The many websites affiliated with the FCC provide a useful case study.

The new FCC Chairman has vowed to launch a new website in the near future.[800] This is an important dimension of reforming government. The current version of the FCC's main website has been widely criticized as antiquated, cluttered, and organized in such a way as to be "an exercise in obscurantism."[801] Recently, however, the FCC has launched a number of issue-specific websites that many agree are more user-friendly and conducive to public input. For example, *Broadband.gov* is the primary web portal for the FCC's National Broadband plan.[802] This site contains, among many other features, a blog - Blogband - that is being used to solicit public comment on the plan.[803] More recently, the FCC launched another website - *OpenInternet.gov* - which is described as

"a place to join the discussion about the important issues facing the future of the Internet."[804] These new websites offer unprecedented levels of public access and outlets for participation. Yet their designs – from look and feel to actual functionality and user-friendliness – vary greatly. The inconsistencies of websites housed within one federal agency are instructive of the universe of inconsistencies across all federal agency websites.

To promote enhanced consistency, the federal government has established a Federal Web Managers Council, which is an "interagency group of senior federal government web managers who collaborate to share common challenges, ideas, and best practices, and improve the online delivery of U.S. Government information and services."[805] The Council has, among other things, devised a set of rules governing federal website design.[806] These rules, however well-intentioned, have resulted in what some commentators have described as a "compliance minefield that makes it hard for [web managers] to avoid breaking the rules – while diverting energy from innovation into compliance."[807]

Federal website design remains fragmented, inconsistent, and, in some cases, poor. Indeed, poor design may deter more robust usage by target audiences. For example, as previously discussed, the Medicare Part D website was found to be difficult to navigate by senior citizens and frustrating to use, which likely prevented some older adults from fully benefitting from the site (see Section II.B.2.b). These inconsistencies and the current compliance framework create a formidable barrier to experimentation with broadband and broadband-enabled tools. Some agencies, like the FCC, have successfully experimented with modern web design techniques. But there are no established channels for exporting these or other successes – and lessons learned from failures – among other agencies and organizations.

b. *Interagency collaboration & information sharing*

Broadband and broadband-enabled systems could be used to facilitate better information sharing and collaboration across federal agencies. Moreover, broadband and broadband-enabled tools could allow those agencies that have implemented user-friendly sites (e.g., the IRS) or that have successfully deployed collaborative tools (e.g., the USPTO's Peer-to-Patent program) to share best practices with other, less tech-savvy agencies. However, a lack of policies or incentives to encourage such behavior creates a barrier to further adoption and usage of broadband and broadband-enabled tools.

Intra-agency collaboration may offer principles for enabling interagency collaborations. Perhaps the most notable example is the creation of Intellipedia by the Central Intelligence Agency (CIA). Intellipedia uses wiki technology to aggregate a searchable directory of intelligence and other such information for use by CIA employees.[808] To date, nearly one million pages have been created via this tool.[809] However, policies that

facilitate these types of collaborations across agencies are still lacking, creating a barrier to further usage of broadband-enabled services like the wiki technology used in Intellipedia.

Interagency collaborations could generate a number of valuable efficiencies and useful services. To this end, the GAO has identified a number of instances where information sharing among agencies would result in discernible benefits for the government and the public. For example, the GAO recently recommended "a systematic approach...to shar[ing] information broadly across the federal government about agency-developed promising practices in recruitment and retention of older, experienced workers to meet their workforce needs."[810] Similarly, the GAO has recommended that federal agencies "establish an ongoing forum for government personnel from [various] agencies that sponsor [Federally Funded Research and Development Centers] (FFRDCs) to discuss their agencies' FFRDC policies and practices."[811] Broadband could facilitate the type of information sharing and collaboration recommended by the GAO in these specific instances and in a variety of other instances.

4. *Cost concerns related to further integration of broadband into government functions*

The U.S. government will spend approximately $75 billion on information technologies in 2009, representing a two percent increase from 2008.[812] *By 2014, IT spending is expected to reach $90 billion a year.*[813] *With regard to e-government services, the amount of money allocated to support interagency iniatives will increase fourfold over the next year.*[814] These trends signify not only the rising costs of IT generally but also the current administration's dedication to using advanced information and communications technologies for bolstering the openness and transparency of government. However, at a time when many agencies' budgets are being cut or frozen,[815] concerns regarding the many costs associated with integrating and deploying broadband-enabled e-government services may slow the adoption and usage of these tools at the agency level. Investment levels are important since it has been found that "successful innovators spend a significant amount of their overall budget on information technology."[816]

The costs associated with using broadband-enabled e-government tools are multiple and vary depending on the type of tool being used. For example, more bandwidth-intensive applications (e.g., video) will require the purchase of additional bandwidth from the government's broadband provider. Video is a particularly expensive application in terms of money spent on bandwidth. Consider that, in 2009, YouTube, the most popular video site on the Internet, could spend approximately $300 million on bandwidth to support its service.[817] Moreover, for a variety of reasons (e.g., compliance costs), the cost of implementing something as simple as a blog, usually free to the public, can cost the government upwards of $600,000.[818] Additional costs may stem

from redesigning current versions of website, hiring additional staff to manage new tools and services, and a variety of other hardware and software costs. With agency budgets being cut, cost concerns associated with the deployment, management, and upkeep of the broadband-enabled tools described above could prove to be a formidable barrier to continued innovation and experimentation within government.

5. *A complex array of laws and policies regarding transparency, administrative procedure, and e-government*

The array of federal laws and policies that directly or indirectly impact the ability of a federal agency to solicit information from the public or to make information publicly available create a formidable barrier to using broadband to enhance these processes. Many of these laws are outdated and do not include provisions for using the Internet to streamline information gathering or data transparency. Moreover, many of the laws that do reference the Internet have not yet been updated to account for the growing universe of broadband-enabled social media tools that are increasingly popular across the federal government (e.g., blogs, Twitter, and YouTube). Indeed, a recent memo issued by members of the Federal Web Managers Council highlighted the antiquated nature of many government laws and policies as a major impediment to more robust use of social media.[819]

Laws and policies that impact the usage of broadband-enabled tools include:

- *Freedom of Information Act (FOIA).*[820] FOIA requires the disclosure of certain types of information to the public upon request. Under FOIA, any person "can request an agency record and, implicitly, can do so for any reason or no reason at all."[821] However, despite an increase in transparency and accountability, "not all government information is available to the public."[822] Thus the universe of government information is limited by FOIA's provisions.
- *Electronic Freedom of Information Act (EFOIA).* This Act, which was passed in 1996, sought to modernize the FOIA at a time when the Internet was emerging as an important medium for information sharing. As previously noted, compliance with the EFOIA's disclosure requirements has been slow. One commentator has identified a number of reasons for this, ranging from "a simple lack of available resources to the seeming reluctance on the part of lawmakers and agencies to treat the task of public records maintenance as an essential component of a transparent, democratic government."[823] In addition to these, an increase in the amount of compliance required by federal web designers may have added to the institutional inertia described above.[824]

- *Administrative Procedure Act (APA).*[825] Enacted in the mid-1940s, the APA guides the various processes of federal administrative agencies, including the rulemaking process, which allows for public input during the notice-and-comment portion of the process. These provisions, though well intentioned, have been widely criticized as vulnerable to regulatory capture.[826] In addition, many agencies lack the resources to fully vet each public comment.
- *E-Government Act.*[827] Among other things, the E-Government Act legislated e-rulemaking to streamline the traditional rulemaking process under the APA and to "improve the quality of federal rule making decisions."[828] However, as one commentator has observed, using the web for e-rulemaking has "made it easier for machines, or bots – rather than people – to send electronic postcards, further deluging agencies with unusable information."[829] Moreover, some agencies have been more successful in leveraging broadband-enabled e-rulemaking tools than others. The FCC, as previously discussed, has been criticized by some for not making dockets fully searchable via keywords.[830] Lack of coordination and information sharing among agencies could be hindering further progress on this front (see Barrier #3).
- *Paperwork Reduction Act.*[831] This Act was passed to "maximize the utility of information created, collected, maintained, used, shared, and disseminated by the Federal Government"[832] by mandating the online publication of documents. However, not all data are "online or web-accessible,"[833] creating gaps in what the public has a right to access and what agencies have a right to keep confidential.
- *Procurement Policies.* In addition to formal laws regulating the actions of federal agencies and offices vis-à-vis using broadband-enabled technologies for e-government purpose, a number of more informal but enforceable policies have also been implemented. Some of these, like the laws previously discussed, are outdated. For example, as the Federal Web Managers Council recently observed, "Government procurement rules didn't anticipate the flood of companies offering free tools to anyone who wants to use them."[834] Agencies that wish to implement these types of services face uncertainty regarding various aspects related to their use, including the propriety of using a free service (e.g., whether use of the service is considered a gift under ethics rules).[835]

These laws and policies create a complex maze of compliance requirements for federal agency staff, which results in increased costs and likely more entrenched institutional inertia. As a result, many agencies may be reluctant to experiment with broadband-enabled e-government tools for fear of running afoul of one of these laws or policies.

6. *Lack of public awareness regarding the value of using broadband to participate in deliberative e-government services*

As discussed above, an increasing percentage of the population is using broadband to participate in some form of online political discourse or activity (see Section VII.A.2). For example, the IRS reported a 19 percent increase in e-filing via home computers in 2009, due, in part, to e-filers receiving refunds faster than other filers.[836] However, despite the many benefits of broadband-enabled e-government, many citizens have yet to participate in more deliberative e-government services (e.g., e-rulemaking), suggesting either a lack of awareness or skepticism regarding the utility and value of these types of tools. This barrier could result in a majority of Americans being left out of critical deliberations being conducted online.

A recent study highlights the importance of raising awareness of the value of these services in order to spur usage. The study found a direct correlation between the use of various broadband-enabled civic tools and income level.[837] Indeed, the study concluded that "those who are lower on the socio-economic ladder are less likely to go online or to have broadband access at home, making it impossible for them to engage in online political activity. Yet even within the online population there is a strong positive relationship between socio-economic status and most of the measures of internet-based political engagement we reviewed."[838] A similar gap in usage was observed among different age groups (younger users are more active).[839] These gaps limit the pool of participants in a given e-government exercise and thus raise the possibility of skewed or incomplete results.

For example, during the presidential transition, the Obama administration released a "Citizen's Briefing Book" online and asked the public "to submit ideas to the president" and vote on the submitted proposals.[840] Over 44,000 proposals and 1.4 million votes on the proposals were received.[841] Yet despite such overwhelming feedback, the top proposals included legalizing marijuana and online poker, not economic or social reforms.[842] Similar results flowed from the initial public comment cycle of the Open Government Initiative described above. A number of "fringe" proposals were among the top proposals and included revealing UFO secrets and verification of President Obama's birth certificate.[843]

Various experiments and pilot programs have shown that well-designed civic engagement exercises can yield useful results by empowering citizen users to "self-select" and to self-police an online forum, thus providing an environment that is more conducive to debate and deliberation.[844] Moreover, carefully designed programs that create "an ongoing collaboration between government and citizens" could spur more participation.[845] For example, *Apps for Democracy*, launched by the District of Columbia's CTO, engaged the public in a contest to design innovative applications for

using public data released by the local government.[846] The first contest in late 2008 yielded "[seven] iPhone, Facebook and web applications with an estimated value in excess of $2,600,000 to the city."[847] The second contest, held in May 2009, attracted 230 public "insightful ideas and innovative applications" for bolstering government feedback mechanisms.[848]

The underlying assumption of many of these government-implemented deliberative experiments is that participation will increase via a form of viral marketing among friends and colleagues. As one commentator has summarized: "Anyone interested in a particular rulemaking initiative could get involved, with a realistic belief that her input could make a difference; and the reasonableness of that belief could lead many others to get involved as well, producing an upward spiral of individual involvement that would change rulemaking into a truly participatory process."[849] However, the results of some of the programs described above underscore the importance of increasing citizen participation generally and, more specifically, of properly structuring citizen participation via broadband-enabled e-government tools.

In general, a lack of awareness among the citizenry regarding the value of participating in deliberative e-government services could slow further implementation of these types of tools if federal officials become frustrated with low levels of public input or if they determine that results are representative of only a small segment of the population.[850] Moreover, if citizens are unable to see that their input is having a direct impact on decision-making (e.g., that their proposals are not being addressed in the process), then they may be further discouraged from participating.[851]

7. *Unresolved privacy issues*

The rapid adoption of broadband-enabled e-government and social media tools by the federal government raises a number of novel privacy issues. A recent example regarding the federal "cookie" policy is instructive.

A "cookie" is a "mechanism that allows a web site to record your comings and goings."[852] In June 2000, the federal government's Office of Management and Budget issued a memorandum that "prohibited Federal agencies from using certain web-tracking technologies, primarily persistent cookies, due to privacy concerns," unless authorized due to a compelling need.[853] The Obama administration is now considering whether to allow for more use of cookies by the federal government in order for "agencies to be able to provide the same user- friendly, dynamic, and citizen-centric websites that people have grown accustomed to using when they shop or get news online or communicate through social media networks, while also protecting people's privacy."[854] Despite this justification, proposed changes have been met with fierce criticism from some privacy advocates who fear that a change to the cookie policy

would "allow the mass collection of personal information of every user of a federal government website."[855]
Similar concerns arise as the federal government begins to use more services and applications developed by private sector innovators. For example, the federal cookie controversy has been driven by concerns that the government is seeking to adjust its policies in order to use services like YouTube.[856] Some worry that third-party innovators could benefit from increased web traffic to federal sites.[857]

One commentator has succinctly summarized the array of privacy concerns stemming from the use of broadband-enabled e-government tools: "[T]he digital collection of personally identifiable information renders that data subject to the immense search and aggregation powers of technology systems, increases the capacity for repurposing and reuse, and provides increasingly attractive targets to hackers bent on misuse. These phenomena raise serious concerns about a surveillance capacity that can erode personal privacy."[858] Such uncertainty regarding how the federal government collects and uses personal information could impede further adoption and use of broadband-enabled e-government tools by citizens and could create political disincentives for policymakers to champion further use of these tools.

8. *Unresolved data security issues*

In addition to privacy concerns, increased use of broadband-enabled e-government tools raises a number of concerns regarding security of the data collected via these services.

Federal government websites are targeted daily by hacker attacks. Many of these are "denial of service" attacks, which seek to overwhelm websites and servers with a "blizzard of data."[859] Other attacks include attempts at hacking into secure systems. For example, in May 2009 the U.S. Department of Homeland Security had its "platform for sharing sensitive but unclassified data with state and local authorities...hacked."[860] Hackers have also successfully penetrated the U.S. electricity grid and have "left behind software programs that could be used to disrupt the system."[861]

Data security is a major concern among Internet users. The majority of Internet users are still hesitant about providing personal information online.[862] The vulnerability of federal government websites may dissuade already hesitant users from utilizing broadband-enabled e-government services for fear of having their personal information compromised. The Obama administration has acknowledged the seriousness of these types of security breaches and has developed a comprehensive plan for cybersecurity.[863] However, many issues remain unresolved.

For example, security concerns arise from the growing use of third-party services by government agencies and staff. For example, a number of security concerns have been

raised ahead of Google's launch of cloud computing services for government use.[864] Chief among these concerns is whether the services offered by Google and other providers will be secure. Each service will be required to comply with security requirements set forth in the Federal Information Security Management Act.[865] However, a majority of potential cloud computing users have lingering concerns regarding the security of these services.[866]

The perception that broadband-enabled e-government services are unsecure could hinder further adoption and use of these services by the public. In addition, lower demand by the public for these services could slow experimentation and innovation by the federal government.

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VIII. CONCLUSION

This Report is a conversation starter. Its intended purpose is to spark discussions among policymakers, regulators, innovators, and users regarding best practices for spurring more robust adoption and use of broadband. *The over 60 barriers identified herein make clear that one policy will not fit all when it comes to maximizing the adoption rate across all demographic groups and sectors of the economy.*

Overarching themes, however, do emerge. These include:

- The need for further inquiry into the dynamics of demand, adoption, and use of broadband among certain groups. As discussed at length above, the demands of different user groups vary greatly and require a thorough examination.
- In order to complete a comprehensive examination of the unique needs of certain user groups, more precise and current data regarding these needs is required. For example, there is a dearth of granular data regarding the broadband needs of people with specific types of disabilities. In addition, many studies regarding computer and Internet availability and usage for educational purposes are based on census data from 2005 or earlier. A robust set of up-to-date data is necessary in order to develop policies that are of immediate value to all under-adopting user groups.
- A multifaceted approach to spurring broadband adoption will likely be the most effective way of bolstering utilization in the short-term. To this end, public-private partnerships will likely produce the best outcomes since they combine public resources with private sector innovation.
- Innovation is, in many cases, producing effective solutions to some of the most common barriers identified in this Report. Policies that foster an innovative environment could lead to more grassroots solutions to many facets of the adoption problem.

In sum, this Report provides stakeholders with a starting place for further analysis of the dynamics of broadband adoption in the six sectors described herein and many other sectors. It also invites stakeholders to submit specific recommendations for overcoming these and other barriers to broadband adoption.

Going forward, an open, interactive, and data-driven process that focuses on the specific needs of discrete user groups will likely produce effective policies for maximizing broadband adoption and use across all user groups.

ENDNOTES

[1] For example, President Obama "believes that modernized infrastructure is a necessary part of the foundation for long term economic stability and prosperity. That includes everything from a comprehensive national broadband plan, to new health care information technology, to a modernized electrical grid." *See* The White House, Issues: Technology, http://www.whitehouse.gov/issues/technology/.

[2] It is estimated that companies invested upwards of $60 billion in communications infrastructure in 2008. *See Statement of Jonathan Banks to the Subcommittee on Telecommunications and the Internet, Committee on Energy and Commerce,* U.S. House of Representatives, p. 2, July 22, 2008, *available at* http://energycommerce.house.gov/images/stories/Documents/Hearings/PDF/Testimony/TI/110-ti-hrg.072208.Banks-testimony.pdf (quoting a projection made by Yankee Group).

[3] The most recent FCC broadband data reported that there were nearly 1,400 broadband providers in the United States as of June 30, 2008 and that over 90 percent of zip codes reports having four or more broadband providers. *See High Speed Services for Internet Access: Status as of June 30, 2008,* at Table 8 & Chart 12, Industry Analysis & Technology Division, Wireline Competition Bureau (rel. July 2009), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-292191A1.pdf.

[4] Over $7 billion have been allocated to support broadband deployment and adoption efforts. The majority of these funds - $4.2 billion – will be administered by the U.S. Department of Commerce's National Telecommunications & Information Association. The remaining $2.5 billion will be invested by the Rural Utilities Service of the U.S. Department of Agriculture. *See* Press Release, *Vice President Biden Launches Initiative to Bring Broadband, Jobs to More Americans,* July 1, 2009, USDA, *available at* http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_1OB?contentidonly=true&contentid=2009/07/0276.xml.

[5] For data regarding the adoption rates of adults over the age of 65, African Americans, and people with annual incomes below $20,000, *see* John Horrigan, *Home Broadband Adoption 2009,* at p. 13-14, Pew Internet & American Life Project (June 2009), *available at* http://www.pewinternet.org/~/media//Files/Reports/2009/Home-Broadband-Adoption-2009.pdf ("*Home Broadband Adoption 2009*"). For data regarding the broadband adoption rate among people with disabilities, *see infra* at Section III.A.1.

[6] *See, e.g.,* FCC Chairman Julius Genachowski, Prepared Remarks: America's Mobile Broadband Future, Oct. 7, 2009, FCC, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293891A1.pdf ("*Genachowski Wireless Remarks - Oct. 7, 2009*").

[7] For example, a recent article observed that "The use of mobile information technology to assist healthcare professionals in making treatment decisions at the point of care is expected to improve the quality, safety, and value of care delivery. Added value from these applications is extremely important for the growing number of seniors who want to independently age in place in the least restrictive environment possible." *See* Gregory L. Alexander et al., *Mobile IT Applications,* at p. 21, Long Term Living (Jan. 2009), *available at* http://eldertech.missouri.edu/files/Papers/Alexander/LTL%20-%20Mobile%20IT%202009.pdf.

[8] *See In the Matter of Fostering Innovation and Investment in the Wireless Communications Market,* para. 20, FCC, GN Docket No. 09-157 (rel. Aug. 27, 2009) (noting that "The provision of innovative wireless services is critically dependent on having access to spectrum. Further, as wireless is increasingly used as a platform for broadband communications services, the demand for spectrum bandwidth will likely continue to increase significantly, and spectrum availability may become critical to ensuring further innovation and deployment in the wireless sector.") ("*FCC Wireless Innovation NOI*").

[9] *Genachowski Wireless Remarks – Oct. 7, 2009* (noting that a primary objective is "unleashing spectrum for broadband").

[10] *FCC Wireless Innovation NOI* at para. 25.

[11] *Id.* at para. 22 (observing that "the Commission has established rules governing non-Federal access to and use of the spectrum. The rules provide details as to how the spectrum may be used, how it will be licensed, who is eligible, technical standards, etc. The license provides the right to access and use the spectrum, usually over specific frequencies or frequency bands and at a particular location or geographic area.").

[12] Two bills were introduced in 2009 that address spectrum usage. S. 649 – The Radio Spectrum Inventory Act of 2009 – was introduced in March 2009 and calls on the NTIA and FCC to compile a report that " includes an inventory of each radio spectrum band, from 300 Megahertz to 3.5 Gigahertz, managed by each such agency." Text of this bill is *available at* http://thomas.loc.gov/cgi-bin/query/z?c111:S.649:. H.R. 3125 – The Radio Spectrum Inventory Act of 2009 – was introduced in July 2009 and calls on the NTIA and FCC to "create an inventory of each radio spectrum band of frequencies used in the United States Table of Frequency Allocations, from 225 megahertz to 10 gigahertz." In addition, this bill requires the report to include recommendations for the swaths of spectrum that should be reallocated. Text of this bill is *available at* http://www.govtrack.us/congress/billtext.xpd?bill=h111-3125.

[13] *FCC Wireless Innovation NOI* at para. 52.

[14] *Genachowski Wireless Remarks – Oct. 7, 2009* (noting that "removing obstacles to [next-generation wireless network] deployment, like delays in tower siting" is another objective of the FCC).

[15] *See generally* Charles M. Davidson & Michael J. Santorelli, *The Impact of Broadband on Senior Citizens*, A Report to the U.S. Chamber of Commerce (Dec. 2008), *available at* http://www.nyls.edu/user_files/1/3/4/30/83/BroadbandandSeniors.pdf ("*Broadband & Seniors*").

[16] *See A Profile of Older Americans: 2008*, at p. 1, U.S. Department of Health and Human Services, Administration on Aging (2009), *available at* http://www.aoa.gov/AoARoot/Aging_Statistics/Profile/2008/docs/2008profile.pdf ("*Statistical Profile*").

[17] *Id.* at p. 2.

[18] *See* Jeffrey S. Passel and D'Vera Cohn, *U.S. Population Projections: 2005-2050*, at p. 20, Pew Research Center (Feb. 2008), *available at* http://pewhispanic.org/files/reports/85.pdf ("*U.S. Population Projections: 2005-2050*").

[19] *See, e.g., Growing Older in America: The Health and Retirement Study*, at 4, Report of the National Institute on Aging, National Institutes of Health, U.S. Department of Health and Human Services (March 2007), *available at* http://www.nia.nih.gov/NR/rdonlyres/D164FE6C-C6E0-4E78-B27F-7E8D8C0FFEE5/0/HRS_Text_WEB.pdf ("*Growing Older*").

[20] *See* Press Release, *Oldest Baby Boomers Turn 60*, U.S. Census Bureau (rel. Jan. 3, 2006), *available at* http://www.census.gov/Press-Release/www/releases/archives/facts_for_features_special_editions/006105.html.

[21] *In the Matter of a National Broadband Plan for Our Future, Notice of Inquiry*, FCC GN Docket No. 09-51, para. 5.

[22] *Home Broadband Adoption 2009* at p. 13.

[23] *See* John Horrigan, *Home Broadband Adoption 2008*, Pew Internet & American Life Project, at p. 3 (July 2008), *available at* http://www.pewinternet.org/~/media//Files/Reports/2008/PIP_Broadband_2008.pdf.

[24] *Home Broadband Adoption 2009* at p. 15.

[25] *See Women, Teens, and Seniors Help Fuel 34% Mobile Web Spike*, Sept. 30, 2009, NielsenWire, *available at* http://blog.nielsen.com/nielsenwire/online_mobile/mobile-web-up-34-percent-july-09/ ("*Women, Teens, and Seniors – Mobile Web Use 2009*").

[26] *See* Sydney Jones, *Generations Online in 2009*, at p.5, Pew Internet & American Life Project (Jan. 2009), *available at* http://pewresearch.org/pubs/1093/generations-online.

[27] *Broadband & Seniors* at p. 11 (discussing the efforts of a nonprofit group in New York City that has been successful in spurring awareness, demand, and adoption broadband among seniors of all ages).

[28] *Statistical Profile* at p. 5.

[29] *See Senior Citizens who Master Computers Have Less Depression*, Aug. 18, 2005, SENIOR JOURNAL, *available at* http://seniorjournal.com/NEWS/Aging/5-08-18MasterComputers.htm.

[30] *See generally* T.E. Seeman, *Social Ties and Health: The Benefits of Social Integration*, 6 Annals of Epidemiology 442-451 (1996).

[31] *See* Richard W. Johnson and Corina Mommaerts, *Unemployment Rate Hits All-Time High for Adults Age 65 and Older*, at p. 1, Urban Institute (March 2009), *available at* http://www.urban.org/uploadedpdf/411846_recessionandolderworkersfactsheetmarch2009.pdf.

[32] *Id.*

[33] *See Overlooked and Underserved: The Crisis Facing America's Older Workers*, at p. 4 Executive Summary, Experience Works (September 2009), *available at* http://www.experienceworks.org/site/DocServer/EW-ExecSummary_09-Final.pdf?docID=10381 ("*Older Workers 2009*").

[34] *Id.* at p. 3.

[35] As AARP concluded, broadband will play a major role in extending the careers of seniors. *See* AARP Policy Book, Ch. 10, Utilities: Telecommunications, Energy and Other Services, at p. 10-40, *available at* http://assets.aarp.org/www.aarp.org_/articles/legpolicy/10_utili07.pdf ("*AARP Policy Book*").

[36] *See, e.g.*, Jonathan L. Willis, *What Impact will E-Commerce have on the U.S. Economy?* at p. 53, Economic Review, Second Quarter 2004, Federal Reserve Bank of Kansas City, *available at* http://www.kc.frb.org/publicat/Econrev/PDF/2q04will.pdf.

[37] *Id.* at p. 60-61.

[38] *See Prescription Drugs: Smart Shopping Yields Big Savings*, CONSUMER CHECKBOOK.ORG (2004), *available at* http://www.checkbook.org/cgi-bin/free/drug.pdf.

[39] *See* Walgreens, AARP partnership, https://www.walgreenshealth.com/whc/aarp/jsp/aarp_home.jsp.

[40] *See* Older Adults Technology Services, *Medicare Peer Counseling Saves Bronx Seniors Thousands in Drug Costs, available at* http://www.oatsny.org/medicare.htm

[41] *See* Robert E. Litan, *Great Expectations: Potential Economic Benefits to the Nation From Accelerated Broadband Deployment to Older Americans and Americans with Disabilities*, New Millennium Research Council (Dec. 2005) ("*Great Expectations*").

[42] *See generally* Charles M. Davidson & Michael J. Santorelli, *The Impact of Broadband on Telemedicine*, A Report to the U.S. Chamber of Commerce (April 2009), at p. 12-18, *available at* http://www.nyls.edu/user_files/1/3/4/30/83/BroadbandandTelemedicine.pdf ("*Broadband & Telemedicine*").

[43] *See Aging Services: The Facts*, General Facts, American Association of Homes and Services for the Aging, *available at* http://www.aahsa.org/aging_services/default.asp.

[44] *Id.*

[45] *Id.*

[46] *See* Robert Litan, *Vital Signs via Broadband: Remote Health Monitoring Transmit Savings, Enhances Lives,* at p. 2, White Paper of Better Healthcare Together (Oct. 2008), *available at* http://betterhealthcaretogether.org/SitesResources/bhctv2/Resources/Documents/VITAL%20SIGNS%20via%20BROADBAND%20FINAL%20with%20FOREWORD%20and%20TITLE%20pp%2010%2022.pdf ("*Vital Signs*").

[47] *Home Broadband Adoption 2009* at p. 3.

[48] *Home Broadband Adoption 2009* at p. 42-43.

[49] *Id.*

[50] *See* Amanda Lenhart, *The Ever-Shifting Internet Population: A New Look at Internet access and the Digital Divide,* at p. 16, Pew Internet & American Life Project (June 2003), *available at* http://www.pewinternet.org/Reports/2003/The-EverShifting-Internet-Population-A-new-look-at-Internet-access-and-the-digital-divide.aspx

[51] *See Luxury or Necessity?* Dec. 14, 2006, Pew Research Center, Social & Demographic Trends, *available at* http://pewsocialtrends.org/pubs/323/luxury-or-necessity.

[52] *See* Comments of Susannah Fox, Associate Director, Digital Strategy, Pew Internet & American Life Project, FCC Workshop #7a – Adoption/Utilization- Building the Fact Base, Transcript p. 78-79 (August 19, 2009), *available at* http://www.broadband.gov/ws_adoption_fixed.html ("*Fox FCC Comments*").

[53] *See* Susannah Fox, *Older Americans and the Internet,* Pew Internet & American Life Project at p. 11 (March 2004), *available at* http://www.pewinternet.org/~/media//Files/Reports/2004/PIP_Seniors_Online_2004.pdf.pdf ("*Older Americans*").

[54] *See* William G. Korver, *Broadband Adoption and Not Availability is Key Challenge, Says One Economy,* July 31, 2008, BroadbandCensus.com, *available at* http://broadbandcensus.com/blog/?p=225; *Home Broadband Adoption 2008* at p. 12-14 (noting that "one-third (33%) of non-internet users say they are simply not interested in the internet" whereas "just 7% say it is too expensive.").

[55] A recent study estimated that "by 2050 the number of people with early age-related macular degeneration will double in the United States to more than 17.8 million. Without treatment, these patients would be expected to result in approximately 1.6 million cases of visual impairment and blindness in 2050, compared to between 400,000 and 600,000 cases today." *See Visual Impairments will Increase as Population Ages, but Treatment can Mitigate Effects,* April 13, 2009 News-Medical.net, *available at* http://www.news-medical.net/news/2009/04/13/48292.aspx (citing a study by researchers at RTI International and the Centers for Disease Control and Prevention, published in the April 2009 issue of Archives of Ophthalmology).

[56] *See* Mark Notess and Lesa Lorenzen-Huber, *Online Learning for Seniors: Barriers and Opportunities,* eLearn Magazine, *available at* http://www.elearnmag.org/subpage.cfm?section=research&article=7-1. ("*Online Learning for Seniors*").

[57] *See* Emily Shartin, *Designing Websites with Senior Citizens in Mind,* April 3, 2005, Boston Globe, *available at* http://www.boston.com/business/technology/articles/2005/04/03/designing_websites_with_senior_citizens_in_mind/.

[58] *See* Jack Nielsen, *Usability for Senior Citizens*, April 28, 2002, UseIT, *available at* http://www.useit.com/alertbox/seniors.html (citing *Web Usability for Senior Citizens*, Nielsen Norman Group, *available at* http://www.nngroup.com/reports/seniors/ ["*Usability for Senior Citizens*"]).

[59] *Id.*

[60] *Home Broadband 2009* at p. 43.

[61] *Usability for Senior Citizens.*

[62] *See* Traci A. Hart, *Evaluation of Websites for Older Adults: How "Senior-Friendly" Are They?* Usability News, vol. 6, Issue 1 (Feb. 2004), *available at* http://www.surl.org/usabilitynews/61/older_adults.asp ("*Website Evaluation*").

[63] *Usability for Senior Citizens.*

[64] *Id.*

[65] *See Making Your Website Senior Friendly*, National Insitute on Aging, U.S. National Institutes of Health, *available at* http://www.nia.nih.gov/HealthInformation/Publications/website.htm.

[66] *See* Usability.gov, About Us, http://www.usability.gov/about/index.html.

[67] *Website Evaluation.*

[68] *See* Steve Reinberg, *Medicare Web Site Confounds Many Seniors*, Aug. 19, 2008, HealthDay, *available at* http://health.usnews.com/articles/health/healthday/2008/08/19/medicare-web-site-confounds-many-seniors.html?PageNr=1.

[69] *Id.*

[70] *See, e.g.*, Comments of Link Hoewing, Vice President, Verizon Communications, FCC Workshop #7a – Adoption/Utilization- Building the Fact Base, Transcript p. 26 (August 19, 2009) (citing a study by Forrester Research, Inc.), *available at* http://www.broadband.gov/ws_adoption_fixed.html ("*Hoewing FCC Comments*").

[71] *See* Debra Donston, *IRS Makes Less Taxing Web Site*, December 23, 2005, eWeek.com, *available at* http://www.eweek.com/c/a/Government-IT/IRS-Makes-Less-Taxing-Web-Site/.

[72] *Id.*

[73] *See Press Release, IRS e-File Up Sharply in 2008*, May 28, 2008, IRS.gov, *available at* http://www.irs.gov/newsroom/article/0,,id=183321,00.html.

[74] *See* Press Release, *E-file Hits Record 90 Million; 30 Million Filed from Home Computers*, April 30, 2009, IRS, available at http://www.irs.gov/newsroom/article/0,,id=207293,00.html ("*IRS E-file Record – 2009*").

[75] *See* Ann Chadwick-Dias et. al, *Web Usability and Age: How Design Changes can Improve Performance*, Fidelity Investments (2002), *available at* http://portal.acm.org/citation.cfm?id=957212&dl=GUIDE&coll=GUIDE&CFID=11110647&CFTOKEN=22497669.

[76] *See Connected Tennessee Residential Technology Assessment*, at p. 2, Connected Nation (Jan. 2009), *available at* http://www.broadband.gov/docs/ws_adoption_mobile/ws_adoption_mobile_noriega.pdf.

[77] *Older Americans* at p. 3.

[78] *See Broadband in America: Access, Use and Outlooks*, at p. 6, Consumer Electronics Association (July 2007), *available at* http://www.ce.org/PDF/CEA_Broadband_America.pdf ("*CEA Report*").

[79] *Broadband & Seniors* at p. 10

[80] *Statistical Profile* at p. 10.

[81] *Id.*

[82] *See* Carmen DeNavas-Walt, Bernadette D. Proctor, and Jessica C. Smith, *Current Population Reports: Income, Poverty, and Health Insurance Coverage in the United States: 2007*, at p. 15, U.S. Census Bureau (2008), *available at* http://www.census.gov/prod/2008pubs/p60-235.pdf.

[83] *Home Broadband Adoption 2009* at p. 14.

[84] *Id.* at p. 29.

[85] *See Consumer Discounts on Telephone Service Under Federal Universal Service Programs*, Lifeline Across America, *available at* http://www.lifeline.gov/lifeline_Consumers.html.

[86] *See* John Eggerton, *Hill Ponders Adding Broadband to USF*, March 12, 2009, Broadcasting & Cable, *available at* http://www.broadcastingcable.com/article/189856-Hill_Ponders_Adding_Broadband_To_USF.php.

[87] *See* H.R. 3646 – The Broadband Affordability Act of 2009 (introduced Sept. 24, 2009), *available at* http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.3646: (charging the FCC to "to establish a broadband lifeline program that enables qualifying low-income customers residing in urban and rural areas to purchase broadband service at reduced charges by reimbursing providers for each such customer served.").

[88] *See* John Horrigan, *Online Shopping*, at p. 8, Pew Internet & American Life Project (February 2008), *available at* http://www.pewinternet.org/~/media//Files/Reports/2008/PIP_Online%20Shopping.pdf.pdf ("*Online Shopping*").

[89] *Id* at p. 10.

[90] *See OATS "Family Link" Program*, Older Adults Technology Services (Jan. 2008).

[91] *See* S.L. Gatto & S.H. Tak, *Computer, Internet, and e-mail use among older adults: Benefits and barriers.* Educational Gerontology: An International Journal, *34(4)*, 800-811 (2008) ("*Computer, Internet, and E-mail Use Among Older Adults*").

[92] *Id.*

[93] *Id.*

[94] *See* Sharon O'Brien, *Why Older Adults are More Vulnerable to Scams*, About.com, *available at* http://seniorliving.about.com/od/manageyourmoney/a/scamsolderadult.htm.

[95] *Id.*

[96] *See Internet Safety: Understanding the Risks*, Web Wise Washington, Washington State Office of the Attorney General, *available at* http://www.atg.wa.gov/InternetSafety.aspx.

[97] *Id.*

[98] AARP has teamed up with Google to help keep users safe online. *See* AARP, Online Safety, http://www.aarp.org/money/consumer/online_safety/.

[99] *See In the Matter of 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 Telecommunications Act of 1996*, Fifth Report, GN Docket No. 07-45, para. 36 (rel. June 12, 2008) (finding that broadband deployment has been "reasonable and timely").

[100] *See* David P. McLure, *Deployment of Broadband to Rural America*, at p. 15, USIIA Report (rel. Mar. 4, 2008), *available at* http://www.usiia.org/pubs/Rural.pdf ("*Rural Broadband Deployment*").

[101] *See* Comments of Peter Stenberg, Ph.D., Senior Economist, Economic Research Service, U.S. Department of Agriculture, FCC Workshop #7a- Building the Fact Base, August 19, 2009, at Transcript p.10, *available at* http://www.broadband.gov/ws_adoption_fixed.html.

[102] *Id.*

[103] *See Rural Population and Migration: Trend 6 – Challenges From an Aging Population*, USDA Economic Research Service, Briefing, *available at* http://www.ers.usda.gov/Briefing/Population/Challenges.htm.

[104] *Id.*

[105] *Statistical Profile* at p. 5.

[106] *Id.*

[107] *Id.*

[108] *Fox FCC Comments* at Transcript p. 92.

[109] *See* Comments of Karen Archer Perry, Director of the Connected Communities Team, Knight Center of Digital Excellence, FCC Workshop #7a – Adoption/Utilization - Building the Fact Base, Transcript p.32 (Aug. 19, 2009), *available at* http://www.broadband.gov/ws_adoption_fixed.html.

[110] *Home Broadband Adoption 2009* at p. 38.

[111] *Fox FCC Comments* at Transcript p. 92.

[112] *See* AARP Policy Book, Ch. 10, Utilities: Telecommunications, Energy and Other Services, at p. 10-40, *available at* http://assets.aarp.org/www.aarp.org_/articles/legpolicy/10_utili07.pdf ("*AARP Policy Book*").

[113] *Older Workers 2009* at p. 3-4.

[114] *AARP Policy Book.*

[115] *See* Report of the Taskforce on the Aging of the American Workforce (Feb. 2008), at p. 9, *available at* http://www.doleta.gov/reports/FINAL_Taskforce_Report_2-11-08.pdf ("*Aging Taskforce*").

[116] *AARP Policy Book.*

[117] *Aging Taskforce* at p. 3.

[118] *See* ROB SALKOWITZ, GENERATION BLEND: MANAGING ACROSS THE TECHNOLOGY AGE GAP 67 (Wiley 2008) (noting that "Workers in their sixties and seventies not only have the potential to remain productive, thanks to increasing life spans and health improvements, but are also the custodians of irreplaceable knowledge, relationships, and cultural lore.") ("GENERATION BLEND").

[119] According to the Medicare website: "Medicare eligibility is not based on income or resource levels. Your Medicare eligibility will not be affected by how much income you earn after retirement. However, your Medicare Part B monthly premiums [covering medical insurance] will be higher if you file an individual tax return and your annual income is more than $85,000, or if you are married (file a joint tax return) and your annual income is more than $170,000." *See* Medicare.gov, FAQ: "I am retired and on Medicare. If I go back to work, will my earnings affect my Medicare eligibility? Is there a ceiling on how much I can earn and still keep Medicare?", http://tiny.cc/WU7l8.

[120] *See* Toddi Gutner, *Pitfalls of Working Past Retirement Age*, April 29, 2008, Wall St. J., *available at* http://www.huntalternatives.org/download/1137_04_29_08_pitfalls_of_working_past_retirement_age.pdf.

[121] The U.S. Social Security Administration (SSA) provides a full explanation. *See* SSA.gov, How Work Affects Your Benefits, http://www.ssa.gov/pubs/10069.html.

[122] *See Perceived Benefits and Barriers of Computer, Internet, and E-mail Use by Older Adults*, Arkansas Geriatric Education Center, AGEC VISION, vol. 9, no. 2, *available at* http://www.agec.org/news/news_app.asp?id=178.

[123] *See, e.g.*, GENERATION BLEND at p. 67 (noting that many members of the "Silent generation" [i.e., those born between 1925 and 1945] are "the most likely generation to have avoided digital technology in their work and lives. Even the youngest were well into their careers when general-purpose computers appeared in the workplace, ad older still when they became affordable as consumer devices. Many Silents express an initial fear or reluctance to experiment with technology.").

[124] *Fox FCC Comments* at Transcript p. 78-79.

[125] *Computer, Internet, and E-mail Use Among Older Adults.*

[126] *Id.*

[127] *Id.*

[128] *See* Joy Goodman et al., *Older Adult's Use of Computers: A Survey*, Department of Computing Science, University of Glasgow (2003), *available at* http://www.dcs.gla.ac.uk/~joy/research/2003_bcs_hci/paper.pdf.

[129] Interview with Bob Lunaburg, retired IBM employee and Lead Volunteer Computer Instructor, Computers4Seniors, Marietta, GA, Sept. 15, 2009 (conducted by ACLP staff).

[130] *See generally Broadband & Seniors.*

[131] *Id.* at p. 31-32.

[132] *Id.* at p. 34.

[133] *See* Press Release, *Americans with Disabilities: July 26*, May29, 2007, U.S. Census Bureau, *available at* http://www.census.gov/Press-Release/www/releases/archives/facts_for_features_special_editions/010102.html.

[134] *See* Matthew Brault, *Disability Status and the Characteristics of People in Group Quarters: A Brief Analysis of Disability Prevalence Among the Civilian Noninstitutionalized and Total Populations in the American Community Survey*, U.S. Census Bureau, American Community Survey, 2006 Data (Feb. 2008), *available at* http://www.census.gov/hhes/www/disability/GQdisability.pdf ("*Census ACS 2008*").

[135] *Id.*

[136] *See 2007 Disability Status Report – United States*, at p. 16, Rehabilitation Research and Training Center on Disability Demographics and Statistics, Cornell University, *available at* http://www.ilr.cornell.edu/edi/disabilitystatistics/StatusReports/2007-PDF/2007-StatusReport_US.pdf?CFID=7676403&CFTOKEN=73912389&jsessionid=f030ad698d2ccb1a9bcc34517277762361b1 ("*2007 Disability Status Report*").

[137] According to the ACS, a physical disability is defined as condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying." *Id.* at p. 44.

[138] According to the ACS, a sensory disability is defined as someone who experiences "blindness, deafness, or a severe vision or hearing impairment." *Id.*

[139] *Id.* at p. 7.

[140] *See* National Spinal Cord Injury Statistical Center, University of Alabama, Facts and Figures at a Glance (April 2009), http://images.main.uab.edu/spinalcord/pdffiles/FactsApr09.pdf ("*Spinal Cord Stats*").

[141] *See* National Center for Health Statistics, Disabilities/Limitations, http://www.cdc.gov/nchs/FASTATS/disable.htm.

[142] *Id.*

[143] *See Special Report on Aging and Vision Loss*, American Foundation for the Blind, September 2008, *available at* http://www.afb.org/Section.asp?SectionID=15&DocumentID=4423 ("AFB uses the term "vision loss", which is the equivalent of the term "vision trouble" on the 2006 National Health Interview Survey. Investigators should also note that, as mentioned, the 2006 NHIS estimates pertain to the non-institutionalized civilian population."); *see also* National Center for Health Statistics, National Health Interview Survey 2006, www.cdc.gov/nchs/nhis.htm.

[144] *See Health Status and Routine Physical Activities in Adults by Hearing Status*, Center of Disease Control, *available at* http://www.cdc.gov/Features/dsHearing-Disparities/, *citing* Pleis JR, Lethbridge-Cejku M. Summary health statistics for U.S. adults: National Health Interview Survey, 2006; National Center for Health Statistics. Vital Health Stat 10(235), 2007; and Pleis JR, Benson V, Schiller JS. Summary health statistics for U.S. adults: National Health Interview Survey, 2000. National Center for Health Statistics. Vital Health Stat 10(215), 2003.

[145] The Coleman Institute for Cognitive Disabilities at the University of Colorado defines a cognitive disability as "a substantial limitation in one's capacity to think, including conceptualizing, planning, and sequencing thoughts and actions, remembering, interpreting subtle social clues, and understanding numbers and symbols. Cognitive disabilities include intellectual disabilities and can also stem from brain injury, Alzheimer's disease and other dementias, severe and persistent mental illness, and, in some cases, stroke." *See* David Braddock et al., *Emerging Technologies and Cognitive Disabilities*, at p. 1, J. Special Education Tech., Vol. 19, No. 4 (Fall 2004), *available at* http://www.colemaninstitute.org/article_braddock_1.pdf ("*Emerging Technologies & Cognitive Disabilities*").

[146] *Id.*

[147] Percentages are derived from using 2004 U.S. Census Bureau Data. *See* National Institute of Mental Health Website, *available at* http://www.nimh.nih.gov/health/statistics/index.shtml.

[148] *See* Alzheimer's Association, Facts & Figures, http://www.alz.org/alzheimers_disease_facts_figures.asp.

[149] *See* Cerebral Palsy Facts, Statistics, http://www.cerebralpalsyfacts.com/stats.htm.

[150] Community Partnerships for Adult Learning, *How Serious *are* Learning Disabilities? – How bad can it be?* Basics of Adult Literacy Eduction Module, *available at* http://www.c-pal.net/course/module1/pdf/LDstats.pdf (*citing* statistics from the National Institute for Literacy, http://www.nifl.gov/).

[151] National Information Center for Children and Youth with Disabilities, *available at* http://www.nichcy.org/pubs/factshe/fs7txt.htm, *citing* 23rd Annual Report to Congress, Department of Education (2001).

[152] *See Criteria for Determining Disability in Speech-Language Disorders*, Agency for Healthcare Research and Quality (AHRQ) Summary, Evidence Report/Technology Assessment, No. 52, AHRQ Publication No. 02-E009 (Jan. 2002), *available at* http://www.ahrq.gov/clinic/epcsums/spdissum.htm.

[153] *See* Autism Society of America, About Autism, http://www.autism-society.org/site/PageServer?pagename=about_home.

[154] *In the Matter of a National Broadband Plan for Our Future, Notice of Inquiry*, FCC GN Docket No. 09-51, para. 5.

[155] *See Consumer Insights to America's Broadband Challenge*, at p. 5, Connected Nation, *available at* www.nga.org/Files/pdf/0812broadbandchallenge.pdf ("*Consumer Insights*").

[156] *See* Susannah Fox, *E-patients with a Disability or Chronic Illness*, at p. 2, Pew Internet & American Life Project (Oct. 2007), *available at* http://pewresearch.org/pubs/608/e-patients ("*E-patients 2007*").

[157] A 2000 study found that only 24 percent of people with disabilities had a computer at home, compared to nearly 52 percent for people without a disability. *See* H. Stephen Kaye, *Computer and Internet Use Among People with Disabilities*, at p. 5, National Institute on Disability and Rehabilitation Research, U.S. Department of Education (Mar. 2000), *available at* http://dsc.ucsf.edu/pdf/report13.pdf. By 2006, the number of people with disabilities who had a home computer had risen substantially, to nearly 40 percent, but this number was still lower than people without disabilities. *The Disability Divide* at p. 322. By 2008, slightly more than half of people with disabilities – 51 percent – reported having a computer at home. *Consumer Insights* at p. 5.

[158] *See generally* Kerry Dobransky & Eszter Hargittai, *The Disability Divide in Internet Access and Use*, at p. 325, Information, Communication & Society, Vol. 9, No. 3, pp. 313-334 (June 2006) ("*The Disability Divide*").

[159] *E-patients 2007* at p. 3 (finding that 89 percent of people with disabilities and chronic diseases send and receive email) ("*E-Patients*"); *see also The Disability Divide* at p. 328 (observing that in 2006 nearly 84 percent of people with disabilities used email or instant messaging services).

[160] *E-Patients* at p. 3 (observing that nearly 40 percent of people with disabilities and chronic diseases use their Internet connection to send instant messages).

[161] *See, e.g.*, American Association of People with Disabilities, Summary Fact Sheet: High Speed Internet and People with Disabilities, www.aapd.com/TTPI/AAPD_CWA_High_Speed_Internet_Access_WORD.doc ("*High Speed Fact Sheet*").

[162] *The Disability Divide*, at p. 315.

[163] *2007 Disability Status Report*

[164] *See* Carol Wilson, *Telecommuting Interest Soars*, Aug. 28, 2008, Telephony Online, *available* at http://telephonyonline.com/access/news/telecommuting-increases-0828/.

[165] *See* U.S. Dept. of Labor, Office of Disability Employment Policy, Small Business and Self Employment for People with Disabilities, http://www.dol.gov/odep/programs/promotin.htm.

[166] *See* Michael J. Copps, *Bringing Broadband to Rural America: Report on a Rural Broadband Strategy*, at para. 19, FCC (rel. May 22, 2009), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-291012A1.pdf ("*Rural Broadband Strategy*").

[167] *See* Diana Spas, *Update on the Demography of Rural Disability, Part One: Rural and Urban*, April 2005, Research and Training Center on Disability in Rural Communities, The University of Montana Rural Institute, *available at* http://rtc.ruralinstitute.umt.edu/RuDis/RuDemography.htm.

[168] *See Briefing, Rural Population and Migration: Trend 6 – Challenges From an Aging Population*, USDA Economic Research Service, *available at* http://www.ers.usda.gov/Briefing/Population/Challenges.htm.

[169] *See, e.g., NTCA 2008 Broadband/Internet Availability Survey Report*, National Telecommunications Cooperative Association, *available at* http://www.ntca.org/images/stories/Documents/Advocacy/SurveyReports/2008ntcabroadbandsurveyreport.pdf (observing that 91 percent of customers in its 2008 Survey area had access to broadband.)

[170] *Home Broadband Adoption 2009* at p. 16-17.

[171] *See* Jenifer Simpson, *Factors Promoting Broadband Use by People with* Disabilities, at p. 1, Telecommunications and Technology Policy, American Association of People with Disabilities (2008), *available at* www.aapd.com/TTPI/Broadband_Policies_and__PWDs_by_Jenifer_Simpson.pdf.

[172] *See*, e.g., *Broadband in America: Access, Use and Outlooks*, Consumer Electronics Association, at p. 6, July 2007, available at http://www.ce.org/PDF/CEA_Broadband_America.pdf (finding that half of the U.S. households without broadband lack a computer. The other half has not adopted broadband for a wide variety of reasons.).

[173] *See* H. Stephen Kaye, *Computer and Internet Use Among People with Disabilities*, at p. 5, National Institute on Disability and Rehabilitation Research, U.S. Department of Education (Mar. 2000), *available at* http://dsc.ucsf.edu/pdf/report13.pdf ("*Computer & Internet Use – 2000*").

[174] *The Disability Divide* p. 322.

[175] *Consumer Insights* at p. 5.

[176] A 2007 study found that working-age people with disabilities earned approximately $6,500 less per year than people without disabilities. *2007 Disability Status Report.*

[177] *See ComReg Trends Survey 2007*, at p. 28, Amarach Consulting (Oct. 2007), *available at* http://www.comreg.ie/_fileupload/publications/ComReg0778.pdf.

[178] *The Disability Divide* at p. 321.

[179] *See* Jenifer Simpson, *Comments of the Coalition of Organizations for Accessible Technology, In the Matter of A National Broadband Plan for Our Future*, GN Docket No. 09-51, COAT &American Association of People with Disabilities, June 8, 2009, at p. 8-9 ("*National Broadband Plan*").

[180] *Id.*

[181] *Id.*

[182] *See Notice of Funds Availability*, at p. 33113, Federal Register, Vol. 74, No. 130 (July 9, 2009), *available at* http://www.ntia.doc.gov/frnotices/2009/FR_BBNOFA_090709.pdf.

[183] *See, e.g.*, Washington Secretary of State, Broadband Stimulus Funding: Public Computing Centers, http://wiki.secstate.wa.gov/broadband/%28S%28jhf31mr1pj3kwi45u4hxmj55%29%29/PCC.ashx.

[184] *See Letter from Jill Nishi, Deputy Director – U.S. Libraries, Bill & Melinda Gates Foundation, to Marlene Dortch, Secretary*, FCC, GN Docket No. 09-51 (submitted Oct. 5, 2009), http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=7020040706 (estimating 17,000 public libraries currently open in the United States).

[185] *See* John Horrigan, *Obama's Online Opportunity II: If You Build It, Will They Log On?*, p. 2, Pew Internet & American Life Project (Jan. 2009), *available at* http://www.pewinternet.org/pdfs/PIP_Broadband%20Barriers.pdf ("*If You Build It*").

[186] *The Disability Divide* at p. 317.

[187] *See, e.g., The Economic Impact of Stimulating Broadband Nationally*, at p. 16, A Report from Connected Nation (rel. Feb. 21, 2008), *available at* http://connectednation.com/_documents/Connected_Nation_EIS_Study_Full_Report_02212008.pdf; *See also Broadband & Seniors* at p. 10-11 (discussing a unique program for spurring demand for and use of computers and broadband among senior citizens).

[188] *Fox FCC Comments* at Transcript p. 92.

[189] *See* Susannah Fox, *Digital Divisions*, at p. 3, Pew Internet & American Life Project (October 5, 2005), *available at*

http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Society_and_the_Internet/PIP_Digital_Divisions_1005.pdf.

[190] In February 2009, the unemployment rate of people with disabilities reached 14%, compared to just 8.7% for people without disabilities. *See* Bureau of Labor Statistics (March 6, 2009), *available at* http://www.bls.gov/cps/cpsdisability.htm.

[191] *E-Patients 2007* at p. 3.

[192] *Home Broadband 2009* at p. 14.

[193] *The Disability Divide* at p. 325.

[194] *See*, e.g., Jack Gillum, *A Third of Adults Without Internet Don't Want It*, Feb. 3, 2009, *available at* http://www.usatoday.com/printedition/life/20090203/internetusage03_st.art.htm (noting that "A report last month by the Pew Internet & American Life Project finds that although price is a barrier for dial-up users in switching to broadband, one-third of those without a Net connection simply aren't interested in e-mailing or exploring the Web.")

[195] *Home Broadband 2009* at p. 41.

[196] *Id.*

[197] *National Broadband Plan* at p. 8.

[198] *See The Need for Federal Legislation and Regulation Prohibiting Telecommunications and Information Services Discrimination*, National Council on Disability (2006) at p. 33-34, *available at* http://www.ncd.gov/newsroom/publications/2006/pdf/discrimination.pdf ("*Telecommunication and Information Services*").

[199] *Id.*

[200] *Id.*

[201] *See, e.g.*, D. D'Amour, *Technology upgrade boosts access for blind Canadians*, at. p. 23, Reading Today, vol. 21, no. 5 (2004).

[202] The World Wide Web Consortium released updated accessibility guidelines for Web 2.0 in December 2008. These guidelines articulate "a wide range of recommendations for making Web content more accessible. Following these guidelines will make content accessible to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photosensitivity and combinations of these." *See* W3C, Web Content Accessibility Guidelines 2.0, http://www.w3.org/TR/WCAG20/#guidelines.

[203] *See New Captions Feature for Videos*, Aug. 28, 2008, YouTube Blog, *available at* http://www.youtube.com/blog?entry=mi8D3ntPgFQ.

[204] *See* Hulu, Programming Info, http://www.hulu.com/support/content_faq.

[205] *See How people with disabilities use the Web*, in W3C Working Draft, World Wide Web Consortium, (10 December 2004), *available at http://www.w3.org/WAI/EO/Drafts/PWD-Use-Web/20041210#tools*.

[206] *See*, e.g., Beth A. Loy, *Deciphering Access for People with Disabilities*, Oct. 1, 2001, Digital Divide Network, *available at* http://www.digitaldivide.net/articles/view.php?ArticleID=204.

[207] *See generally* Frank G. Bowe, *Broadband and Americans with Disabilities*, Report of the National Association of the Deaf and the New Millennium Research Council (2002) at p. 20, *available at* http://www.newmillenniumresearch.org/archive/disability.pdf ("*Broadband & Disabilities - 2002*")

[208] *Home Broadband Adoption 2009* at p. 29.

[209] *Id.* at p. 14.

[210] *Disability Status* at p. 30.

[211] *Id.* at p. 34.

[212] *See* Erik Eckholm, *Last Year's Poverty Rate Was Highest in 12 Years*, Sept. 11, 2009, N.Y. Times, *available at* http://www.nytimes.com/2009/09/11/us/11poverty.html.

[213] *See* Bureau of Labor Statistics (August-September 2009), *available at* http://www.bls.gov/cps/cpsdisability.htm.

[214] *National Broadband Plan* at p. 7-8.

[215] *See*, e.g., Web Accessibility in Mind (WebAIM), Assistive Technologies for Motor Disabilities, http://www.webaim.org/articles/motor/assistive.php; WebAIM, Introduction to Web Accessibility, http://www.webaim.org/intro.

[216] *National Broadband Plan* at p. 7-8.

[217] *Id.*

[218] *Id.*

[219] *See Comments of Jim Fruchterman, CEO, Benetech*, FCC Workshop 8 – Broadband Opportunities for People with Disabilities, at transcript p. 63 (Aug. 20, 2009), *available at* http://www.broadband.gov/ws_disability.html ("When you get people developing closed systems that don't interoperate, that don't allow assistive technology vendors to make something accessible, that's when people with disabilities are most left out, most let down, most locked out of the opportunities that the technology builds in.").

[220] *See* Comments of Mary Brooner, Chairperson, Accessibility Working Group, Telecommunications Industry Association, during FCC Workshop 8 – *Broadband Opportunities for People with Disabilities*, Transcript p. 38, August 20, 2009, *available at* http://www.broadband.gov/ws_disability.html.

[221] *Id.*

[222] *Telecommunication and Information Services* at p. 26-31.

[223] *Id.*

[224] *Id.*

[225] *Id.*

[226] Public Law 100-394, codified at 47 U.S.C. 610.

[227] *See* FCC, Hearing Aid Compatibility for Wireless Telephones: FAQs, http://www.fcc.gov/cgb/consumerfacts/hac_wireless.html.

[228] *Id.*

[229] *See, e.g.*, Larry Brethower, *Cell Phone and Hearing Aid Compatibility, 2008*, Sept. 3, 2008, The Hearing Review, *available at* http://www.hearingreview.com/issues/articles/2008-09_03.asp (observing that "the industry has quickly achieved and surpassed the [FCC's] standards. It currently offers more than 90 models of phones with an acceptable M-3 emissions rating.").

[230] *See* TEITAC, *Report to the Access Board: Refreshed Accessibility Standards and Guidelines in Telecommunications and Electronic and Information Technology* (April 2008), *available at* http://www.access-board.gov/sec508/refresh/report ("*TEITAC Report - 2008*").

[231] *See* Microsoft, Accessibility: Mission, Strategy & Progress, http://www.microsoft.com/enable/microsoft/mission.aspx.

[232] *Emerging Technologies & Cognitive Disabilities* at p. 4.

[233] For example, nearly 20 years ago Verizon became the first telecommunication company to "embrace a set of Universal Design Principles," which are now "part of [its] product design process." *See* Verizon, Universal Design Principles, http://responsibility.verizon.com/home/information/design-principles. In the wireless realm, universal design principles are also increasingly prevalent. AT&T, in 2008, released its Universal Design methodology "in an effort to encourage application developers and handset manufacturers to consider the needs of seniors and customers with disabilities when creating new mobile products and services." *See AT&T Opens Universal Design Methods to Developers*, Mar. 18, 2008, Fierce Developer, *available at* http://www.fiercedeveloper.com/story/att-opens-universal-design-methods-to-developers/2008-03-18.

[234] *See* John Horrigan et al., *The Ever-Shifting Internet Population: A New Look at Internet Access & the Digital Divide*, at p. 31, Pew Internet & American Life Project (April 2003), *available at* www.pewinternet.org/pdfs/PIP_Shifting_Net_Pop_Report.pdf.

[235] *E-Patients 2007* at p. 9.

[236] A study conducted in 2001 found that most adults with disabilities had little to no knowledge about assistive technologies. *See Assistive Technology Survey Results: Continued Benefits and Needs Reported by the Americans with Disabilities, available at* http://www.ed.gov/offices/OSERS/NIDRR/. In 2007 a survey found that many individuals with disabilities experience difficulty while getting information about the equipment and services available or contacting customer service representatives for assistance, which may be a significant factor in their low adoption rate of advanced technologies. *See New booklet on choosing phone and broadband for people with disabilities*, NCBI, October 27, 2007, *available at* http://www.ncbi.ie/news/press-releases/2007-10-26_new-booklet-on-choosing-phone-and-broadband-for-people-with-disabilities.

[237] *See Assistive Technology*, United Cerebral Palsy of Central Pennsylvania (2009), *available at* http://www.ucp.org/ucp_localsub.cfm/132/9397/9409.

[238] *See School Leaders: Lack of Teacher Training Holds Back Special Ed Computer Use*, Jan. 15, 2000, SpecialEdNews.com, *available at* http://www.specialednews.com/technology/technews/NCEScomputeruse011500.html.

[239] *See* Maria Aliza et al, *Increasing Accessibility of PAComputing for Patrons with Disabilities*, August 19, 2005, The Bill and Melinda Gates Foundation, Washington Assistive Technology Alliance, *available at* http://www.webjunction.org/computer-accessiblity/-/articles/content/432184 ("*PAComputing*").

[240] *Id.*

[241] *Rural Broadband Strategy* at p. 13.

[242] *See Ruralfacts, Rates of Computer and Internet Use: A Comparison of Urban and Rural Access by People with Disabilities*, University of Montana, RTC Rural Institute (Aug. 2006), *available at* http://rtc.ruralinstitute.umt.edu/TelCom/computer.htm ("*Ruralfacts*").

[243] *Disability Divide* at p. 318.

[244] *Id.*

[245] *Home Broadband Adoption 2009.*

[246] *PAComputing.*

[247] *See News Release, National Council on Disability Calls for Federal Legislation to Prohibit Telecommunications Discrimination for People with Disabilities*, December 29, 2006, *available at* http://www.ncd.gov/newsroom/news/2006/r06-529.htm.

[248] *See* Ashlee Vance, *Insurers Fight Speech-Impairment Remedy*, Sept. 15, 2009, N.Y. Times, *available at* http://www.nytimes.com/2009/09/15/technology/15speech.html?_r=1.

[249] *Id.*

[250] *Id.*

[251] For example, Representative Edward Markey introduced a sweeping new law in 2008 that sought to modernize a number of telecommunications laws. However, that law did not pass and was recently re-introduced. *See H.R. 3101 – The 21st Century Communications and Video Accessibility Act*, introduced June 26, 2009, *available at* http://www.govtrack.us/congress/billtext.xpd?bill=h111-3101.

[252] *TEITAC Report – 2008.*

[255] *See* Issue Paper, *Telemedicine, Telehealth, and Health Information Technology*, at p. 3, American Telemedicine Association (May 2006), *available at* http://www.americantelemed.org/files/public/policy/HIT_Paper.pdf ("*ATA HIT Paper*").

[256] *Id.* Examples include videoconferencing, transmission of images, and remote monitoring of a patient's vital signs.

[257] *See Telemedicine for the Medicare Population: Update*, Agency for Healthcare Research & Quality, U.S. Dept. of Health & Human Services, No. 131 (Feb. 2006), *available at* http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat1b.section.28721 ("In store-and-forward telemedicine, clinical data are collected, stored, and then forwarded to be interpreted later. A store-and-forward system eliminates the need for the patient and the clinician to be available at either the same time or place.").

[258] Mobile monitoring includes the "extension of monitoring even outside the home." *See FCC Broadband Taskforce Presentation*, at Slide 98, Sept. 29, 2009, Federal Communications Commission, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293742A1.pdf ("*FCC Broadband Taskforce Presentation - Sept. 29, 2009*").

[259] *See generally Broadband & Telemedicine.*

[260] For example, the number of pediatricians in rural parts of the United States remains low relative to the percentage of the population that lives in these areas. A 2001 study found that only 8 percent of pediatricians are located in rural parts of the country. *See* Greg Randolph, et al., *Trends in the Rural-Urban Distribution of General Pediatricians*, Pediatrics, Vol. 107, No. 2 (2001), *available at* http://pediatrics.aappublications.org/cgi/reprint/107/2/e18.pdf. More generally, a 2005 study found that only three percent of medical students expressed a desire to work in rural areas. *See* Myrle Crosdale, *Admissions Process Aims to Boost Rural Doctors*, Feb. 7, 2005, American Medical Association AmedNews.com, *available at* http://www.ama-assn.org/amednews/2005/02/07/prsb0207.htm. The Association of American Medical Colleges has also observed that a lack of primary care doctors in unserved and under-served areas is a major problem facing the United States, especially since rural residents have a "higher incidence of illness and disability." *See The Complexities of Physician Supply and Demand: Projections Through 2025*, p. 41-41, Association of American Medical Colleges (Nov. 2008), *available at* www.tht.org/education/resources/AAMC.pdf.

[261] According to the Agency for Healthcare Research and Quality's 2007 *National Healthcare Quality Report*: "The average annual rate of improvement reported across the core measures included in this year's fifth annual NHQR is 2.3%, based on data spanning 1994 to 2005. An analysis of selected core measures, which

cover data from 2000 to 2005, shows that quality has slowed to an annual rate of 1.5%," at p. iv. This report, released in February 2008, is *available at* http://www.ahrq.gov/qual/nhqr07/nhqr07.pdf.

[262] For example, it has been argued that the adoption of Computerized Physician Order Entry systems, which allow doctors to prescribe medicine electronically, can "substantially decrease the overuse, under use, and misuse of healthcare services." *See* Gilad J. Kuperman & Richard F. Gibson, *Computer Physician Order Entry: Benefits, Costs, and Issues*, at p. 31, Annals of Internal Medicine, Vol. 139, No.1 (2003), *available at* http://www.annals.org/cgi/reprint/139/1/31.pdf. Studies have also found that this type of technology enables cost-savings for patients by "allowing doctors to check, with a patient's consent, the relative cost of co-payments for generic, formulary, and non-formulary drugs in a patient's health plan." *See* Laura Landro, *Incentives to Push More Doctors to e-Prescribe*, Jan. 21, 2009, Wall St. J.

[263] The FCC's Rural Healthcare Pilot Program, for example, is designed to facilitate the creation of a nationwide broadband network dedicated to "healthcare, connecting public and private non-profit healthcare providers in rural and urban locations." Under this pilot project, "selected participants [are] eligible for universal service funding to support up to 85 percent of the costs associated with the construction of state or regional broadband healthcare networks and with the advanced telecommunications and information services provided over those networks." The goal of this program is to "bring the benefits of telehealth and telemedicine to areas where the need for these benefits is most acute; allow patients to access critically needed specialists in a variety of practices; and enhance the healthcare community's ability to provide a rapid and coordinated response in the event of a national healthcare crisis." Total funding for the program is approximately $417 million over three years. *See* FCC, Rural Healthcare Pilot Program, http://www.fcc.gov/cgb/rural/rhcp.html; *See In the Matter of Rural Healthcare Support Mechanism*, WC Docket No. 02-60 (rel. Nov. 19, 2007), at para. 2, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-279101A1.pdf.

[264] *See* Susannah Fox & Lee Rainie, *The Online Healthcare Revolution: How the Web Helps Americans Take Better Care of Themselves*, at p. 3, Pew Internet & American Life Project (Nov. 2000), *available at* http://www.pewinternet.org/pdfs/PIP_Health_Report.pdf.

[265] *See* Susannah Fox, *The Engaged e-Patient Population*, at p. 1, Pew Internet & American Life Project (Aug. 2008), *available at* http://www.pewinternet.org/pdfs/PIP_Health_Aug08.pdf.

[266] *See* Amy G. Rabalais, MD and Moises Arriaga, MD, *Patient Satisfaction with Telemedicine Neurotology Care*, at p. 88-89, Otalaryngology-Head and Neck Surgery, Vol. 141, No. 3S1, (Sept. 2009), *available at* http://download.journals.elsevierhealth.com/pdfs/journals/0194-5998/PIIS0194599809007219.pdf.

[267] IBM has observed that "as consumers become more directly accountable for their health and healthcare choices, they can also become wiser, more value-based purchasers, improve their health through better choices, and at the same, exert pressure to keep system costs in line." *See Healthcare 2015: Win-Win or Lose-Lose? A Portrait and a Path to Successful Transformation*, at p. 26, IBM Institute for Business Value (2006).

[268] *See Senior Citizens to See High Tech Sensors in Homes, on Bodies to Monitor Health*, Dec. 6, 2007, Senior Journal, *available at* http://www.seniorjournal.com/NEWS/Features/2007/7-12-06-SenCit2See.htm.

[269] *Id.*

[270] *See Continued Progress: Hospital Use of Health Information Technology*, at p. 1, American Hospital Association (2007), *available at* http://www.aha.org/aha/issues/HIT/resources.html ("*Continued Progress*").

[271] *See* Press Release, *Large Survey of Physicians Show Size and Setting Continue as Major Factors Influencing EHR Adoption Rates*, June 18, 2008, U.S. Dept. of Health & Human Services, *available at* http://www.hitadoption.org/index.php?module=News&id=cntnt01&cntnt01action=detail&cntnt01articleid=4&cntnt01returnid=30.

[272] In January 2009, "Medicare began paying physicians a bonus if they switched their patients over to e-prescribing. The bonus amounts to 2% of charges billed to Medicare for 2009 and 2010, 1% in 2011 and 2012 and 0.5% in 2013, the program's last year...Physicians who don't e-prescribe will have their Medicare reimbursements cut by 1% starting in 2012, rising to 1.5% in 2013 and by 2% in 2014 and beyond." This system has worked. According to recent data, "As of [October 2009], 143,000 - or one in four physicians and other prescribers who are office based - are e-prescribing, up from 74,000 in 2008. Through the end of August, 110 million of the more than 3.7 billion prescriptions dispensed annually by U.S. retail pharmacies were sent electronically." *See* Victoria E Knight, *Medicare Bonuses Motivate More Physicians to E-Prescribe*, Oct. 5, 2009, Dow Jones Newswire, *available at* http://online.wsj.com/article/BT-CO-20091005-700024.html (citing data from Surescripts, a private company that runs the network that routes prescriptions between physicians and pharmacies).

[273] *See* American Well, *How it Works*, http://www.americanwell.com/how_american_well_works.html.

[274] *Id.*

[275] *See* Bernie Monegain, *New research projects swelling telemedicine market*, Oct.8, 2009, HealthcareITNews.com, *available at* http://www.healthcareitnews.com/news/new-research-projects-swelling-telemedicine-market (citing a recent study by Pike & Fisher).

[276] *See National Study Reveals mHealth has Vast Appeal in America*, Oct. 8, 2009, CNBC Business Wire, *available at* http://www.cnbc.com/id/33227645 (citing a recent study by CTIA – The Wireless Association).

[277] *See* Sarah Jane Tribble, *Downloadable phone apps put a healthy lifestyle in the palm of your hand*, Oct. 5, 2009, The Cleveland Plain Dealer, *available at* http://www.cleveland.com/healthfit/index.ssf/2009/10/downloadable_phone_apps_put_a.html.

[278] *See* MIM Vista, Mobile MIM for the iPhone, http://www.mimvista.com/iphone.

[279] In 2007, healthcare costs represented 16 percent of U.S. GDP, or approximately $2.1 trillion, and are expected to rise to nearly 20 percent of GDP by 2017. *See* Dept. of Health & Human Services, Centers for Medicare & Medicaid Services, *National Health Expenditure Fact Sheet*, http://tiny.cc/OZJt6.

[280] *Vital Signs* at p. 2.

[281] *See* Marlis Meyer, Rita Kobb & Patricia Ryan, *Virtually Healthy: Chronic Disease Management in the Home*, at p. 1, *Disease Management* Vol. 5, No. 2 (June 2002), *available at* www1.va.gov/visn8/v8/clinical/cccs/articles/virtually.doc.

[282] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at slide 100 (citing: Chumbler NE et al, *Mortality risk for diabetes patients in care coordination, home-telehealth program*, Journal of Telemedicine and Telecare 2009:15:98-01; Bates DW et al, *Veteran senate hearings*, http://veterans.senate.gov.)

[283] *See* Press Release, *Alzheimer's Disease to Quadruple Worldwide by 2050*, June 10, 2007, Johns Hopkins University Bloomberg School of Public Health, *available at* http://www.jhsph.edu/publichealthnews/press_releases/2007/brookmeyer_alzheimers_2050.html (announcing a study by Ron Brookmeyer et al. entitled *Forecasting the Global Burden of Alzheimer's Disease*).

[284] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at slide 102 (citing: Chumbler NE et al, *Mortality risk for diabetes patients in care coordination, home-telehealth program*, Journal of Telemedicine and Telecare 2009:15:98-01; Bates DW et al, *Effect of computerized physician order entry and a team intervention on*

prevention of serious medical errors, JAMA 280(15): 1311-1316 October 21, 1998. Jencks SF, et al, *Rehospitalizations among Patients in the Medicare Fee-For-Service Program*, Health Affairs, New England J. of Medicine 2009, 360 1418-28).

[285] *See* Mark Terry, *Three Modalities of Cardiovascular Telemedicine*, 14 J. Telemed. & e-Health 1031, 1032 (Dec. 2008).

[286] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at slide 102.

[287] *See* Alexander H. Vo, *The Telehealth Promise: Better Healthcare and Cost Savings for the 21st Century*, at p. 8, Univ. Texas Medical Branch, *available at* http://attcenter.utmb.edu/presentations/The%20Telehealth%20Promise-Better%20Health%20Care%20and%20Cost%20Savings%20for%20the%2021st%20Century.pdf

[288] *See* Sharona Hoffman & Andy Podgurski, *Finding a Cure: The Case for Regulation and Oversight of Electronic Health Records Systems*, 22 Harv. J. L. & Tech. 104, 116 (2008) (citing Jan Walker et al., *The Value of Health Care Information Exchange and Interoperability*, 25 Health Affairs W5-10, W5-16 (2005)) ("*Finding a Cure*").

[289] *See* Richard Hillestad et al., *Can Electronic Medical Record Systems Transform Healthcare? Potential Health Benefits, Savings, and Costs*, at p. 1103, Health Affairs, Vol. 24, No. 5 (2005). It is estimated, however, that implementing EHRs across the entire U.S. healthcare system could cost upwards of $100 billion. *See* David Goldman, *Obama's Healthcare Challenge*, Jan. 12, 2008, CNN MONEY, *available at* http://money.cnn.com/2009/01/12/technology/stimulus_health_care/index.htm.

[290] *Great Expectations.*

[291] *U.S. Population Projections: 2005-2050.*

[292] *See* Majd Alwan, Devon Wiley & Jeffrey Noble, *State of Technology in Aging Services*, at p. 1, Center for Aging Services Technology (Nov. 2007), *available at* http://www.agingtech.org/documents/bscf_state_technoloy_phase1.pdf.

[293] *See Innovation, Demand, and Investment in Telehealth*, at p. 70-71, Office of Tech. Policy, U.S. Dept. of Commerce (2004), *available at* https://www.ncsbn.org/2004Report.pdf.

[294] *Broadband & Telemedicine* at p. 41.

[295] *See* Kao-Ping Chua, *Overview of the U.S. Healthcare System*, at p. 3, American Medical Student Association (Feb. 2006), *available at* http://www.amsa.org/uhc/HealthCareSystemOverview.pdf.

[296] *Broadband & Telemedicine* at p. 41.

[297] *See* U.S. Dept. of HHS, Centers for Medicare & Medicaid Services, Data Compendium: 2008 Edition, Populations Table IV.1, http://www.cms.hhs.gov/DataCompendium/downloads/2008Populations.zip.

[298] *See Medicare at a Glance*, Kaiser Family Foundation (April 2005), *available at* http://www.kff.org/medicare/upload/Medicare-at-a-Glance-Fact-Sheet.pdf.

[299] *See* U.S. Dept. of HHS, Centers for Medicare & Medicaid Services, Data Compendium: 2008 Edition, Populations Table IV.8, http://www.cms.hhs.gov/DataCompendium/downloads/2008Populations.zip

[300] *See Medicaid: A Primer*, at p. 17, Kaiser Family Foundation (Mar. 2007), *available at* http://www.kff.org/medicaid/upload/Medicaid-A-Primer-pdf.pdf.

[301] *See* John Leland, *Helping Elderly Leave Nursing Homes for a Home*, Sept. 18, 2009, *available at* http://www.nytimes.com/2009/09/19/health/policy/19aging.html?_r=2&ref=todayspaper ("*Home Care for Elderly*").

[302] *Id.*

[303] *Broadband & Telemedicine* at p. 41.

[304] *See, e.g., Medicare Payment of Telemedicine & Telehealth Services,* at p. 5-6, American Telemedicine Association (Dec. 2008), *available at* http://www.americantelemed.org/files/public/policy/Medicare_Payment_Of_Services.pdf (*"Medicare Payment"*). Additional information can be found in a Fact Sheet made available by the U.S. Department of HHS. *See Fact Sheet: Telehealth Services,* Centers for Medicare & Medicaid Services (July 2009), *available at* http://www.americantelemed.org/files/public/membergroups/TeleICU/TelehealthSrvcsFctSht.pdf.

[305] *See Medicare Pilot to Maintain PHRs,* Aug. 13, 2008, Federal Telemedicine News, *available at* http://telemedicinenews.blogspot.com/2008/08/medicare-pilot-to-maintain-phrs.html.

[306] *Id.*

[307] *Medicare Payment* at p. 1-4.

[308] *Id.* at p. 4-5.

[309] *Id.* at p. 2, 4.

[310] *Home Care for Elderly.*

[311] *Id.*

[312] *See Telemedicine Policy,* United Healthcare (2009), *available at* https://www.unitedhealthcareonline.com/b2c/cmaIndexResult.do?channelId=422fe7a1e193b010VgnVCM100000c520720a____&htmlFilePath=/ccmcontent/ProviderII/UHC/en-US/Assets/ProviderStaticFiles/ProviderStaticFilesHtml/ReimbursementPolicies/TELE_0046C_081709.htm.

[313] *Id.*

[314] *Id.*

[315] *Id.*

[316] American Well, for example, has begun partnering with insurance companies to provide healthcare services through an online marketplace, utilizing state-of-the-art technologies in Web communications and digital telephony. *See* American Well, About Us, http://www.americanwell.com/aboutus.html. This online service "allows credentialed healthcare providers to [be] available to consumers for online and phone consultations at their discretion, any time, from any location, as long as they choose." *See Press Release, American Well launches the Online Healthcare Marketplace,* American Well, AHIP Institute, June 18, 2008, *available at* http://www.americanwell.com/pressRelease_Launch.html. Blue Cross Blue Shield is among the first providers to participate, and will begin by providing online care to 10,000 of its employees and family members. *See Blue Cross and Blue Shield of Minnesota and American Well Join to Bring Online Care to Minnesota,* April 15, 2009, Medical News Today, *available at* http://www.medicalnewstoday.com/articles/146012.php. Members of the plan will provide co-pay to American Well, and insurers will pay a license fee per member to use the software, in addition to a $2 transaction fee per consult. *See* Claire Cain Miller, *The Doctor Will See You Now – Online,* Nov. 19, 2008, N.Y. Times Bits Blog, *available at* http://bits.blogs.nytimes.com/2008/11/19/the-doctor-will-see-you-now-online/?scp=58&sq=telemedicine&st=cse.

[317] *See* Robert Pear, *Privacy Issue Complicates Push to Link Medical Data,* Jan. 17, 2009, N.Y. Times, *available at* http://www.nytimes.com/2009/01/18/us/politics/18health.html?_r=2&ref=health (describing recent discussions regarding the need for more robust privacy safeguards in the use of EHRs and other electronic transmissions of medical data).

[318] *Broadband & Telemedicine* at p. 43.

[319] *See* Glenn W. Wachter, *HIPAA's Privacy Rule Summarized: What Does It Mean For Telemedicine?*, Feb. 23, 2001, Telemedicine Information Exchange, *available at* http://tie.telemed.org/articles/article.asp?path=legal&article=h ipaaSummary_gw_tie01.xml.

[320] *Id.*

[321] *See* Jonathan Bick, *Emerging Internet Telemedicine Issues*, N.J. Law J., December 24, 2007, *available at* http://www.bicklaw.com/Telemed.htm.

[322] *Id.*

[323] *Id.*

[324] *Id.*

[325] *See* Vaibhav Garg, *CERIAS Tech Report 2009-11, Security Concerns in Telecare and Telemedicine* at p.11, Center for Education and Research, Information Assurance and Security, Perdue University (2009), *available at* https://www.cerias.purdue.edu/assets/pdf/bibtex_archive/2009-11.pdf (*"CERIAS Report"*).

[326] Pew has found that "Spam continues to plague the Internet as more Americans than ever say they are getting more spam than in the past." However, users are increasingly adept at adopting tools to manage spam and similar applications. Indeed, Pew found that 71 percent of Internet users use spam filters on their emails accounts. *See* Deborah Fallows, *Data Memo: The Volume of Spam is Growing in Americans' Personal and Workplace Email Accounts, but Email Users are Less Bothered By It*, at p. 1, Pew Internet & American Life Project (May 2007) (*"Pew Spam Study"*). Recent data from MessageLabs estimates that approximately 151 billion unsolicited messages (i.e. spam) are sent across the web each day. *See MessageLabs Intelligence: Q3/September 2009*, at p. 1, MessageLabs, *available at* http://www.messagelabs.com/mlireport/MLI_2009.09_Sept_SHSFINAL_EN.pdf.

[327] *See* Kevin Poulsen, *Hackers Assault Epilepsy Patients via Computer*, March 28, 2008, Wired.com, *available at* http://www.wired.com/politics/security/news/2008/03/epilepsy.

[328] *Id.*

[329] *Id.*

[330] *See* Jordan Robertson, *Hackers attack epilepsy forum*, May 7, 2008, USA Today, *available at* http://www.usatoday.com/tech/news/computersecurity/2008-05-07-hackers-attack-epilepsy_N.htm ("In a similar attack this year [2008], a piece of malicious code was released that disabled software that reads text aloud from a computer screen for blind and visually impaired people. That attack appeared to have been designed to cripple the computers of people using illegal copies of the software, researchers said.").

[331] *Broadband & Telemedicine* at p. 45.

[332] *See* M. Savastano et al., *Identity-management factors in e-health and telemedicine applications*, 14 J. of Telemedicine and Telecare 386 (2008).

[333] *CERIAS Report* at p. 12.

[334] *See* Ellie Friedman, *Telemedicine 101: Is Your Telehealth Network Secure?* March/April 2003, Telemedicine Information Exchange, *available at* http://tie.telemed.org/articles/article.asp?path=articles&article=securenetwork_ef_tpr03.xml (originally printed in Telehealth Practice Report (2003), v8(1):4, p. 10-11) (*"Telemedicine 101"*).

[335] Chris Ellis, *'7 Steps' for network security*, Communications News 40(2): 36-7 (Feb. 2003), *available at* http://findarticles.com/p/articles/mi_m0CMN/is_2_40/ai_97724647/.

[336] *Telemedicine 101.*

[337] *Id.*

[338] A recent incident at an Ohio hospital is instructive. A woman was coaxed by an ex-boyfriend into installing a Spyware program on a computer in the hospital where she worked. Over a 10-day period, the "spyware sent more than 1,000 screen captures to [the ex-boyfriend] via e-mail. They included details of medical procedures, diagnostic notes and other confidential information relating to 62 hospital patients. He was also able to obtain e-mail and financial records of four other hospital employees as well." *See* Robert McMillan, *Misdirected Spyware Infects Ohio Hospital*, Sept. 17, 2009, IDG News Service, *available at* http://www.csoonline.com/article/502517/Misdirected_Spyware_Infects_Ohio_Hospital?page=1%20%20IDG.

[339] *See Computer Crime and Security Survey* at p. 13-14, Computer Security Institute, Federal Bureau of Investigation (2005), *available at* http://www.cpppe.umd.edu/Bookstore/Documents/2005CSISurvey.pdf, ("*Security Survey*").

[340] *Telemedicine 101.*

[341] *CERIAS Report* at p. 16.

[342] *Security Survey* at p.18-19.

[343] *Id.*

[344] *CERIAS Report* at p. 15.

[345] *See* K. Z. Haigh & H. A.Yanco, *Automation as Caregiver: Survey of issues and Technologies*, Proceedings of the AAAI-02 Workshop: *Automation as caregiver*, at p. 7 (2002).

[346] *See* American Medical Association, Physician Education, Licensure, and Certification, http://www.ama-assn.org/aps/physcred.html#license.

[347] *See* Glenn W. Wachter, *Interstate Licensure of Telemedicine Practitioners*, March 10, 2000, Telemedicine Information Exchange (Mar. 2000), *available at* http://tie.telemed.org/articles/article.asp?path=telemed101&article=interstate Licensure_gw_tie00.xml ("*Interstate Licensure*").

[348] *Broadband & Telemedicine* at p. 46.

[349] *See Telemedicine Report to the Congress*, HHS, GPO No: 0126-E-04 (MF) (1997); *Telemedicine Report to Congress*, HHS, GPO No: 619-261/65410 (2001).

[350] *See, e.g., Telemedicine Licensure Report*, The Center for Telemedicine Law & The Office for the Advancement of Telehealth (June 2003), *available at* ftp://ftp.hrsa.gov/telehealth/licensure.pdf (citing two examples: In 2002, when the House Commerce Committee inserted language in the Safety Net Legislation that expressed the Congressional interest in collaboration among regulatory boards to facilitate elimination of barriers to telehealth practice. (Healthcare Safety Net Amendments of 2002, Pub. L. No. 107-251, 116 Stat. 1621). This legislation was ultimately signed by the President. Similar language was included in the Senate version of the prescription drug legislation pending on Capitol Hill. (See S. 1, 108th Cong., 1st Sess. § 450H, 2003).

[351] *Interstate Licensure.*

[352] *Broadband & Telemedicine* at p. 46-47.

[353] *See Physician Credentialing, Policy 21*, American College of Medical Quality (last updated Feb. 2004), *available at* http://www.acmq.org/policies/policy21.pdf ("*Physician Credentialing*").

[354] *Id.*

[355] *See* Center for Telehealth and E-Health Law, Credentialing & Accreditation, http://www.telehealthlawcenter.org/?c=125 ("*Credentialing & Accreditation*").

[356] *Physician Credentialing.*

[357] *Credentialing & Accreditation.*

[358] *Id.*

[359] *See Credentialing: CTeL Assesses the Impact of CMS Conditions of Participation on Telehealth,* Center for Telehealth and E-Health Law, *available at* http://www.telehealthlawcenter.org/?c=125&a=1937.

[360] *See Credentialing,* Telemedicine Resource Center, University of Michigan Health System, *available at* http://www.med.umich.edu/telemedicine/partners/ext_credentialing.html.

[361] A physician would be credentialed by the distant facility in two ways: (1) the distant facility could credential the physician based on their own standards; or (2) the distant facility could accept the credentials of the treating physician based on the fact that the remote institution is JC-accredited. *Credentialing & Accreditation.*

[362] *See The Joint Commission and Telemedicine: The Final Word?,* May 13, 2009, HCPro, *available at* http://www.hcpro.com/ACC-232912-1000/The-Joint-Commission-and-Telemedicine-The-Final-Word.html.

[363] *Credentialing & Accreditation.*

[364] *Id.*

[365] *Id.*

[366] *See Healthcare Liability/Damages,* Friends of the U.S. Chamber of Commerce, *available at* http://www.friendsoftheuschamber.com/issues/index.cfm?ID=59.

[367] *See Key Issues in Analyzing Major Health Insurance Proposals,* at Ch. 7, n. 57, Congressional Budget Office (Dec. 2008), *available at* http://www.cbo.gov/ftpdocs/99xx/doc9924/12-18-KeyIssues.pdf.

[368] *See* Jeffery L. Rensberger, *Choice of Law, Medical Malpractice, and Telemedicine: The Present Diagnosis with a Prescription for the Future,* 55 U. Miami L. Rev. 31 (2000).

[369] *See Regulatory Jurisdiction,* at p. 4, Mar. 12, 2008, Action for Health, *available at* http://ir.lib.sfu.ca/bitstream/1892/4094/1/Regulatory%20Jurisdiction.pdf.

[370] *See* Patricia C. Kuszler, *Telemedicine and Integrated Healthcare Delivery: Compounding Malpractice Liability,* 25 Am. J.L. & Med. 297 (1999).

[371] *See* Jonathan Bick, *Emerging Internet Telemedicine Issues,* Dec. 24, 2007, N.J. Law J., *available at* http://www.bicklaw.com/Telemed.htm.

[372] *See, e.g.,* Dennis Thompson, *In Health Care Today, It's Electronic All the Way,* Oct. 3, 2009, HealthDay.com, *available at* http://www.healthday.com/Article.asp?AID=627398(reporting on a recent study of tele-stroke patients and quoting a lead author as saying that "I don't think the electronic interactions are going to completely replace the personal interaction, but they can augment them. You don't have to be standing in front of a physician to accomplish certain things, but that hands-on interaction needs to be there in many cases.").

[373] *See* Pamela Whitten, Ph.D. et. al, *St. Vincent's Home Telehealth for Congestive Heart Failure Patients,* at p. 151-152, J. Telemedicine and e-Health (March 2009).

[374] *Id.* at p. 151.

[375] *Id.*

[376] *See Philips National Study on the Future of Technology & Telehealth in Home Care,* at p. 32, National Association for Home Care & Hospice, Philips Home Healthcare Solutions, Fazzi Associates, Inc. (April 2008), *available at* http://www3.medical.philips.com/resources/hsg/docs/en-us/custom/PhilipsNationalStudyFullReport.pdf (*"Philips 2008"*).

[377] *See In-Home Health Monitoring Market Faces Near- Term Uphill Struggle: Seniors and Baby Boomers Lukewarm to Service Concept, Frugal on Spending,* Parks Associates (January 24, 2006), *available at* http://www.download3k.com/Press-In-Home-Health-Monitoring-Market-Faces-Near-Term.html

[378] *Id.*

[379] *See* Carpenter, Mark, *Serving the Consumer: Older Adults & Technology.* An AARP Presentation at the ATA 7th Annual Industry Briefing (Dec. 2005).

[380] *See Overcoming the Psychological Barriers to Telemedicine: Empowering Older Americans to Use Remote Health Monitoring Services* at p. 12, New Millennium Research Council (Feb. 2007), *available at* http://www.newmillenniumresearch.org/archive/Telemedicine_Report_022607.pdf (*"Empowering Older Adults"*).

[381] *See* Marsha King, *Elderly seek to grow old together, form new support groups; Circles of Caring catch on,* May 1, 2006, The Seattle Times, *available at* http://www.innovations.harvard.edu/news/12237.html.

[382] *Empowering Older Adults* at p. 13.

[383] *Id* at p. 14.

[384] *Id.* Results from a 2004 study are illustrative: "three participants stated that they could think of friends or relatives who would refuse to 'wear' a device, being afraid that it would stigmatize them as frail or needing special assistance." *See* George Demiris et al., *Older Adults' Attitudes Towards and Perceptions of 'Smart Home' Technologies: A Pilot Study* at p. 87-94, Medical Informatics and the Internet in Medicine 29.2 (2004), *available at* http://eldertech.missouri.edu/files/Papers/Demiris/Older%20adults%27%20attitudes%20towards%20and%20perceptions%20of%20smart%20hom.pdf. .

[385] *See, e.g., Old age in the technology age: New devices to monitor health and well-being at home a growing new sector. San Francisco Chronicle,* Aug. 8, 2005. http://www.sfgate.com/cgibin/article.cgi?f=/c/a/2005/08/08/BUG7PE2HL01.DTL.

[386] *Empowering Older Adults* at p. 13.

[387] *See Electronic Medical Records,* The American Consumer Institute (March 2008), *available at* http://www.theamericanconsumer.org/2008/03/07/electronic-medical-records-the-benefits-significantly-outweigh-the-costs/ (*"Electronic Medical Records"*).

[388] *Finding a Cure* at p. 123.

[389] *See* Anne Zieger, *Despite Benefits, Telemedicine Barriers Remain High,* March 10, 2008, FierceHealthIT, *available at* http://www.fiercehealthit.com/story/despite-benefits-telemedicine-barriers-remain-high/2008-03-10.

[390] *See* David W. Bates, *Physicians and Ambulatory Electronic Health Records,* at p. 1182, Health Affairs, (September/October 2005), *available at* http://content.healthaffairs.org/cgi/reprint/24/5/1180 (*"Physicians & EHRs"*).

[391] *See Press Release, HHS Fact Sheet – HIT Report At-A-Glance,* July 21, 2004, U.S. Department of Health & Human Services, HHS.gov, *available at* http://www.hhs.gov/news/press/2004pres/20040721.html (*"HHS Fact Sheet"*).

[392] *Id.*

[393] *See Connecting the Enterprise,* at p. 24, CDW-G (Jan. 2009), *available at* http://webobjects.cdw.com/webobjects/media/pdf/newsroom/CDWG-Unified-Communications-Report-0109.pdf. "Unified communications" refers to "the convergence of communications and applications through the integration of products that facilitate the use of multiple enterprise communication methods, including equipment, software and services," at p. 4 (citing a Gartner study).

[394] *See* Samuel J. Wang et al., *A Cost-Benefit Analysis of Electronic Medical Records in Primary Care,* at p. 400, April 1, 2003, American Journal of Medicine, Vol. 114, *available at* http://www.brighamandwomens.org/gms/News/WangEMRCostBenefit.pdf.

[395] *Id.*

[396] *See Study: EHR System Efficiencies Can Cover the Cost of Adoption,* July 13, 2007, Wordpress.com, *available at* http://emradvice.wordpress.com/category/ehr/.

[397] *Electronic Medical Records.*

[398] *Id.*

[399] *See* Jan Walker et al., *The Value of Health Care Information Exchange and Interoperability,* Health Affairs, 19 January 2005, *available at* content.healthaffairs.org/cgi/content/abstract/hlthaff.w5.10.

[400] *See* Ram Misra, Shankar Srinivasan & Dinesh Mital, *Outsourcing of Healthcare Services: Issues and a Framework for Success,* 1 J. of Info. Tech. & Applications 79-88 (Sept. 2006).

[401] *See* Thomas R. McLean and Edward P. Richards, *Teleradiology: A Case Study of the Economic and Legal Considerations in International Trade in* Telemedicine, at p. 1381, Health Affairs (Sept./Oct. 2006) , *available at* http://content.healthaffairs.org/cgi/reprint/25/5/1378 (*"Teleradiology Case Study"*).

[402] *Id.*

[403] *Id.* at p. 1382.

[404] *See* Jeff Marion, *Outsource your EHR to India,* Sept. 4, 2009, HealthcareITNews.com, *available at* http://www.healthcareitnews.com/blog/outsource-your-ehr-india.

[405] *See* Sanjiv N. Singh & Robert M. Wacther, *Perspectives on Medical Outsourcing and Telemedicine – Rough Edges in a Flat World?* at p. 1623, The New England J. of Med., Vol. 358 (April 2008).

[406] *Id.* at p. 1622.

[407] *Id.*

[408] *Teleradiology Case Study.*

[409] *Id.* at p. 1380.

[410] *See* Associated Press, *Some U.S. Hospitals Outsourcing Work,* Dec. 6, 2004, MSNBC, *available at* http://www.msnbc.msn.com/id/6621014/.

[411] *Teleradiology Case Study* at p. 1380.

[412] *Id.*

[413] *Id.* at p. 1379.

[414] For example, a 1997 GAO report estimated that "nine federal departments and independent agencies...invested at least $646 million in telemedicine projects from fiscal years 1994 to 1996." *See* Report to Congressional Requesters, *Telemedicine: Federal Strategy is Needed to Guide Investments,* at p. 3, U.S. General Accounting Office (Feb. 1997), *available at* http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=gao&docid=f:n397067.pdf.

[415] *Broadband & Telemedicine* at p. 20.

[416] *See* FCC, Rural Healthcare Pilot Program, http://www.fcc.gov/cgb/rural/rhcp.html.

[417] *See In the Matter of Rural Healthcare Support Mechanism*, WC Docket No. 02-60 (rel. Nov. 19, 2007), at para. 2, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-279101A1.pdf ("*FCC Rural Health Pilot Order*").

[418] *See, e.g.*, Alan Joch, *Broadband Flows to Rural Clinics*, June 9, 2008, GOV. HEALTH IT, *available at* http://www.govhealthit.com/print/4_18/features/350394-1.html.

[419] *See Comments of the American Telemedicine Association on the FCC Notice of Inquiry, In the Matter of a National Broadband Plan for Our Future*, GN Docket No. 09-51, at p. 5.

[420] *Physicians & EHRs* at p. 1182.

[421] *Broadband & Telemedicine* at p. 30.

[422] *See* Healthcare IT Standards Panel, About, http://hitsp.org/about_hitsp.aspx.

[423] This effort seeks to "provide a secure, nationwide, interoperable health information infrastructure that will connect providers, consumers, and others involved in supporting health and healthcare. *See* HHS, NHIN – Background, http://www.hhs.gov/healthit/healthnetwork/background/.

[424] NIST collaborates with the healthcare industry to promote the use of HIT. To this end, it was recently awarded $20 million under the American Recovery and Reinvestment Act of 2009 ("ARRA") to support its work in testing and analyzing standards for EHRs. *See* Joseph Conn, *Money to Boost EHR Initiatives Nationwide: Stimulus*, Feb. 23, 2009, ModernHealthcare.com, *available at* http://www.modernhealthcare.com/article/20090223/REG/302239983 ("*Money to Boost EHR*").

[425] CCHIT is a voluntary initiative that leverages its reputation as a leading certifier of EHRs to create incentives for doctors to adopt and use the efficient tools in order to bolster their quality of patient care and to protect against medical liabilities. *See CCHIT Certified Electronic Health Records Reduce Malpractice Risk*, White Paper of CCHIT (2007), *available at* http://www.cchit.org/files/wpCCHITPhysicianBusinessCaseforCertEHR.pdf.

[426] *See, e.g., Testimony of HITSP Program Director LeRoy Jones before the House Ways and Means Subcommittee on Health*, July 24, 2008, *available at* http://waysandmeans.house.gov/hearings.asp?formmode=view&id=7234.

[427] *See, e.g.*, Deborah D. McAdams, *Legislators Press for Spectrum Inventory*, Sept. 17, 2009, Television Broadcast, *available at* http://www.televisionbroadcast.com/article/87290 (quoting FCC Chairman Julius Genachowski as saying that "there is a demand crunch coming" for spectrum) ("*Spectrum Inventory*").

[428] *FCC Wireless Innovation NOI.*

[429] *Spectrum Inventory* (referring to comments made by FCC Commissioners during a House oversight hearing and to two separate spectrum inventory bills that were passed in the House and the Senate in 2009).

[430] *See* Mark Terry, *Text Messaging in Healthcare*, 14 J. Telemed. & e-Health 520, 521 (July/Aug. 2008).

[431] *See, e.g.*, Niraj Sheth & Yukari Iwatani Kane, *Smart-Phone Makers Call the Doctor*, Oct. 7, 2009, Wall St. J. (describing a pilot program at Stanford Hospital & Clinics in California to "test software that will let medical staff access patient charts on Apple's iPhone.").

[432] *See* Carol Wilson, *Hospitals Becoming Wireless Hotbeds*, Sept. 23, 2009, Telephony Online, *available at* http://telephonyonline.com/3g4g/news/hospitals-becoming-wireless-0923/.

[433] *Tomorrow's Wireless World,* at p. 12, OfCom (rel. May 7, 2008), *available at* http://www.ofcom.org.uk/research/technology/overview/randd0708/randd0708.pdf; *see also* Adam Sherwin, *New Wi-Fi Devices Warn Doctors of Heart Attacks,* May 7, 2008, THE TIMES, *available at* http://technology.timesonline.co.uk/tol/news/tech_and_web/article3883082.ece.

[434] *See* Heath Stover, *The Truth About EMR- Physician Resistance,* EzineArticles, *available at* http://ezinearticles.com/?id=878043 ("*Physician Resistance*").

[435] *Id.*

[436] *Id.*

[437] *See* CLAYTON M. CHRISTENSEN, JEROME H. GROSSMAN & JASON HWANG, THE INNOVATOR'S PERSCRIPTION: A DISRUPTIVE SOLUTION TO HEALTHCARE 135, (McGraw-Hill 2009).

[438] See Milt Freudenheim, *For Outsiders, Opening Doors to Health Care,* Aug. 20, 2009, N.Y. Times, http://www.nytimes.com/2009/08/20/education/20HEALTH.html.

[439] *Physicians & EHRs* at p. 1182.

[440] *Id.*

[441] *See* Chip Means, *Saving the healthcare industry: EMRs are the 'beginning, not the end',* July 1, 2009, Healthcare IT News, *available at* http://www.healthcareitnews.com/news/saving-healthcare-industry-emrs-are-beginning-not-end.

[442] *Physician Resistance.*

[443] *See National Transmission Grid Study* at p. 63, U.S. Department of Energy (May 2002), *available at* http://www.pi.energy.gov/documents/TransmissionGrid.pdf.

[444] *See The Smart Grid: An Introduction,* at p. 7, Prepared for the U.S. Department of Energy by Litos Strategic Communication (2008), *available at* http://www.oe.energy.gov/DocumentsandMedia/DOE_SG_Book_Single_Pages.pdf ("*DOE Smart Grids*").

[445] *Id.* at p. 8.

[446] *Id.*

[447] *Id.*

[448] The U.S. Department of Energy has found that demand for electricity in the United States has exceeded transmission growth by almost 25% each year since 1982. DOE estimates that new and necessary electricity infrastructure to support great demand would require a $1.5 trillion investment. *Id.*

[449] *See* Amy Abel, *Smart Grid Provisions in H.R. 6, 100th Congress,* Dec. 20, 2007, CRS Report for Congress, *available at* http://assets.opencrs.com/rpts/RL34288_20071220.pdf ("*CRS Report*").

[450] *See* Steve Pullins, *Smart Grid: Enabling the 21st Century Economy,* Presentation at the Governor's Energy Summit West Virginia (Dec. 2008), *available at* http://www.netl.doe.gov/moderngrid/docs/SG-Enabling%20the%2021st%20Century%20Economy_Pullins_2008_12_02.pdf

[451] *DOE Smart Grids.*

[452] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at Slide 108 (citing: Normalized from *The iGridProject,* The Brattle Group, July 2009; *Smart 2020: Enabling the Low Carbon Economy in the Information Age,* United States Report Addendum, GESI and BCG, Nov. 2008; *Power Delivery System of the Future: A Preliminary Estimate of Costs and Benefits,* EPRI, July 2004; *The Green Grid: Energy Savings and Carbon Emissions Reduced Enabled by a Smart Grid, EPRI,* Jun. 2008).

[453] *See* Michael Kintner-Meyer, Kevin Scheider & Robert Pratt, *Impact Assessment of Plug-In Hybrid Vehicles on Electric Utilities and Regional U.S. Power Grids, Part 1: Technical Analysis*, Journal of EUEC (2007), *available at* http://www.euec.com/documents/pdf/Paper_4.pdf.

[454] *See, e.g., Wiser Wires*, Oct. 8, 2009, The Economist (observing that "More intelligence in the grid would also help integrate renewable sources of electricity, such as solar panels or wind turbines. As things stand, the trouble is that their output, being hostage to the weather, is highly variable. A standard grid becomes hard to manage if too many of them are connected to it; supply and demand on electricity-transmission systems must always be in balance. A smart grid could turn on appliances should, for instance, the wind blow more strongly.").

[455] *DOE Smart Grids* (citing a study by the European Wind Energy Association).

[456] *Id.*

[457] *See* Hannah Choi Granade et al., *Unlocking Energy Efficiency in the U.S. Economy*, at p. iii, McKinsey Global Energy and Materials, McKinsey & Co., *available at* http://www.mckinsey.com/clientservice/electricpowernaturalgas/downloads/US_energy_efficiency_full_report.pdf ("*McKinsey Energy Efficiency*").

[458] *Id.*

[459] *See* Bracken Hendricks, *Wired for Progress: Building a National Clean-Energy Smart Grid, Version 1.0*, at p. 31, Center for American Progress (Feb. 2009), *available at* http://www.americanprogress.org/issues/2009/02/pdf/electricity_grid.pdf ("*Wired for Progress*").

[460] *See, e.g., Primer on Demand-Side Management*, at p. 30-32, A Report to the World Bank (Feb. 2005), *available at* http://siteresources.worldbank.org/INTENERGY/Resources/PrimeronDemand-SideManagement.pdf (describing a real-time pricing pilot project in Chicago).

[461] *See Smart Grid System Report*, at p. 30, U.S. Dept. of Energy (July 2009), *available at* http://www.oe.energy.gov/DocumentsandMedia/SGSRMain_090707_lowres.pdf (citing a Dec. 2008 FERC staff report on advanced metering and demand response) ("*Smart Grid System Report*").

[462] *See* Press Release, *Tendril Introduces Next Phase of its Groundbreaking Energy Management Platform*, Feb. 3, 2009, Tendril, *available at* http://www.tendrilinc.com/2009/02/tendril-introduces-next-phase-of-its-groundbreaking-energy-management-platform.

[463] *Building the smart grid.*

[464] *See* Staff Report, *Assessment of Demand Response & Advanced Metering*, at p. i, FERC (Dec. 2008), *available at* http://www.ferc.gov/legal/staff-reports/12-08-demand-response.pdf ("*2008 FERC Assessment*").

[465] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at Slide 110. *Source: National Assessment of Demand Response Potential*, FERC, June 2009.

[466] *See, e.g.*, Rebecca Smith, *New Appliances, in Sync with Smart Meters, Shit to Energy-Saver Modes When Told*, Sept. 28, 2009, Wall St. J.

[467] See *John Timmer*, GE brings smart grids to life as appliances gain support, *July 9, 2009, Ars Technica*, available at http://arstechnica.com/business/news/2009/07/ge-cuts-a-deal-to-ready-its-appliances-for-the-smart-grid.ars.

[468] *Id.*

[469] *Wired for Progress* at p. 1.

[470] *See* Charles Waltner, *Smart Buildings Offering Clever Ways to Reduce Energy Consumption*, July 21, 2008, Cisco, *available at* http://newsroom.cisco.com/dlls/2008/ts_072108.html (citing a study by The Hartman Co.) ("*Smarter Buildings*").

[471] McKinsey argues that viewing a building as one integrated system, "rather than as a set of independent end-uses," can result in "additional energy savings in a cost effective manner." *McKinsey Energy Efficiency* at p. 32.

[472] *Smarter Buildings.*

[473] *Wired for Progress* at p. 31.

[474] *See Technology Providers: One of Six Smart Grid Stakeholder Books*, at p. 3, Prepared for the U.S. Department of Energy by Litos Strategic Communication (2008), *available at* http://www.oe.energy.gov/DocumentsandMedia/TechnologyProviders.pdf.

[475] *See Executive Order: Federal Leadership in Environmental, Energy, and Economic Performance*, The White House, Office of the Press Secretary (rel. Oct. 5, 2009), *available at* http://www.whitehouse.gov/the_press_office/President-Obama-signs-an-Executive-Order-Focused-on-Federal-Leadership-in-Environmental-Energy-and-Economic-Performance/.

[476] *See* Eve Tahmincioglu, *The Quiet Revolution: Telecommuting*, Oct. 5, 2007, MSBC, *available at* http://www.msnbc.msn.com/id/20281475/.

[477] *Id.*

[478] *See* Joseph Romm, *The Internet and the New Energy Economy* in Sustainability at the Speed of Light (Dennis Pamlin, ed.), at p. 39 (2002), *available at* http://assets.panda.org/downloads/wwf_ic_1.pdf ("*Internet and New Energy Economy*").

[479] *See* Joseph P. Fuhr Jr. & Stephen B. Pociask, *Broadband Services: Economic and Environmental Benefits*, The American Consumer Institute (Oct. 2007), *available at* http://www.theamericanconsumer.org/2007/10/31/broadband-services-economic-and-environmental-benefits/.

[480] *Id.*

[481] *Internet and New Energy Economy* at p. 37.

[482] *McKinsey Energy Efficiency* at p. 99.

[483] *See, e.g.*, Prepared Remarks of Chairman Julius Genachowski, Federal Communications Commission, *Preserving a Free and Open Internet: A Platform for Innovation, Opportunity, and Prosperity*, The Brookings Institution, Sept. 21, 2009, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293568A1.pdf (noting that "the Internet is helping enable smart grid technologies, which promise to reduce carbon dioxide emissions by hundreds of millions of metric tons.").

[484] *See FCC hires energy director, plans rules for smart grid networks*, Aug.18, 2009, Smart Grid Today.

[485] *Comment Sought on the Implementation of Smart Grid Technology*, National Broadband Plan Public Notice #2, GN Docket Nos. 09-47, 09-51, 09-137 (rel. Sept. 4, 2009), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-09-2017A1.pdf.

[486] *See* FCC, National Broadband Plan, Workshops: Smart Grid, Broadband and Climate Change, http://www.broadband.gov/ws_eng_env_trans.html.

[487] *See* NIST, Smart Grid Interoperability Standards Project, http://www.nist.gov/smartgrid/.

[488] *See NIST denies need for prodding on IP in smart grid*, Sept. 8, 2009. Smart Grid Today ("*NIST Denies*").

[489] See *NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0*, Sept. 24, 2009, NIST, *available at* http://www.nist.gov/public_affairs/releases/smartgrid_interoperability.pdf ("*NIST Smart Grids Standards Framework & Roadmap – Release 1.0*").

[490] *See Commerce Secretary Presents Draft NIST Smart Grid Roadmap*, Sept. 25, 2009, Smart Grid Today.

[491] *NIST Denies.*

[492] *See Smart Grid Policy*, FERC, 18 CFR Chapter I, Docket No. PL09-4-000 (rel. July 16, 2009), *available at* http://www.ferc.gov/whats-new/comm-meet/2009/071609/E-3.pdf ("*FERC Smart Grid Policy Statement*").

[493] *Id.* at para. 29-85.

[494] *Id.* at para. 22-28.

[495] *See The Strategic Plan: FY 2009-2014*, at p. 23, FERC (rel. Oct. 15, 2009), *available at* http://www.ferc.gov/about/strat-docs/FY-09-14-strat-plan-print.pdf.

[496] *Id.*

[497] *See* Press Release, *Sixteen State Regulators Join NARUC-FERC Smart Grid Collaborative*, Mar. 31, 2008, NARUC, *available at* http://www.naruc.org/News/default.cfm?pr=77&pdf.

[498] *Boulder Named 'Smart Grid City"*, Mar. 12, 2008, Denver Business Journal, *available at* http://denver.bizjournals.com/denver/stories/2008/03/10/daily26.html

[499] Kate Galbraith, *Deep in the Heart of Texas: A Smart Grid*, Dec. 3, 2008, New York Times, *available at* http://greeninc.blogs.nytimes.com/2008/12/03/deep-in-the-heart-of-texas-a-smart-grid/?scp=7&sq=%22Smart%20grid%22&st=cse

[500] *See, e.g., McKinsey Energy Efficiency* at p. 101-107 (discussing the need for more coordinated collaboration among stakeholders in and around the energy sector).

[501] *See, e.g.*, Dieter Helm, *The New Energy Paradigm*, at p. 18, in THE NEW ENERGY PARADIGM (D. Helm, ed.) (Oxford 2007) (noting that "energy policy tends to lag market developments").

[502] The FCC defines the "value chain" in the wireless context as "the chain of individual, value-creating activities. This chain includes not only those activities performed by wireless communications service providers themselves, but also those performed by all other entities, including providers of inputs and complements to wireless communications services." *See In the Matter of Fostering Innovation and Investment in the Wireless Communications Market*, at n. 2, GN Docket No. 09-157 (rel. August 27, 2009).

[503] *See, e.g.*, Charles. M. Davidson, *Losing the Forest for the Trees: Properly Contextualizing the Use of Early Termination Fees in the Current Wireless Marketplace*, at p. 19-22, ACLP Scholarship Series (June 2009), *available at* http://www.nyls.edu/user_files/1/3/4/30/83/Early%20Termination%20Fees%20-%20June%202009.pdf (analyzing the impact of regulatory certainty on innovation in the wireless market); Robert Han & Hal Singer, *Why the iPhone Won't Last Forever and What the Government Should Do to Promote its Successor*, The Georgetown Center for Business & Public Policy (Sept. 2009), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1477042 (arguing that "heavy handed" regulation in the wireless sector would deter "disruptive" innovation in handset innovation).

[504] *See, e.g.* Lino Mendiola, *The Erosion of Traditional Ratemaking Through the Use of Special Rates, Riders, and Other Mechanisms*, 10 Tex. Tech Admin. L.J. 173, 177-178 (2008) ("The value of the utility's property, less depreciation, constitutes the "rate base." Tangible property includes plants and equipment that are "used and useful" in providing service. Intangible property includes the value of working capital and may include other items like legal rights." (*internal citations omitted*)).

[505] *See, e.g.*, Howard A. Shelanski, *Adjusting Regulation to Competition: Toward a New Model for U.S. Telecommunications Policy*, 24 Yale J. on Reg. 55, 59-62 (2007).

[506] Between 1939 and 1962, the percentage of households that had telephone service increased from 42 percent to 80 percent. *See* SUSAN MCMASTER, THE TELECOMMUNICATIONS INDUSTRY 84 (Greenwood Press 2002).

[507] *See* Douglas H. Ginsburg, *Synthetic Competition*, 16 MEDIA L. & POL'Y 1, 5 (2006), *available at* http://www.nyls.edu/user_files/1/3/4/30/84/88/16MLP1fall06.pdf.

[508] *See, e.g.*, HERBERT HOVENKAMP, THE ANTITRUST ENTERPRISE: PRINCIPLE AND EXECUTION 13-14 (Harv. U. Press 2005).

[509] *See Smart Grid Report*, at p. 28, U.S. Department of Energy (July 2009), *available at* http://www.oe.energy.gov/DocumentsandMedia/SGSRMain_090707_lowres.pdf,.

[510] *Id.*

[511] Edward Robinson, *Smart-grid competition heats up with involvement of telecom technology*, Sept. 6, 2009, The Seattle Times, *available at* http://seattletimes.nwsource.com/html/businesstechnology/2009813989_smartgrid06.html?syndication=rss.

[512] Some, however, advocate the construction of an entirely new "mesh" network to support the smart grid and related applications (e.g., plug-in hybrid vehicles). *See, e.g.*, David Weinberger, *The Grid, Our Cars and the Net: One Idea to Link them All*, May 8, 2009, Wired.com, *available at* http://www.wired.com/autopia/2009/05/the-grid-our-cars-and-the-internet-one-idea-to-link-them-all/ (providing an overview of a proposal by Robin Chase, founder of Zipcar).

[513] *See Do utilities blame smart grid gear-makers for lack of standards?* Sept. 17, 2009, Smart Grid Today.

[514] *CRS Report.*

[515] *See Congressional top dogs jump on Smart Grid bandwagon...NIST, NEMA, and NARUC say wait until standards are in place... Utility group publishes standards white paper*, Mar. 9, 2009, Smart Grid News, *available at* http://www.smartgridnews.com/artman/publish/news/Congressional_top_dogs_jump_on_Smart_Grid_bandwagon_NIST_NEMA_and_NARUC_say_wait_until_standards_are_in_place_utility_group_publishes_standards_white_paper-533.html.

[516] *See, e.g.*, Tony Clark & Michael J. Santorelli, *Federalism in Wireless Regulation: A New Model for a New World*, ACLP Scholarship Series (Feb. 2009), *available at* http://www.nyls.edu/user_files/1/3/4/30/83/Clark%20%20&%20Santorelli%20-%20Wireless%20Federalism%20-%20February%202009.pdf (discussing regulatory federalism in the wireless market).

[517] As an example, the wireless market has shifted away from state-by-state regulation and towards a framework that is largely national in scope. States, however, do retain regulatory jurisdiction over "terms and conditions" of wireless service. *See Omnibus Budget Reconciliation Act of 1993*, Pub. L. No. 103-66, § 6002(b), 107 Stat. 312, 392 (codified in relevant part at 47 U.S.C. § 332) (imposing a national regulatory framework for wireless).

[518] *See, e.g., Accelerating Smart Grid Investments*, at p. 21, World Economic Forum in partnership with Accenture (2009), *available at* http://www.weforum.org/pdf/SlimCity/SmartGrid2009.pdf (noting that "If smart grids are to gain traction, it will need to be clear to all the stakeholder groups what smart grids are, how they are different to the status quo and why they will be a central enabler of a low-carbon future" and opining that "Consumers will need to be educated on how their energy consumption

patterns at home, at work and in transit drive cost and have value") ("*Accelerating Smart Grid Investments*").

[519] *See Lighting the Way: Understanding the Smart Energy Consumer*, at p. 4, IBM Global Business Services, Institute for Business Value, *available at* http://www.ibm.com/common/ssi/fcgi-bin/ssialias?infotype=PM&subtype=XB&appname=GBSE_GB_TI_USEN&htmlfid=GBE03187USEN&attachment=GBE03187USEN.PDF.

[520] *Id.* at p. 5-6.

[521] *Id.* at p. 7.

[522] *Id.* at p. 6 ("The impact of the global economic downturn of 2008 is clearly competing with the environmental concerns of consumers. Across the core group of countries [included in the IBM survey], the number of consumers paying a premium for green products and services is down 20 to 30 percent.").

[523] *Smart Grid System Report* at p. 35 (citing *2008 FERC Assessment*).

[524] *See Building the smart grid*, June 4, 2009, The Economist, *available at* http://www.economist.com/sciencetechnology/tq/displaystory.cfm?STORY_ID=13725843 ("*Building the smart grid*").

[525] *See* Sarah Reedy, *Grid Week: DOE Secretary Chu on Fighting Consumer Smart-Grid Resistance*, Sept. 21, 2009, Telephony Online, *available at* http://telephonyonline.com/business_services/news/doe-secretary-chu-smart-grid-20090921/.

[526] *See* National Association of State Utility Consumer Advocates, Resolution 2009-03: Smart Grid Principles of the National Association of State Utility Consumer Advocates, *available at* www.nasuca.org/2009-03%20FINAL.doc ("NASUCA Principles").

[527] *NIST Smart Grids Standards Framework & Roadmap – Release 1.0* at p. 5.

[528] *See Do utilities blame smart grid gear-makers for lack of standards?*, Sept. 17, 2009, Smart Grid Today.

[529] *See* Sarah Reedy, *Smart Grid Series, Part 4: How Standards will Shape the Grid*, Sept. 18, 2009, Telephony Online, *available at* http://telephonyonline.com/topics/smart-grids/ieee-mcdonald-standards-0918/ ("*How Standards Will Shape*").

[530] *NIST Smart Grids Standards Framework & Roadmap – Release 1.0* at p. 5.

[531] *CRS Report.*

[532] *How Standards Will Shape.*

[533] *See, e.g.*, Comments of the Utilities Telecom Council and Edison Electric Institute, p. 7-11, *In the Matter of a National Broadband Plan for Our Future*, GN Docket No. 09-51 (sub. Jun 8, 2009); *see also The Utility Spectrum Crisis: A Critical Need to Enable Smart Grids*, p. 14-18, Utilities Telecom Council (Jan. 2009), *available at* http://www.utc.org/fileshare/files/3/Public_Policy_Issues/Spectrum_Issues/finalspectrumcrisisreport0109.pdf.

[534] *See, e.g., Letter of Digital Energy Solutions Campaign to FCC Chairman Genachowski*, at p. 2 ("*Digital Energy Letter*").

[535] *See, e.g.*, Deborah D. McAdams, *Legislators Press for Spectrum Inventory*, Sept. 17, 2009, Television Broadcast, *available at* http://www.televisionbroadcast.com/article/87290 (quoting FCC Chairman Julius Genachowski as saying that "there is a demand crunch coming" for spectrum.).

[536] *Id.* (referring to comments made by FCC Commissioners during a House oversight hearing and to separate spectrum inventory bills that were passed in the House and the Senate in 2009).

[537] *Accelerating Smart Grid Investments* at p. 22-23 (noting that there is a lack of skills and expertise in the energy sector regarding digital network security and how a lack of skilled workers may make networks vulnerable in the transition from analog to digital systems).

[538] *See, e.g.*, Brian Krebs, '*Smart Grid*' *Raises Security Concerns*, July 28, 2009, The Washington Post, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2009/07/27/AR2009072702988.html ("*Smart Grid Security Concerns*").

[539] *See Cyberspace Policy Review: Assuring a Trusted and Resilient Information and Communications Infrastructure*, at p. 29, Executive Office of the President (May 2009), *available at*: www.whitehouse.gov/assets/documents/Cyberspace_Policy_Review_final.pdf ("*White House Report*").

[540] *Smart Grid Security Concerns.*

[541] *See* Jeanne Meserve, '*Smart Grid*' *May be Vulnerable to Hackers*, March 21, 2009, CNN, *available at* http://www.cnn.com/2009/TECH/03/20/smartgrid.vulnerability/index.html (citing a report by IOActive).

[542] *See* Jeff St. John, *Defense Contractors Pursue the Smart Grid*, Sept. 4, 2009, *GreenTech Media, available at* http://www.greentechmedia.com/articles/read/defense-contractors-pursue-the-smart-grid.

[543] *See* Mark F. Foley, *Data Privacy and Security Issues for Advanced Metering Systems (Part 2)*, July 1 2008, Smart Grid News, *available at* http://www.smartgridnews.com/artman/publish/industry/Data_Privacy_and_Security_Issues_for_AdvanceNd_Metering_Systems_Part_2.html,

[544] *See* Longhao Wang and Eliabeht Carin Eraker, *Consumer Privacy and Smart Grid Technology*, Oct. 6, 2009, Privacy Beta Blog, Center for Democracy & Technology, *available at* http://blog.cdt.org/2009/10/06/consumer-privacy-and-smart-grid-technology/ (summarizing recent comments submitted to the FCC regarding smart grids and observing that "granular usage data reveals deeply personal information about consumer habits, and about consumer activities within the private space of the home. Given both the sensitive nature and high commercial value of this data, utilities and third-party businesses will be eager to make use of it, as will law enforcement investigators and, unfortunately, criminals. For example, if your thermostat is set at 55 degrees for 3 days in the winter in New England, that is a good signal that you are away from your house. As such, a lack of care around this data will pose serious privacy and security risks for consumers. These issues are further complicated by the reality that the Smart Grid, at present, is governed by a patchwork of state and federal laws.").

[545] *NASUCA Principles.*

[546] *White House Report* at p. 33.

[547] *See* Jim Duffy, *Cisco Targeting Utilities*, May 18, 2009, Network World, *available at* http://www.networkworld.com/community/node/41938 (noting that "Cisco is looking to supply utilities with an IP network, from the power generation facilities to the home. Cisco's smart grid strategy will encompass data centers and substations, neighborhood-area networks, and businesses and homes.").

[548] *See* U.S. Dept. of Transportation, Commuter Choice Primer, http://www.itsdocs.fhwa.dot.gov/jpodocs/repts_pr/13669.html.

[549] These include Connecticut, Georgia, Oregon and Virginia. *See* Telecommute Connecticut, About Us, http://telecommutect.com/about/about.php (providing resources and consultative services to businesses looking to implement a telecommuting program); Georgia House Bill 194 (2005), http://www.legis.state.ga.us/legis/2005_06/fulltext/hb194.htm (providing $20,000 credit for a telework assessment, and a $1,200 per employee credit for teleworkers that meet a certain threshold of time teleworking for the years 2008 and 2009); Oregon Department of Energy, Transportation,

http://egov.oregon.gov/ENERGY/TRANS/transhm.shtml; and Telework!Va, http://www.teleworkva.org/.

[550] *Comments of Google on Smart Grid Technology Deployment in California*, Dec. 18, 2008, Google.Org, *available at* http://www.google.org/powermeter/cpuc.html.

[551] *Id.*

[552] *See* Google.org, PowerMeter, http://www.google.org/powermeter/index.html.

[553] *See* John Timmer, *Google wants in on the smart grid of the future*, Feb. 10, 2009, Ars Technica, *available at* http://arstechnica.com/science/news/2009/02/google-wants-in-on-the-smart-grid.ars.

[554] *Digital Energy Letter* at p. 3 (noting that "In this way Opto pulls real-time energy use data that it presents on both an in-home display and a Web portal, enabling trial customers to not only monitor their usage remotely, but also to remotely control different appliances over whatever wireless or wireline broadband connection they have.").

[555] *See* Google.org, PowerMeter: Partners, http://www.google.org/powermeter/partners.html.

[556] According to the U.S. Department of Education, 34.9 million students attended pre-K–8th grade public school, while 4.8 million students attended pre-k–8th grade private school. The DOE also found that 14.9 million students attended public high school in 2008, while 1.35 million students attended a private high school. *See Digest of Education Statistics, 2007*, at Table 3, U.S. Department of Education, National Center for Education Statistics 2008-022 (2008), *available at* http://nces.ed.gov/fastfacts/display.asp?id=65.

[557] *See The Condition of Education 2007*, Indicator 2, U.S. Department of Education, National Center for Education Statistics (NCES 2007–064), *available at* http://nces.ed.gov/fastfacts/display.asp?id=78 (data as of 2005).

[558] These programs include English as a Second Language, adult basic education classes, GED classes, college/university/vocational training, apprenticeships, and courses taken for work or personal interest. *See Issue Brief: Recent Participation in Formal Learning Among Working-Age Adults with Different Levels of Education*, U.S. Department of Education, National Center for Education Statistics 2008-041 (Jan. 2008), *available at* http://nces.ed.gov/pubs2008/2008041.pdf (data collected between 2000 and 2005).

[559] *See, e.g.*, TERRY M. MOE & JOHN E. CHUBB, LIBERATING LEARNING: TECHNOLOGY, POLITICS, AND THE FUTURE OF AMERICAN EDUCATION 109 (2009) ("Schools organized around distance learning can offer AP physics or remedial math or Mandarin or whatever local districts are not offering; and they can cater to constituencies – students who are gifted, in need of specialized courses, in rural or inner-city areas, in need of extra credits for graduation and so on – that are underserved by the current system.") ("LIBERATING LEARNING").

[560] *See* U.S. Department of Education, National Center for Education Statistics, Question: What percentage of elementary and secondary schools offer distance education?, http://nces.ed.gov/fastfacts/display.asp?id=79.

[561] *See High-Speed Broadband Access for All Kids: Breaking Through the Barriers*, State Educational Directors Association (June 2008), available at http://www.setda.org/web/guest/2020/broadband ("*Breaking Through the Barriers*").

[562] *See Evaluation of Evidence-Based Practices in Online Learning*, at p. xi, U.S. Department of Education, Center for Technology in Learning (2009), *available at* http://www.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf ("*Evaluation of Online Learning*").

[563] *See* I. Elaine Allen and Jeff Seaman, *Staying the Course: Online Education in the United States, 2008*, at p. 5, Sloan Consortium, *available at* http://www.sloanconsortium.org/publications/survey/index.asp; *see also* Eve Tahmincioglu, *The Faculty Is Remote, But Not Detached*, March 9, 2008, N.Y. Times.

[564] *Evaluation of Online Learning* at p. ix.

[565] *See Maximizing the Impact: The Pivotal Role of Technology in a 21st Century Education System*, at p. 2, A Joint Report of the Partnership for 21st-Century Skills, ISTE & SETDA (2007), *available at* http://www.21stcenturyskills.org/documents/p21setdaistepaper.pdf.

[566] *See, e.g.*, Ray Uhalde and Jeff Strohl, *American in the Global Economy*, p. 47-50, A Background Paper for the New Commission on the Skills of the American Workforce (Dec. 2006), *available at* http://www.skillscommission.org/pdf/Staff%20Papers/America_Global_Economy.pdf.

[567] *See* 21stCenturySkills.org, Maine Advisory Council, http://www.21stcenturyskills.org/route21/index.php?option=com_content&view=article&id=135&Itemid=219.

[568] *See Internet Access in U.S. Public Schools and Classrooms: 1994-2005*, at p. 10, National Center for Education Statistics, *available at*- http://nces.ed.gov/pubs2007/2007020.pdf ("*Public Schools*").

[569] *Id.*

[570] *See, e.g.*, John Windhausen, Jr., *A Blueprint for Big Broadband*, at p. 14, EDUCAUSE (Jan. 2008), *available at* http://www.educause.edu/ir/library/pdf/EPO0801.pdf.

[571] *See Connected to the Future*, at p. 8, Center for Public Broadcasting, (2002), *available at* http://www.cpb.org/stations/reports/connected/connected_report.pdf

[572] *See* Linda A. Jackson et al., *Does Home Internet Use Influence the Academic Performance of Low-Income Children*, Developmental Psychology 42(3) (2006) 429, *available at* www.apa.org/releases/dev423-jackson.pdf.

[573] *See* Robert Atkinson and Daniel Castro, *Digital Quality of Life: Understanding the Personal & Social Benefits of the Information Technology Revolution: Education & Training*, at p. 22, Information Technology and Innovation Foundation (Oct. 2008), *available at* http://www.itif.org/files/DQOL-4.pdf ("*Digital Quality of Life – Education & Training*").

[574] *Breaking Through the Barriers* at p. 6.

[575] According to the U.S. Department of Education, 100 percent of public schools had Internet access by 2003. *See* U.S. Department of Education, National Center for Education Statistics, Digest of Education Statistics 2008: Table 427 – Public schools and instructional rooms with internet access, by selected school characteristics: Selected years, 1994 through 2005, http://nces.ed.gov/programs/digest/d08/tables/dt08_427.asp ("*NCES Table 427*").

[576] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at Slide 119.

[577] *See* U.S. Department of Education, National Center for Education Statistics, Question: How many schools have access to the Internet?, http://nces.ed.gov/fastfacts/display.asp?id=46.

[578] *See* Kelly Caraher and Meredith Braselman, *News Release, 2009 School Safety Index Finds Security Improvements Aren't Keeping Pace with Breaches*, May 18, 2009, CDWG, *available at* http://newsroom.cdwg.com/news-releases/news-release-05-18-09.html.

[579] *See The 21st-Century Campus: Are We There Yet?* at p. 17, Oct. 13, 2008, CDWG *available at* http://webobjects.cdw.com/webobjects/media/pdf/newsroom/CDWG-21st-Century-Campus-1008.pdf ("*CDWG 2008*")

[580] *See* Kelly Caraher and Meredith Braselman, *News Release, 2009 School Safety Index Finds Security Improvements Aren't Keeping Pace with Breaches*, May 18, 2009, *available at* http://newsroom.cdwg.com/news-releases/news-release-05-18-09.html.

[581] *See Fast Facts About Online Learning*, at p. 2, NACOL International Association for K-12 Online Learning (2008) (citing *Upcoming Statistical Abstract of the United States: 2009, Table 252*, U.S. Census Bureau, *available at* http://www.census.gov/compendia/statab).

[582] *NCES Table 427.*

[583] *See Access, Adequacy, and Equity in Education Technology*, at p. 9, National Education Association (May 2008), *available at* http://www.edutopia.org/files/existing/pdfs/NEA-Access,Adequacy,andEquityinEdTech.pdf (*"NEA 2008"*).

[584] *Id.* at p. 10.

[585] *CDWG 2008* at p. 17.

[586] *Id.*

[587] *See* Amanda Lenhart, *Presentation: Teens and Social Media – An Overview*, Slide 5, April 10, 2009, Pew Internet & American Life Project, *available at* http://www.pewinternet.org/Presentations/2009/17-Teens-and-Social-Media-An-Overview.aspx.

[588] *Id.* at Slide 8.

[589] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at Slide 120 (citing Pew studies).

[590] *Id.* at Slide 7.

[591] *NEA 2008* at p. 23.

[592] *See Internet Access in U.S. Public Schools and Classrooms: 1994-2005*, at p. 10, National Center for Education Statistics, *available at* http://nces.ed.gov/pubs2007/2007020.pdf.

[593] *NEA 2008* at p. 19.

[594] *Id.* at p. 20.

[595] *See* CMCH Mentors, Cell phones, http://www.cmch.tv/mentors/hotTopic.asp?id=70 (citing C&R Research).

[596] *Women, Teens, and Seniors – Mobile Web Use 2009.*

[597] *See* Project K-Nect, Home, http://www.projectknect.org/Project%20K-Nect/Home.html.

[598] *See* Carly Shuler, *Pockets of Potential: Using Mobile Technologies to Promotes Children's Learning*, at p. 14, Industry Brief, The Joan Ganz Cooney Center at Sesame Workshop (Jan. 2009), *available at* http://www.joanganzcooneycenter.org/pdf/pockets_of_potential.pdf.

[599] *See* Press Release, *35% of Teens Admit to Using Cell Phones to Cheat*, June 18, 2009, Common Sense Media, *available at* http://www.commonsensemedia.org/about-us/press-room/hi-tech-cheating-poll.

[600] CDWG at p. 17.

[601] *See* eLearners.com, Facts and Figures from the Online Education Research, http://www.elearners.com/guide-to-online-education/online-education-research.asp (citing the Vault.com study).

[602] *Digital Quality of Life – Education & Training* at p. 18.

[603] *See* Joe Mullich, *A Second Act for E-Learning*, Workforce.com (Feb. 2004), *available at* http://www.workforce.com/section/11/feature/23/62/89/index.html.

[604] *See 2009 Corporate Learning Factbook Reveals 11% Decline in Corporate Training Spending*, Jan. 26, 2009, eLearningCouncil.com, *available at* http://www.elearningcouncil.com/content/2009-corporate-learning-factbook-reveals-11-decline-corporate-training-spending.

[605] *See 21st Century Campus* at p. 6, White Paper.

[606] *See A Resource Guide Identifying Technology Tools for Schools*, at p. 7, The state Educational Technology Directors Association (SETDA) and the National Association of State Title I Directors (NASTID), September 2009, *available at* http://www.setda.org/c/document_library/get_file?folderId=295&name=DLFE-490.pdf.

[607] *Id.*

[608] "Higher costs for online development and delivery are seen as barriers among those who are planning online offerings, but not among those who have online offerings." *See* Elaine Allen and Jeff Seaman, *Online Nation: Five Years of Growth in Online Learning*, at p. 3, The Sloan Consortium (October 2007).

[609] *See* Tom Rolfes and Tammy Stephens, *21st Century Networks for 21st Century Schools: Making the Case for Broadband*, at p. 4-6, CoSN ("*21st Century Networks*").

[610] *Id.*

[611] *Id.*

[612] *Id.*

[613] *Id.*

[614] *Id.* at p. 5.

[615] *Home Broadband Adoption 2009* at p. 14-16 ("Home broadband adoption for adults with household incomes under $20,000 grew by 40 percent from 2008 to 2009. However, a total of only 35 percent of adults with household incomes under $20,000 have broadband at home, compared to 63 percent of all adults.").

[616] One study found that, in 2000, "64 percent of households with at least one child between the ages of 2 and 17 had a computer. By 2002, 83 percent of family households reported computer ownership — a 30 percent growth rate in two years." *See Connected to the Future*, at p. 2-3, Corporation for Public Broadcasting, http://www.cpb.org/stations/reports/connected/connected_report.pdf ("*Connected to the Future*").

[617] *See* Tamar Lewin, *In a Digital Future, Textbooks are History*, Aug. 8, 2009, N.Y. Times, *available at* http://www.nytimes.com/2009/08/09/education/09textbook.html?_r=3&ref=education.

[618] *See Fast Facts About Online Learning*, at p. 2, NACOL International Association for K-12 Online Learning (2008), (citing *Upcoming Statistical Abstract of the United States: 2009, Table 252, available at* http://www.census.gov/compendia/statab).

[619] *Public Schools* at p. 6.

[620] *NEA 2008* at p. 2.

[621] *See Internet Access in U.S. Public Schools and Classrooms: 1994-2005*, at p. 6, National Center for Education Statistics, *available at* http://nces.ed.gov/pubs2007/2007020.pdf.

[622] *Connected to the Future* at p.6.

[623] *Id.* According to U.S. Census data from 2005, less than half – 45 percent – of blacks used a computer at home, compared to over 60 percent for both Whites and Asians. *See Computer and Internet Use in the United States: October 2007*, Table 4 - Reported Computer and Internet Access for Individuals 15 Years and

Older, by Selected Characteristics: 2005, U.S. Census Bureau, *available at* http://www.census.gov/population/socdemo/computer/2007/tab04.xls.

[624] *See* American Library Association, Library Fact Sheet No. 6, http://www.ala.org/ala/aboutala/offices/library/libraryfactsheet/alalibraryfactsheet6.cfm (citing an analysis of 2002 data by the National Center for Education Statistics).

[625] *Id.*

[626] *See* Mark Warschauer, *Information Literacy in the Laptop Classroom,* Teachers College Record (2007), *available at* http://www.tcrecord.org/Content.asp?ContentID=14534 (*"Information Literacy"*).

[627] *Id.*

[628] *Id.*

[629] *See* J. James Cengiz Gulek and Hakan Demirtas, *Learning with technology: The impact of laptop use on student achievement,* at p. 29, Journal of Technology, Learning, and Assessment, vol. 3, no. 2 (2005), *available at* http://escholarship.bc.edu/cgi/viewcontent.cgi?article=1052&context=jtla.

[630] *See generally* Michael Russell et al., *Laptop learning: A comparison of teaching and learning in upper elementary classrooms equipped with shared carts of laptops and permanent One-to-One laptops,* Technology and Assessment Collaborative Study, Boston College (Feb. 2004), *available at* http://www.bc.edu/research/intasc/PDF/Andover1to1.pdf.

[631] *Id.*

[632] *See Overview of the Schools and Libraries Program,* Universal Service Administrative Company, *available at* http://www.universalservice.org/sl/about/overview-program.aspx.

[633] *Id.*

[634] *Breaking Through the Barriers* at p. 22.

[635] *See Report to Congressional Requesters, Long-Term Strategic Vision Would Help Ensure Targeting of E-rate Funds to Highest-Priority Uses,* at p. 2, United States Government Accountability Office (GAO) (March 2009) (*"GAO Report"*).

[636] *Id.*

[637] *See* Comments of Sheryl Abshire, Chief Technology Officer of the Calcasieu Parish School System, Presentation at FCC Workshop: Education (Aug. 20, 2009), available at http://www.broadband.gov/ws_education.html ("The most widely disseminated criticism of the E-Rate program is its lack of funding.").

[638] *Breaking Through the Barriers* at p. 23.

[639] *Id.*

[640] "Each year from 1998- 2007, the amount of funding applicants requested exceeded the amount available... From 1998 through 2007, applicants requested a total of about $41 billion in E-rate funding—174 percent of the $23.4 billion in program funding." *GAO Report* at p. 13.

[641] *Breaking Through the Barriers* at p. 23.

[642] *See* Universal Service Administrative Company, Step 5: Discount Matrix, http://www.universalservice.org/sl/applicants/step05/discount-matrix.aspx.

[643] *See* Patricia M. Worthy, *Racial Minorities and the Quest to Narrow the Digital Divide: Redefining the Concept of "Universal Service,"* 26 Hastings Comm. & Ent. L.J. 1, 45 (2003) (*citing* Charles R. McClure and John

Carlo Bertot, *Public Library Internet Service: Impacts on the Digital Divide*, Information Use Management and Policy 16 (2000)).

[644] *GAO Report* at Highlights.

[645] *Id.*

[646] *See* Laura Devaney, *e-Rate wants to be user friendly*, Sept. 24, 2009, eSchool News, *available at* http://www.eschoolnews.com/news/top-news/index.cfm?i=60880 ("*E-rate User Friendly*").

[647] *GAO Report* at Highlights.

[648] *E-rate User Friendly.*

[649] *Id.*

[650] *See* U.S. Department of Education, Enhancing Education Through Technology State Program, http://www.ed.gov/programs/edtech/index.html.

[651] *See Focus on Technology Integration in America's Schools*, at p.4, SETDA (2009) *available at* http://www.setda.org/c/document_library/get_file?folderId=6&name=DLFE-329.pdf ("*America's Schools*").

[652] *America's Schools* at p. 4.

[653] *Id* at p.17.

[654] *See Stimulus Broadband Funds Aim to Expand Public Access, Service and Mapping*, July 9, 2009, Thompson, *available at* http://www.thompson.com/public/newsbrief.jsp?cat=EDUCATION&id=2226 ("*Stimulus Broadband Funds*").

[655] *21st Century Networks* at p. 6.

[656] *See Ready, set, go*, Oct. 3, 2009, The Economist.

[657] *Id.*

[658] *See* Alexandra R. Moses, *Stimulus Package to Quickly Impact Education Technology*, Feb. 20, 2009, Edutopia, *available at* http://www.edutopia.org/economic-stimulus-education-school-technology ("*Stimulus to Impact Education Technology*").

[659] *Id.*

[660] *21st-Century Networks* at p. 6.

[661] *Id.*

[662] *Id.*

[663] *Id.*

[664] *Id.*

[665] *Id.*

[666] *Id.*

[667] *Stimulus to Impact Education Technology*

[668] *See, e.g.*, Clayton M. Christensen and Michael B. Horn, *Commentary: Don't Prop up Failing Schools*, June 2, 2009, CNN, *available at* http://www.cnn.com/2009/US/06/02/christensen.schools/index.html.

[669] *Stimulus to Impact Education Technology* (quoting an estimate made by Hilary Goldmann, director of government affairs with the International Society for Technology in Education).

[670] H.R. 558 – The Achievement Through Technology and Innovation (ATTAIN) Act of 2009 – was introduced in January 2009. This bill would reauthorize Section IID of the NCLB. Full text of the bill is *available at* http://www.govtrack.us/congress/billtext.xpd?bill=h111-558.

[671] *See* State Education Technology Directors Association, 2008 Gateway to Graduation Toolkit: ATTAIN Act, http://www.setda.org/web/toolkit2008/student-engagement/attain.

[672] *See* Y. Zhao & K.A. Frank, *Factors affecting technology use in schools: An ecological perspective,* 40 American Educational Research Journal 807-840 (2003).

[673] *See* R.M. Wallace, *A framework for understanding teaching with the Internet,* 41 American Educational Research Journal 447-488 (2004).

[674] *See CDW-G 21st Century Campus Study,* at p. 21, White Paper, CDW-G (January 2009) ("*21st Century Campus*").

[675] *Id.* at p. 4.

[676] *Id.* at p. 16.

[677] *See* Yao-Ting Sung & Alan Lesgold, *Software Infrastructure for Teachers: A Missing Link in Integrating Technology with Instruction,* Teachers College Record (2007), *available at* http://www.tcrecord.org/Content.asp?ContentID=14536 ("*SIT 2007*").

[678] *Public Schools* at p. 9.

[679] *Id.*

[680] *Id.*

[681] *NEA 2008* at p. 3.

[682] *Id* at p. 17.

[683] *See* Christine Van Dusen, *eSN Special Report: 21st Century Teacher Education,* June 1, 2009, eSchool News, *available at* http://www.eschoolnews.com/news/special-reports/special-reports-articles/index.cfm?i=58995&page=1.

[684] *See* J.H. Sandholtz & B. Reilly, *Teachers, not technicians: Rethinking technical expectations for teachers,* 106 Teachers College Record 487-512 (2004).

[685] *SIT 2007* (quoting M. Guzdial et al., *Beyond adoption to invention: Teacher created collaborative activities in higher education,* 10 J. of the Learning Sciences 265-279 (2001)).

[686] *SIT 2007.*

[687] *NEA 2008* at p. 16.

[688] *Id.*

[689] *Id.*

[690] *SIT 2007.*

[691] *NEA 2008* at p. 14.

[692] *Id.* at p. 15.

[693] *See* MOUSE, Why Mouse Squad? http://www.mouse.org/programs/mouse-squad/why-mouse-squad.

[694] *Id.*

[695] *See* MOUSE, MouseTech Source, http://www.mouse.org/programs/mouse-techsource (citing a 2005-2008 study conducted by Fordham University's National Center for Schools and Communities, a summary of which is *available at* http://www.mouse.org/sites/default/files/Fordham%20Summary%20for%20Website.pdf.

[696] *Id.*

[697] *NEA 2008* at p. 16.

[698] *See* Karen Kaminski, Pete Seel, and Kevin Cullen, *Technology Literate Students? Results from a Survey*, at p. 35, Educause Quarterly (2003), *available at* http://net.educause.edu/ir/library/pdf/eqm0336.pdf ("*Technology Literate Students*").

[699] *See Getting America's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge, A Report to the Nation on Technology and Education*, at p. 1, U.S. Department of Education, (1996), *available at* http://www.ed.gov/Technology/Plan/NatTechPlan/.

[700] *Id.*

[701] *Technology Literate Students* at p. 34.

[702] *NEA 2008* at p. 32.

[703] *Id.*

[704] *Id.*

[705] *Connected to the Future* at p. 2.

[706] *Id.* at p. 8.

[707] *Home Broadband Adoption 2009* at p. 13.

[708] *Technology Literate Students* at p. 34.

[709] *See* Carole Bausell and Elizabeth Klemick, *Tracking U.S. Trends*, March 29, 2007, Education Week.

[710] *See* Scott J. Cech, *Tests of Tech Literacy Still Not Widespread Despite NCLB Goals*, Jan. 29, 2008, Education Week.

[711] *See* Ted Kolderie and Tim McDonald, *How Information Technology Can Enable 21st Century Schools*, at p. 6, The Information Technology and Innovation Foundation (July 2009), *available at* www.itif.org/files/Education_ITIF.pdf..

[712] *Id.* at p. 7.

[713] *SIT 2007.*

[714] *21st Century Campus.*

[715] *SIT 2007.*

[716] *See* Catherine Gewertz, *Outside Interests*, March 29, 2007, Education Week.

[717] *21st Century Campus* at p. 6.

[718] *See* Elaine Allen and Jeff Seaman, *Online Nation: Five Years of Growth in Online Learning*, at p. 3, The Sloan Consortium (Oct. 2007), *available at* www.sloan-c.org/publications/survey/pdf/online_nation.pdf.

[719] *Id* at p. 18-19.

[720] *Id.*

[721] *Id* at p. 3.

[722] *Public Schools* at p. 4.

[723] *Breaking Through the Barriers* at p. 6.

[724] *Id.*

[725] *21st Century Networks* at p. 3.

[726] *Breaking Through the Barriers* at p. 4.

[727] *21st Century Networks* at p. 2.

[728] *Breaking Through the Barriers* at p. 23.

[729] *Id.* at p. 6.

[730] *Id.*

[731] *Id.*

[732] *21st Century Networks* at p. 3.

[733] *Id.*

[734] *See* Katie Ash, *Schools' Broadband Needs Grow as Ed-Tech Evolves*, Sept. 30, 2008, Education Week's Digital Directions, *available at* http://www.edweek.org/dd/articles/2008/09/30/01broadband.h02.html.

[735] *See, e.g.*, ROBERT A. SCHAPIRO, POLYPHONIC FEDERALISM: TOWARD THE PROTECTION OF FUNDAMENTAL RIGHTS 22 (Chicago 2009) (discussing the historical and legal bases for the largely local control of schools).

[736] *Id.* at p. 23 (observing that the "NCLB Act institutes massive federal regulation of the administration of elementary and secondary education in the United States. In return for receiving federal education funds, states must accept provisions that regulate the qualifications of teachers, establish student performance goals, and impose detailed reporting requirements. NCLB requires states to establish proficiency goals for the performance of students. Yearly testing monitors the progress in achieving these benchmarks.").

[737] *See* U.S. Department of Education, National Center for Education Statistics: NAEP Overview, http://nces.ed.gov/nationsreportcard/about/.

[738] *America's Schools* at p.3.

[739] LIBERATING LEARNING at p. 7.

[740] *See* Vivek Kundra, *Streaming at 1:00 in the Cloud*, Sept. 15, 2009, The White House Blog, *available at* http://www.whitehouse.gov/blog/Streaming-at-100-In-the-Cloud.

[741] *See, e.g.*, Press Release, *FCC Continues E-Government Push with Crowdsourcing Launch: Web 2.0 Tools Increasing Public Participation at FCC*, Sept. 11, 2009, FCC, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293392A1.pdf (announcing the deployment of a variety of tools – e.g., IdeaScale, YouTube, Facebook, etc. – to assist in the development of the FCC's national broadband plan).

[742] The federal government provides this definition for RSS: "RSS stands for Really Simple Syndication. It's an easy way for you to keep up with news and information that's important to you, and helps you avoid the conventional methods of browsing or searching for information on websites. Now the content you want can be delivered directly to you without cluttering your inbox with e-mail messages. This content is called a 'feed.'" See USA.gov, What is RSS?, http://www.usa.gov/Topics/Reference_Shelf/Libraries/RSS_Library/What_Is_RSS.shtml. The government also maintains and makes available to the public catalogue of RSS feeds for federal government agencies and entities. *See* USA.gov, U.S. Government RSS Library, http://www.usa.gov/Topics/Reference_Shelf/Libraries/RSS_Library.shtml.

[743] A growing number of government agencies and policymakers are using Twitter. USA.gov, for example, has its own twitter feed. *See* http://twitter.com/usaGOV.

[744] A number of commentators have questioned the value of blogs in spurring constructive dialogue. For a brief overview of recent literature, *see* Julianne Mahler & Priscilla M. Regan, *Blogs as Public Forums for Agency Rulemaking*, at p. 2, Issues in Governance Studies No. 26, Brookings Institution (Aug. 2009), *available at* http://www.brookings.edu/~/media/Files/rc/papers/2009/08_blogs_mahler_regan/08_blogs_mahler_regan.pdf.

[745] *See FCC Explains Relationship of Blogband to the Record in the National Broadband Plan Proceeding*, Sept. 22, 2009, Public Notice, GN Docket No. 09-51, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-09-2089A1.pdf ("The FCC wishes the public to be aware that views relevant to the docket may be expressed in the course of discussion on Blogband. Thus, for the purposes of this proceeding, Blogband is hereby deemed to be part of the public record in GN Docket No. 09-51. For this reason, interested persons are advised to review not only ECFS, but also Blogband to ensure that they are aware of all relevant views expressed to the Commission concerning the National Broadband Plan.") ("*Blogband Press Release*").

[746] *See* The Peer to Patent Project, About Community Patent, http://dotank.nyls.edu/communitypatent/about.html (With the consent of the inventor, the Peer-to-Patent: Community Patent Review pilot, developed by the New York Law School Institute for Information Law and Policy in cooperation with the USPTO, enables the public to submit prior art and commentary relevant to the claims of pending patent applications in Computer Architecture, Software, and Information Security.").

[747] *See IRS e-file for Individuals*, Internal Revenue Service, *available at* http://www.irs.gov/efile/article/0,,id=118508,00.html.

[748] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at slide 125 (citing the IRS Inspector General).

[749] *Id.* at slide 130 (citing a 2007 Pew survey and *Governance Studies* by The Brookings Institution).

[750] *See* The White House, Issues: Technology, http://www.whitehouse.gov/issues/technology/.

[751] *See* President Barack Obama, *Memorandum for the Heads of Executive Departments and Agencies*, Jan. 21, 2009, The White House, *available* at http://www.whitehouse.gov/the_press_office/Transparency_and_Open_Government/.

[752] *See* Jesse Lee, *Transparency and Government*, May 21, 2009, White House Blog, *available at* http://www.whitehouse.gov/blog/09/05/21/Opening/.

[753] *Id.*

[754] *See* IdeaScale, About, http://www.ideascale.com/tour/.

[755] The White House's initiative is housed at http://opengov.ideascale.com/.

[756] *See* White House, Open Government, Innovations Gallery, http://www.whitehouse.gov/open/innovations/.

[757] *See* Data.gov, About, http://www.data.gov/about.

[758] Pub. L. No. 107-347, 116 Stat. 2899.

[759] *See* Regulations.gov, About, http://www.regulations.gov/search/Regs/home.html#aboutProgram.

[760] *See* Beth Noveck, *The Electronic Revolution in Rulemaking*, 53 Emory L. J. 433, 439 (2004) ("Technology itself is not per se the savior of citizen participation. What is revolutionary are not the tools alone, but the

way they embed into the tools methods of interpersonal communication and information exchange. I call this methods-plus-technology "speech tools." They enable group collaboration, not because they are interactive, but because they structure and limit communication. They help to unblock the bottleneck of irrelevance and superfluity. Speech tools make communication useful by managing it and can therefore structure cooperation by groups. Agency officials can use these tools to bring about qualitative (as distinct from merely quantitative) and manageable communication in rulemaking," [*citations omitted*].) ("*Electronic Revolution*").

[761] *See* Ray Mosley, *Federal Register 2.0: Opening a Window onto the Inner Workings of Government*, Oct. 5, 2009, The White House Blog, *available at* http://www.whitehouse.gov/blog/Federal-Register-20-Opening-a-Window-onto-the-Inner-Workings-of-Government/.

[762] *Id.*

[763] *Id.*

[764] *See* FedThread.org, Home, http://www.fedthread.org/.

[765] *See Local Government RSS Feeds, Wikis Catch On*, Sept. 21, 2009, Government Technology, *available at* http://www.govtech.com/gt/articles/726409 (citing a study by the Public Technology Institute).

[766] *See* Matt Williams, *Transportation Departments Burn Rubber on Twitter*, Sept. 24, 2009, Government Technology, *available at* http://www.govtech.com/gt/articles/726973 (noting that "Some state and local transportation departments are launching Twitter accounts not just for the main agency, but also for individual roads and construction projects.").

[767] *See, e.g.*, Andrea DiMaio, *Federal Shift to Cloud Raises Tough Issues for CIOs*, Oct. 7, 2009, Gov. Tech., *available at* http://www.govtech.com/gt/articles/729707 (discussing how the federal government's recent adoption of cloud computing services may influence the decisions of local and state-level CIOs).

[768] *See* Aaron Smith et al., *The Internet and Civic Engagement*, at p. 5, Pew Internet & American Life Project (Sept. 2009), *available at* http://www.pewinternet.org/~/media//Files/Reports/2009/The%20Internet%20and%20Civic%20Engagement.pdf ("*Internet & Civic Engagement*").

[769] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at slide 130 (citing: 2007 Pew survey; *Governance Studies,* The Brookings Institution).

[770] *See* Aaron Smith, *The Internet's Role in Campaign 2008*, April 15, 2009, Pew Internet & American Life Project, *available at* http://pewresearch.org/pubs/1192/internet-politics-campaign-2008.

[771] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at slide 130 (citing: 2007 Pew survey; *Governance Studies,* The Brookings Institution).

[772] The political blogging phenomenon has been analyzed by a number of commentators over the years. For an overview of recent commentary, *see generally Special Issue: Blogs, Politics and Power*, 134 Public Choice 1-138 (2008), *available at* http://www.springerlink.com/content/l7p064672q84/?p=224ef5f9aabc48d5af057ec2c0f8670f&pi=14. In particular, one article focuses on the value of blogs vis-à-vis traditional political discourse (e.g., via the "mainstream" media). Among many other findings, the authors conclude that "Blogs...affect political debate by affecting the content of media reportage and commentary about politics. Just as the media can provide a collective interpretive frame for politicians, blogs can create a menu of interpretive frames for the media to appropriate." *See* Henry Farrell & Daniel W. Drezner, *The Power & Politics of Blogs*, 134 Public Choice 14, 22 (2008), *available at* http://www.springerlink.com/content/rm2051728x01278r/fulltext.pdf.

[773] President Obama raised over $500 million via mostly small, online contributions. In particular: "3 million donors made a total of 6.5 million donations online adding up to more than $500 million. Of those

6.5 million donations, 6 million were in increments of $100 or less. The average online donation was $80, and the average Obama donor gave more than once." *See* Jose Antonio Vargas, *Obama Raised Half a Million Online*, Nov. 20, 2008, Washington Post – The Clickocracy, *available at* http://voices.washingtonpost.com/44/2008/11/20/obama_raised_half_a_billion_on.html.

[774] *Internet & Civic Engagement* at p. 7.

[775] *See* Huffington Post, http://www.huffingtonpost.com/; Politico, www.politico.com.

[776] *See* http://technorati.com/search/politics?language=n&media=blogs (search conducted on Sept. 25, 2009).

[777] *See* CitizenTube, http://www.citizentube.com/.

[778] *See* The Huffington Post, FundRace 2008, http://fundrace.huffingtonpost.com/ ("FundRace makes it easy to search by name or address to see which presidential candidates your friends, family, co-workers, and neighbors are contributing to.").

[779] *See* FactCheck.org, About Us, http://factcheck.org/about/ ("We ...aim[] to reduce the level of deception and confusion in U.S. politics.").

[780] *See* EarmarkWatch.org, FAQ, http://www.earmarkwatch.org/faq/.

[781] *See Rise of Facebook as a Political Organizing Tool*, in The 14th Biannual Youth Survey on Politics and Public Service by Harvard University's Institute of Politics: Exeuctive Summary (April. 2008), *available at* http://www.iop.harvard.edu/Research-Publications/Polling/Spring-2008-Survey/Executive-Summary.

[782] *See, e.g.*, Zack Exley, *The New Organizers: What's Really Behind Obama's Ground Game*, Oct. 8, 2008, The Huffington Post, *available at* http://www.huffingtonpost.com/zack-exley/the-new-organizers-part-1_b_132782.html.

[783] For example, a number of recent protests (or "Tea Parties") against tax increases were coordinated via the Web. *See* Glenn Harlan Reynolds, *Tax Day Becomes Protest Day*, April 15, 2009, Wall St. J., *available at* http://online.wsj.com/article/SB123975867505519363.html ("So who's behind the Tax Day tea parties? Ordinary folks who are using the power of the Internet to organize. For a number of years, techno-geeks have been organizing "flash crowds" -- groups of people, coordinated by text or cellphone, who converge on a particular location and then do something silly, like the pillow fights that popped up in 50 cities earlier this month. This is part of a general phenomenon dubbed "Smart Mobs" by Howard Rheingold, author of a book by the same title, in which modern communications and social-networking technologies allow quick coordination among large numbers of people who don't know each other.").

[784] *See File Note Found: 10 Years after E-FOIA, Most Federal Agencies are Delinquent*, at p. 1, The National Security Archive, George Washington University (March 2007), *available at* http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB216/e-foia_audit_report.pdf.

[785] *See, e.g.*, Jerry Brito, *Hack, Mash, & Peer: Crowdsourcing Government Transparency*, 9 Colum. Sci. & Tech. L. R. 119, 123-127 (2008) (discussing how online government data is difficult to use) ("*Crowdsourcing Government*"); Darrell M. West, *State & Federal Electronic Government in the United States, 2008*, Government Studies at Brookings, Brookings Institution (2008), *available at* http://www.brookings.edu/~/media/Files/rc/reports/2008/0826_egovernment_west/0826_egovernment_west.pdf (assessing state and federal websites based on a variety of metrics, including readability and disability access) ("*State & Federal e-Government 2008*").

[786] *See* David Robinson et al., *Government Data and the Invisible Hand*, 11 Yale J. L. & Tech. 160, 161 (2009) ("*Government Data*").

[787] *Electronic Revolution* (discussing the promise of e-rulemaking generally and its potential to dramatically alter the traditional agency decision-making process); *cf.* Stuart Minor Benjamin, *Evaluating*

E-Rulemaking: Public Participation and Political Institutions, 55 Duke L.J. 893, 898 (2006) (arguing that "the uncertainties about the impact and desirability of e-rulemaking are sufficiently great that experimenting with e-rulemaking should proceed on a trial basis, in an attempt to gain greater empirical grounding before the government plunges into any particular set of changes to the rulemaking process.") ("*Evaluating E-Rulemaking*").

[788] *See* BETH SIMONE NOVECK, WIKI GOVERNMENT 34 (Brookings 2009) ("WIKI GOVERNMENT").

[789] *See* Press Release, *Live, from New York, It's NYC Government!* Sept. 24, 2009, The Office of New York City Councilmember Gale Brewer.

[790] *Crowdsourcing Government* at p. 124.

[791] *See* The White House, Issues: Technology, http://www.whitehouse.gov/issues/technology/.

[792] *See* Darrell West & Jenny Lu, *Comparing Technology Innovation in the Private and Public Sectors*, at p. 18, Governance Studies at Brookings, Brookings Institution (June 2009), *available at* http://www.brookings.edu/papers/2009/06_technology_west.aspx ("*Comparing Technology Innovation*").

[793] *Id.* at p. 2.

[794] *See* Michael Calabrese, *The End of Spectrum 'Scarcity,'* at p. 3-4, Working Paper # 25, The New America Foundation (June 2009), *available at* http://www.newamerica.net/files/Calabrese_WorkingPaper25_EndSpectrumScarcity.pdf (noting that the federal government owns nearly a quarter of all spectrum in the 300-3,000 MHz range).

[795] WIKI GOVERNMENT at p. 133 ("One important consequence of the shortcomings of public consultation is a reduction in the quality of data used to make government decisions. Despite transparency and participation legislation, the current paradigm for regulatory decision-making remains highly vulnerable to ideological bias and manipulation."); *see also* William Fenwick et al., *The Necessity of e-Government*, 25 Santa Clara Computer & High Tech L. J. 427, 447 (2009) (noting that "the goal [of e-government] is to minimize or eliminate delays and intermediaries between citizens or businesses and the government that increase the costs and slow down the delivery of government services.") ("*Necessity of e-Government*").

[796] *See* Mark LeVigne, *Electronic Government: A Vision of the Future That is Already Here*, 52 Syracuse L. Rev. 1243, 1248 (2002) (noting that "one of the visions of e-government is to break down these silos, integrating business processes, service programs, and streamlining information management.").

[797] *Comparing Technology Innovation* at p. 2.

[798] *FCC Broadband Taskforce Presentation - Sept. 29, 2009* at slide 128.

[799] *State & Federal e-Government 2008.*

[800] *See* FCC Chairman Julius Genachowski, *Remarks to the FCC Staff*, at p. 4, June 30, 2009, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-291834A1.pdf.

[801] *Crowdsourcing Government* at p. 123.

[802] Available at http://www.broadband.gov/.

[803] *Blogband Press Release*. The blog is *available at* http://blog.broadband.gov/.

[804] *See* OpenInternet.gov, About, http://www.openinternet.gov/about-open-internet.html.

[805] *See* Federal Web Managers Council, Who we Are, http://www.usa.gov/webcontent/about/council.shtml.

[806] *See Recommended Policies and Guidelines for Federal Public Websites Final Report of the Interagency Committee on Government Information Submitted to The Office of Management and Budget* (rel. June 9, 2004), *available at* http://www.usa.gov/webcontent/about/documents/icgi_report.html; *see also* WebContent.gov, Requirements and Best Practices, http://www.usa.gov/webcontent/reqs_bestpractices.shtml.

[807] *Government Data* at p. 162-163.

[808] *See, e.g.,* Massimo Calebresi, *Wikipedia for Spies: The CIA Discovers Web 2.0,* April 8, 2009, *available at* http://www.time.com/time/nation/article/0,8599,1890084,00.html.

[809] *Id.*

[810] *See Older Workers: Enhanced Communication among Federal Agencies Could Improve Strategies for Hiring and Retaining Experienced Workers,* at p. 37, GAO (Feb. 2009), *available at* http://www.gao.gov/new.items/d09206.pdf.

[811] *See Federal Research: Opportunities Exist to Improve the Management and Oversight of Federally Funded Research and Development Centers,* at p. 34, GAO (Oct. 2008), *available at* http://www.gao.gov/new.items/d0915.pdf.

[812] *See* USA Spending.gov, IT Dashboard, Analysis: Current Year, http://it.usaspending.gov/?q=content/current-year-fy2009-enacted.

[813] *See* Press Release, *Obama's Budget Obama's Budget Reveals Technology Spending Trends For Next Five Years,* July 9, 2009, INPUT, *available at* http://www.input.com/corp/press/detail.cfm?news=1427.

[814] Under the President's 2009 budget, funding to support interagency e-government initiatives will increase from $8 million in 2008 to $33 million by 2010. *See* The Fiscal Year 2010 Budget Appendix, p. 1123-1124, *available at* http://www.whitehouse.gov/omb/budget/fy2010/assets/appendix.pdf.

[815] President Obama has asked agency heads to cut $100 million in expenses over the next year. *See, e.g.,* Gregg Carlstrom, *Agencies Details $100 million in 2010 Budget Cuts,* July 28, 2009, Federal Times, *available at* http://www.federaltimes.com/index.php?S=4209558.

[816] *Comparing Technology Innovation* at p. 2.

[817] *See* Todd Spangler, *YouTube's Bandwidth Bill Estimated at $300 million for 2009,* Sept. 9, 2009, Multichannel News, *available at* http://www.multichannel.com/article/339947-YouTube_s_Bandwidth_Bill_Estimated_At_300M_For_2009.php. Some, however, have posited that this amount could be closer to zero. *See* Ryan Singel, *YouTube's Bandwidth Bill is Zero. Welcome to the New Net,* Oct. 16, 2009, Wired.com, *available at* http://www.wired.com/epicenter/2009/10/youtube-bandwidth/.

[818] *See* Robert McMillan, *Government Eyes Big Savings with First Cloud Service,* Sept. 16, 2009, InfoWorld, *available at* http://www.infoworld.com/d/cloud-computing/government-eyes-big-savings-first-cloud-service-916.

[819] *See* Bev Godwin et al., *Social Media and the Federal Government: Perceived and Real Barriers and Potential Solutions,* WebContent.gov, Using Technology (Dec. 2008), *available at* http://www.usa.gov/webcontent/documents/SocialMediaFed%20Govt_BarriersPotentialSolutions.pdf (noting that a variety of laws – from procurement policies to the Administrative Procedure Act – are outdated vis-à-vis social media) ("*Social Media & the Federal Government*").

[820] P.L. 89-487, 80 Stat. 250 (1966), codified at 5 U.S.C. 552 (1996).

[821] *See* Michael Herz, *Law Lags Behind: FOIA and Affirmative Disclosure of Information,* 7 Cardozo Pub. L. Pol'y & Ethics J. 577, 580 (2009).

[822] WIKI GOVERNMENT at p. 121.

[823] *See* Robert Ratish, *Democracy's Backlog: The Electronic Freedom of Information Act Ten Years Later*, 34 Rutgers Computer & Tech. L.J. 211, 212 (2007).

[824] *Id.* at 222.

[825] P.L. 79-404, 60 Stat. 238, codified at 5 U.S.C. 1001–1011.

[826] WIKI GOVERNMENT at p. 131.

[827] P.L. 107-347, 116 Stat. 2899, codified at 44 U.S.C. 101.

[828] *Id.* at Sect. 206.

[829] WIKI GOVERNMENT at p. 139.

[830] *Crowdsourcing Government* at p. 124. However, the FCC recently announced the launch of an upgraded version of its Electronic Comment Filing System, which will includes, among other new features, "the ability for users to file multiple documents to multiple rulemakings in a single submission; advanced search and query of rulemakings; ability to extract comments; RSS feeds; and the ability to export data results to Excel or PDF formats." *See* Press Release, FCC Announces the Public Launch of the Electronic Comment Filing System (ECFS) Version 2.0, Oct. 14, 2009, FCC, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293952A1.pdf.

[831] P.L. 104-13, 109 Stat. 163 (1995), codified at 44 U.S.C. 3501-20.

[832] *Id.*

[833] WIKI GOVERNMENT at p. 122.

[834] *Social Media & the Federal Government* at p. 3.

[835] *Id.*

[836] *IRS E-file Record – 2009*

[837] *Internet & Civic Engagement* at p. 4.

[838] *Id.* at p. 4-5.

[839] *Id.* at p. 5.

[840] *See* Anand Giridharadas, *Athens on the Net*, Sept. 12, 2009, N.Y. Times, *available at* http://www.nytimes.com/2009/09/13/weekinreview/13giridharadas.html?scp=1&sq=athens%202.0&st=cse.

[841] *Id.*

[842] *Id.*

[843] *See* Saul Hansell, *Ideas Online, Yes, but Some Not So Presidential*, June 22, 2009, N.Y. Times, *available at* http://www.nytimes.com/2009/06/23/technology/internet/23records.html,.

[844] WIKI GOVERNMENT at p. 174-177.

[845] *Id.* at p. 109.

[846] *See* Apps for Democracy, About, http://www.appsfordemocracy.org/about/.

[847] *Id.*

[848] *See* Apps for Democracy: Community Addition, http://www.appsfordemocracy.org/dc-awards-10000-final-prize-to-iphone-facebook-app-combo/.

[849] *Evaluating E-Rulemaking* at p. 896-897.

[850] *Cf. Evaluating E-Rulemaking* at p. 904-908 (observing that the costs associated with high levels of public participation in e-rulemaking could hinder the rulemaking process and increase the risk that good ideas are overlooked during the review process).

[851] *Id.* at p. 921.

[852] *See* Electronic Privacy Information Center, Cookies, http://epic.org/privacy/internet/cookies/.

[853] *See* Michael Fitzpatrick and Vivek Kundra, *Federal Websites: Cookie Policy*, July 24, 2009, White House OSTP Blog, *available at* http://blog.ostp.gov/2009/07/24/cookiepolicy/ (citing OMB Director Memo M-00-13, later updated by M-03-22, *available at* http://blog.ostp.gov/2009/07/24/cookiepolicy/#TB_inline?height=220&width=370&inlineId=tb_external).

[854] *See* Michael Fitzpatrick and Vivek Kundra, *On Cookies*, Aug. 11, 2009, White House OSTP Blog, *available at* http://blog.ostp.gov/2009/08/11/the-way-the-cookie-crumbles/.

[855] *See* Spencer S. Hsu and Celia Kang, *Obama Web-Tracking Proposal Raises Privacy Concerns*, Aug. 11, 2009, Wash. Post, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2009/08/10/AR2009081002743.html (quoting American Civil Liberties Union spokesman Michael Macleod-Ball).

[856] *Id.*

[857] *Id.* (noting that The current ban on cookies, according to senior OMB officials, applies only to federal agencies and not third parties. That means that a visitor to http://www.whitehouse.gov, for example, isn't tracked by the government, but information about a user who clicks on a YouTube video on the site could be tracked by Google, according to a source at the company with knowledge of the partnership with the Obama administration.").

[858] *See* Kenneth A. Bamberger and Deirdre K. Mulligan, *Privacy Decisionmaking in Administrative Agencies*, 75 U. Chi. L. Rev. 75, 75-76 (2008).

[859] *See* Ellen Nakashima, Brian Krebs & Blaine Harden, *U.S., South Korea Targeted in Swarm Of Internet Attacks*, July 9, 2009, Wash. Post, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2009/07/08/AR2009070800066.html.

[860] *See* Ben Bain, *Information-Sharing Platform Hacked*, May 13, 2009, Federal Computer Week, *available at* http://www.fcw.com/Articles/2009/05/13/Web-DHS-HSIN-intrusion-hack.aspx.

[861] *See* Siobhan Gorman, *Electricity Grid in U.S. Penetrated by Spies*, April 8, 2009, Wall St. J.

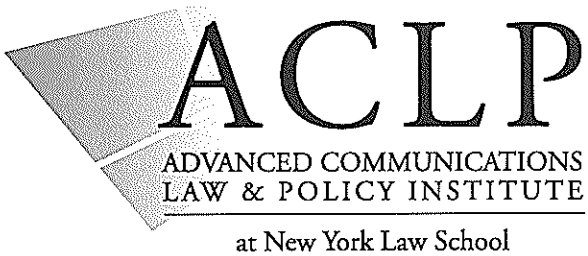
[862] *Online Shopping* at p. i.

[863] *White House Report.*

[864] *See* Jaikumar Vijayan, *Google Pursues Government Biz: Security Concerns Loom*, Sept. 17, 2009, Business Week, *available at* http://www.businessweek.com/technology/content/sep2009/tc20090917_122270.htm ("*Google Pursues*").

[865] 44 U.S.C. § 3541, et seq.

[866] *Google Pursues* (citing a study by Unisys Corp. that found "Of the 312[survey] respondents, about 51% cited security and data privacy concerns as the biggest impediment to adopting cloud services.").



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Network Neutrality Protects the Creators of Digital Content

Testimony in support of Res. No. 712-A

I am the Executive Director of the Writers Guild of America, East, AFL-CIO. Members of Council will remember our 100 day strike which ended in February 2008. In an extraordinary demonstration of solidarity and determination, our members put themselves on the line to make certain that writers can participate in the digital future.

No one knows for certain how the internet will affect the way people consume and create entertainment and news programs. No one knows which business models will become predominant, or how much money will be spent, by whom.

We do know that the internet and other digital media offer an unprecedented opportunity for creators to reach consumers and for people to watch and read what they want, when they want. This is very different from traditional media in which major studios, distributors, and television networks control the flow of movies and programs and make money from ticket sales, DVD sales, and advertising. A relatively small number of major institutions might come to control access to content on the internet, too – big studios, internet service providers, or content aggregators. Our concern is that those mega-

companies might achieve this domination, not because they provide content and services that people prefer, but because they control the flow of data on the net.

We believe people would benefit from an internet that offers a greater variety of options than what is currently available on television, radio, and the movie theater. Digital technology presents an enormous range of possibilities to content creators and consumers alike, and it would be a tragedy to squeeze all of that into a narrow commercial band.

In September 2009 we announced the Writers Guild 2.0 initiative, which includes events and training about various aspects of digital media, including new narrative structures, distribution methods, business models, and skills. We have signed contracts with many entities that make programs for the web. There is an entire community of writers and other creators with enormous imagination and enthusiasm, but without the financial backing of major corporate enterprises. We are very worried that their access to audiences will evaporate if net distribution is skewed in favor of large-scale commercial interests. That is why the Federal Communications Commission should take clear and decisive action to ensure net neutrality.

It is tempting to think of digital media as a force of nature, a phenomenon that exists and develops independent of our ability to shape it. Certainly the forces at work are enormous – significant changes in the global economy, accelerated technological development, major demographic shifts. And digital technology has the potential to transform the way we communicate and think, perhaps even more fundamentally than the printing press did. But decisions about how the internet works are made by human beings.

It is far from clear what position and status writers will have in the digital world, but we must recognize that this will be not determined by abstract outside forces. We at the WGAE believe that the people who craft the stories people love, who make the pain and joy of human experience come alive,

who dig beneath the surface to find and express the truth, should have a direct and meaningful role as decisions are made about the digital future. If their access to the audience, to the public, is controlled by powerful corporate entities, their creative voices will be lost. We do not believe that would be in the public interest. Although our members enjoy the work they do for the major studios and networks, we do not have any illusions that the underlying mission of these for-profit entities is to serve the public interest. Mega-studios make blockbusters about intergalactic robots, not small satires about life in Williamsburg, or about what it's like to be a teenager in the Bronx. Huge networks do not generate enough revenue to cover all of the news, or to present the myriad voices of the nation's diverse communities. Open access to the internet gives people many more opportunities to learn, to laugh, and to understand.

Some people assert that net neutrality aids and abets piracy. We recognize that digital technology makes piracy easier, and piracy takes money out of our members' pockets. However, we do not believe that the way to fight piracy is to give large corporate entities control over the flow of internet data. We do not fight car theft by limiting the number of car dealerships. There is nothing inconsistent about supporting net neutrality and opposing theft of digital content.

We support Resolution Number 712-A.

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In response to COUNCIL TECH COMMITTEE HEARING: OPEN THE INTERNET

Eyebeam is the leading not-for-profit art and technology center in the United States. Founded in 1996 and incorporated in 1997, Eyebeam was conceived as a non-profit art and technology center dedicated to exposing broad and diverse audiences to new technologies and media arts, while simultaneously establishing and demonstrating new media as a significant genre of cultural production. Eyebeam has supported more than 130 fellowships and residencies for artists and creative technologists; run an active education program for youth, artists' professional development and community outreach; and has mounted an extensive series of public programs. Today, Eyebeam offers residencies and fellowships for artists and technologists working in a wide range of media. New projects and work are openly disseminated through online, primarily open-source, publication. Eyebeam challenges convention, celebrates the hack, educates the next generation, encourages collaboration, freely offers its contributions to the community, and invites the public to share in a spirit of openness: open source, open content and open distribution.

Our current program includes *Student Residencies*, a school-year long digital arts and technology program for New York City high school students who are interested

in experimenting, learning, and creating with new technology tools. Spencer Brown, a current student resident, represents a large proportion of current internet users; those that have grown up with this open and unrestricted resource and tool.

One of the most important tools at Eyebeam is access to fast unrestricted internet. Its use is both a tool and a medium for the creation and innovation of not just art works but creative tools. There is already discrimination based on access to technology and without a law to preserve net neutrality the technological divide will become greater.

As we advance further into the technological age, the issue of control of the internet and its assets has grown increasingly paramount. As a current student, Spencer Brown, having never been alive without the Internet, brings a necessary point of view to the discussion because like him a growing number of people have not experienced life or education without it. From the prospective of a teenager and student the Internet is priceless.

This is due to multiple reasons. The first of which is its connectivity. Although it is necessary to pay an access fee, once connected to the Internet it is possible to reach the millions of other users without extra communication fees. This means as a student, the ablilty to share with a community that otherwise would be in-accessible. It allows for an active membership within the internet society where all opinions have weight. The internet has given young people a voice and has become a equalizer in society, allowing a even playing field in terms of social

networks and access to information.

As a technologist and artist, the ability to create content and not just be a content consumer allows for an unparalleled creative expression which is one of the main differences between cable tv and the internet but if the law to preserve net neutrality is not passed the internet will become another cable tv content provider.

Earthify, (http://earthify.org/) a recent project conceived and created at Eyebeam is a mash up of craigs list apartment listings and google earth. It uses google earth's open application programming interface to place apartment listings on a map. Without open access to both the internet and other applications that exist on the internet this would not be possible.

The current companies controlling the delivery of content should not be able to discriminate, by either quality of service or price based on the content of the material. Common carriage should be preserved, for example the postal service does not open and scan the content of letters before delivery and has an price system that is the same for everyone who posts a letter.

To conclude an open and non-discriminatory network is the very heart of the internet. It's why we have the internet we have today, why the culture of "innovation without permission" allowed the internet to turn into the distributed network in which anyone with an idea can try it out without kowtowing to the telephone or cable company. If this is not preserved the internet as we know it goes away. It's that

simple. The control over what consumers and creative individuals see and do online would pass from the consumer to the telephone and cable companies.

Testimony of Jennifer Mercurio,
Vice President & General Counsel of the Entertainment Consumers Association,
Before
The New York City Council Committee on Technology in Government
Regarding
Resolution 712A-~~2007~~ - Seeking Stronger Net Neutrality Rules From the Federal Government

November 20, 2009

Good morning Chair Brewer and members of the Committee on Technology in Government. Thank you for hosting this hearing on Resolution 712A-2007 and the very important issue of Network Neutrality, and for inviting us to testify. I am pleased to speak on behalf of our members regarding Resolution 712A-2007, which seeks stronger Network Neutrality rules from the federal government, and the importance of Network Neutrality on video game consumers.

My name is Jennifer Mercurio and I'm the Vice President & General Counsel at the Entertainment Consumers Association (ECA), which is the non-profit membership organization representing consumers of interactive entertainment in the US and Canada. The association was founded to give gamers a collective voice with which to communicate their concerns, address their issues and focus their advocacy efforts. As such, the ECA is committed to a host of public policy efforts, empowering and enabling the membership to effect change. Additionally, the organization provides members substantial affinity benefits including discounts on games-related purchases and rentals, as well as community and educational initiatives. For additional information on the ECA, including affinity benefits, member discounts and joining the association, please visit: www.theECA.com.

ECA is strongly in support the proposals you've outlined in Resolution 712A-2007 and of the concept of Network Neutrality, the principle that protects one's choice of content and equal opportunity on the Internet. Like President Obama, who has pledged to make Network Neutrality the law of the land, we believe that Network Neutrality is a key right for consumers, insuring continued enjoyment and use of the Internet for a variety of

applications including recreation, creativity and economic expansion. This is especially true for video game players (gamers), because our hobby is increasingly tied to the Internet. Of the 117 million active gamers in the US, 56 percent play games online, accounting for over 65 million Americans.

With online components of game play becoming more the rule than the exception; the Internet is increasingly important in how video games are played. Gamers play online in a variety of ways:

- Popular massively multiplayer online (MMO) games such as Activision Blizzard's *World of Warcraft* hosts more than eight million users worldwide;
- Both Xbox Live® and PlayStation Network® connect tens of millions of console users in the United States and abroad in hundreds of games online;
- Video game streaming sites like Gaikai allow players to connect to an extremely high quality remote server to play so that they experience the game as if the expensive server is sitting in their home;
- Games such as *Farmville* are currently being played by millions of gamers on their social networks such as Facebook, Myspace and Hi5;
- Thousands of games are available via the iPhone and Zune stores and through other wireless providers; and
- Well-liked gaming websites like PoGo.com and PopCap Games also serve millions of users on their web browsers.

All of these game play methods require constant and high bandwidth. Gamers are acutely aware of inconsistent or choppy bandwidth rates, where a 150 millisecond ping rate, would yield a delay in the display (like a skipping record or CD), and can ruin game play. As I'm sure you know, a 150 millisecond ping is quicker than saying the word "ping". Imagine playing *Pac-Man* and suddenly you lose the game, not because you've run into a ghost, but because a ghost catches you while your screen is temporarily frozen. To the gamer, such an action would seemingly happen instantaneously, as though their Pac-Man jumped into a ghost for no reason. While this may sound trite, to 56 million Americans spending over $5 billion annually, this would be an unnecessary annoyance. Too many of these annoyances would encourage gamers to stop spending their money on games, money which helps keep our economy afloat.

Game hardware producers such as Sony (PlayStation) and Microsoft (Xbox) are also making a concerted effort to use the Internet more, transitioning their consoles from just video game playing boxes to multi-media entertainment systems. Xbox Live users can listen to music via the internet radio service "last.fm" and just this week, Xbox Live added the ability to access and use Facebook and Twitter on the Xbox 360. Sony is following suit and will make Facebook available to users soon, with their next firmware update. Netflix is also available on both the Xbox 360 and PS3. Even some games, such as MTV/EA's *Rock Band*, which is available for most systems, have sold over 60 million song downloads.

Digital distribution is also an increasing trend with games, allowing users to download the game directly to their platform of choice and bypass the need for physical media, such as DVD-ROMs, entirely. In an interview earlier this week, Thomas Bidaux, CEO of ICO Partners, a prominent consulting firm specializing in developing and servicing online games and virtual worlds, stated that physical distribution of games as packed goods products is quickly becoming primarily an exercise in marketing, with the primary distribution of games occurring through online play and distribution. Thousands of games, from *The Sims 3* to *Dragon Age: Origins*, can be purchased and downloaded directly to one's PC through services such as Steam, Direct2Drive, Impulse and Gamersgate.

As touched on above, one of the fastest-growing avenues of digital distribution is in the wireless arena. The iPhone App Store and other wireless providers are selling thousands of games to consumers on their mobile devices, but are also urging that principals of Network Neutrality should not apply to them. From a gamer's perspective, wireless providers must be treated the same as any other service provider to insure the same gaming experiences exist across platforms. Indeed, some new services like Gaikai allow the customer to play the same game on any platform, so a gamer would require consistent Internet speeds cross-platform in order to enjoy a seamless gaming experience. These aren't technologies of the future; these are the realities of the video game business today.

All of these applications, services and software depend upon Network Neutrality to insure that carriers cannot price discriminate against gamers, or eliminate or limit access to another provider's content. While the Internet has traditionally been a place of relative freedom, several recent actions by service providers concern the ECA. Under current law, or the lack thereof, Internet service providers can block websites, content, users, services or applications they don't like. And they have, most notably, when Comcast secretly interfered with users' ability to access popular video, photo and music-sharing applications; or AT&T and Apple deciding which applications can be downloaded to iPhones. Both of these activities could easily be aimed at games to limit our hobby online.

Earlier this year, Time Warner began testing a "consumption based billing" structure for its broadband internet service in certain markets in New York, North Carolina and Texas, with bandwidth being capped at 5-, 10-, 20-, and 40-gigabyte levels ranging from $30 to $55 per month plus $1 per gigabyte over. We were told that these caps were to be cumulative. With the average full length video game being anywhere from 2 gigs to 7 gigs, one would quickly go over this limit. ECA successfully fought the effort, and worked with one of the affected Congressmen, Rep. Eric Massa (D-29NY), as he drafted legislation (H.R. 2902) to specifically combat such tiered and capped pricing structures. Since then, we have been running a campaign for our members and the general public, where folks can contact their Members of Congress to support the bill.

We are seeing more troubling behavior in the marketplace. Internet service providers have stated their intention to deploy discriminatory "deep packet inspection" technology that would allow them to monitor and control the Internet. This dangerous technology would give network providers unprecedented power over Internet users, and it presents a serious threat to online privacy and to consumer rights – which could be eroded at an alarming rate.

For these and many other reasons, the ECA supports Network Neutrality and the sentiment behind Resolution 712A-2007. We have also asked that the FCC take action now to affirmatively safeguard the free flow of information on the Internet before it's too late.

Thank you for your time and consideration, and I'd be happy to answer any questions you may have.

Testimony of

Jean Cook
Interim Executive Director,
Future of Music Coalition

New York City Council Committee on Technology in Government Hearing on Net Neutrality

November 20, 2009

Future of Music Coalition
Education, Research and Advocacy for Musicians

Members of the Committee and fellow speakers, it's a privilege to appear here today to talk about net neutrality, which is an issue that has enormous bearing on those in the creative community.

My name is Jean Cook. I'm a musician, and also the Interim Executive Director of Future of Music Coalition, a national non-profit education, research and advocacy organization for musicians. FMC works to ensure that artists are able to develop audiences through platforms like radio and the internet. We also care deeply about developing appropriate compensation structures for artists as we continue this rocky transition to a largely digital environment for music.

When the original Napster appeared nearly a decade ago, the traditional music industry was confronted with a troublesome new reality: reproduction and distribution was no longer something exclusive to the big labels and their industry partners — it was now in the hands of the masses. Clearly, this had major implications for copyright and intellectual property, but as FMC said at the time, the only viable alternative to an illegal Napster is a legal one. Since then, we've advocated for a legitimate digital music marketplace that fairly compensates artists and allows for innovative ways for discovering music.

In the remainder of the decade we've seen remarkable examples of using the open internet to connect with audiences and advance their careers on their own terms. Musicians are collaborating, selling merchandise, booking tours and building fanbases via the web. OK Go's homemade YouTube video became an international sensation and led to the band winning a Grammy for best short video. Erin McKeown holds "virtual concerts" around her house that her fans can watch live online from all over the world. Even though she lives in a remote island off the coast of Washington State, composer Alex Shapiro makes a living off of commissions from her myspace page. Meanwhile, there are now countless legal services such as Rhapsody, Pandora, iTunes, eMusic, MOG and Lala that make it incredibly easy for listeners to seek out music. And niche music discovery sites such as Kalabash or Arkiv Music make it possible to delve deep into

catalogues of music from around the world, and classical music is now on the same playing field as the most mainstream services.

These successes are models for a new industry, and they would not have been possible without open internet structures. Net neutrality gives essentially everyone a license to innovate, and we see the results from the artists whose creativity is fueling "music 2.0" as well as the technologists who are designing amazing new ways to experience music.

In the emerging digital marketplace, there are far fewer middlemen or gatekeepers that are holding artists back or imposing conditions on them in exchange for access to listeners. As the digital music marketplace matures, we are keenly aware of the dangers facing the independent and niche music communities if new gatekeepers such as the telecommunications companies were to be given control over what you can experience on the internet.

Although artists have thus far had the benefit of open internet structures that gives them access to the same essential technology as the best-funded companies, there have been troubling instances where telecommunications companies have behaved in a manner that raises serious concerns for artists' ability to not only reach potential audiences, but also enjoy their right to expression.

One example of the latter came in 2007, when the band Pearl Jam performed at Lollapalooza. AT&T had the exclusive right to the online broadcast of the concert, and during an improvised segment, singer Eddie Vedder made statements critical about then-president George W. Bush. AT&T censored this portion of the broadcast, leaving viewers at home wondering what he was saying. Although this isn't necessarily a perfect example of non-net neutrality, it does illustrate what can happen when one ISP has sole control over the distribution of content and is allowed to make its own calls about what is or isn't "acceptable" speech.

Another telling incident also occurred in 2007 when Comcast was discovered to be interfering with the delivery of internet data using the BitTorrent protocol. While there are clearly those who use torrent technology to illegally share copyrighted material, the technology itself is perfectly legal, and is in fact used by fully licensed audio-visual companies like Vuze (as well as other mainstream providers) as an efficient way to deliver content. An AP reporter attempted to send a copy of the King James Bible – which is in the public domain – via BitTorrent, but Comcast interrupted the transfer, thereby confirming the ISP's "throttling" of BitTorrent traffic. Ultimately, the FCC ruled that Comcast had violated its net neutrality principles, but the order has been appealed by Comcast and is awaiting judgment.

With new FCC Commissioners in place it finally appears that expanded net neutrality principles will become part of the "rules of the road" for the internet. The transparent process the Commission launched with its October 22 Notice of Proposed Rulemaking rightfully recognizes that there are a great number of stakeholders, including creators and the public, whose voices must be considered as the FCC goes about crafting net neutrality policies. We're also pleased to see two new principles added to the Commissions draft rules — one that would not allow ISPs to prevent their customers from using legal devices, applications and services of their choosing, and a "non-discrimination" principle that would keep ISPs from unnecessary blocking or throttling of data, and would compel them to publicly disclose their network management techniques.

It is important to remember that these proposed rules apply only to lawful content, sites and services, which leaves room for discussion about ways to prevent the unlawful sharing of content. This is an important distinction. Ensuring compensation for rightsholders is hardly incompatible with net neutrality. There are currently conversations about possible technological solutions to the illegal transfer of copyrighted content, but such discussions need not compromise the goal of establishing clear and transparent rules for net neutrality. In fact, net neutrality is critical to continue to nurture and support innovation and legal, licensed services as an alternative to piracy. In our quest to ensure proper compensation for creators and rightsholders, we must be careful not to

compromise what makes the internet such an incredible platform for innovation, expression and entrepreneurship.

On behalf of Future of Music Coalition, I am pleased that the Committee is giving this matter the attention it deserves as the FCC undertakes a thorough and open process that will hopefully ensure that the internet remains an unprecedented space for creativity, commerce and the exchange of ideas. Thank you.

New York
COMMON CAUSE
Holding Power Accountable

TESTIMONY OF CHRIS KEELEY, ASSOCIATE DIRECTOR, COMMON CAUSE/NY
Before the NEW YORK CITY COUNCIL COMMITTEE ON TECHNOLOGY IN GOVERNMENT

Regarding **Res 0712-2007** calling upon the United States Congress to pass H.R. 3458 and the Federal Communications Commission to formalize strong network neutrality principles in order to ensure that the Internet will continue to foster innovation, increase competition, and spur economic growth as well as making the Internet faster and more affordable for all.

NOVEMBER 20, 2009

Good morning. Thank you for the opportunity to address you today. My name is Chris Keeley and I am the Associate Director of Common Cause/New York. Common Cause/New York is a nonpartisan non-profit advocacy organization founded as the citizens' lobby to encourage the voices of everyday Americans to be heard in the political process.

Common Cause firmly supports net neutrality -- the principle that Internet users should be able to access any legal web content they choose, post their own content, and use any applications they choose, without restrictions or limitations imposed by their Internet Service Providers. We support the Resolution before the Committee today calling on Congress to pass H.R. 3458 and for the Federal Communications Commission to codify strong net neutrality provisions.

As the Chair and members of this committee know well, the expansion of the Internet in recent years has fostered the development of an entirely new dynamic of democratic participation and has allowed for new heights of citizen involvement and access to information. Not only has the freedom of the Internet fueled innovation and the spread of information, but it has also provided a "town square" within which citizens can exchange opinions and engage in democracy.

According to the FCC proposal, "Congress has recognized that the Internet, 'offer[s] a forum for a true diversity of political discourse...'" Common Cause could not agree more strongly. The Internet provides that 'town square' for public discourse by allowing anyone with an Internet connection to express their views and to react to views of others. From the White House to the local PTA, the Internet has cultivated public debate and democratic participation.

The principle of net neutrality, in particular, has played a critical role in allowing this public discourse to take place. The Council should adopt this Resolution, as it will provide public support for the proposal currently pending before the FCC that would codify important net

neutrality provisions[1] and provide support for an important piece of legislation before the U.S. Congress.

The FCC is currently considering the adoption a set of principles that would codify the open, accessible, and participatory nature of the Internet that we have all come to know. This is a decisive moment. All Internet users should have access to the information of their choosing, as well as access to an uncensored forum of participation. By allowing Internet Service Providers to limit and rank the accessibility of certain voices is a direct infringement on the unparalleled equality that the Internet currently provides. One of the beauties of the Internet has been the level playing field: both the corporate monolith and the small-town blog have equal access to publish their material. Net neutrality is pivotal to this equality, as it places a wealth of information at our fingertips and allows us to submit our own information, largely without financial or geographic limitation.

It is important to note at this point, though, that while Internet access has become widespread, there are significant portions of households in America that do not have access to the Internet, including many right here in New York City. We applaud the Chair's ongoing work to narrow this digital divide and urge continued vigilance on this front.

The Internet, as members of this committee know, is playing an increasingly influential role as a medium for public debate. From political organizations or candidates calling for action by their supporters to facilitating the expanded influence of small-dollar donors in the campaign finance system, the Internet is important to the electoral process.

In addition to political candidates and organizations, individuals can gain access to information about their sitting legislators through forward-looking laws like New York's Local Law 11, which provides City-produced documents to the public through the Internet, and other powerful tools, such as webcasting, which New York City has not yet adopted but we hope to continue moving that forward.

Conclusion

The resolution before the Committee today would be an important public stand in support of net neutrality provisions, urging the FCC and the Congress to act in support of those critical principles. We urge the Council to adopt Res 0712-2007. I would like to thank the committee for holding this hearing. I would be happy to answer any questions you might have.

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[1] The FCC has included a provision in the proposal that would allow ISPs to conduct "reasonable network management." The FCC should clarify these rules to ensure that unfair "management" actions are not taken. The FCC proposal, at paragraph 135: *"Reasonable network management consists of: (a) reasonable practices employed by a provider of broadband Internet access service to (2) reduce or mitigate the effects of congestion on its network or to address quality-of-service concerns; (ii) address traffic that is unwanted by users or harmful; (iii) prevent the transfer of unlawful content; or (iv) prevent the unlawful transfer of content; and (b) other reasonable network management practices."* FCC Notice of Proposed Rulemaking October 22, 2009.

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November 20, 2009

About Net Neutrality.

During my first visit to New York, as a teenager coming from Paris, France in the late 1960s, what impressed me the most was ... that there was only one class in the subway! I got from that first contact the idea that the American society was more egalitarian, that everyone was offered the same level of opportunity. I always felt that the strength of this country is its openness and the fact that for some time it has been able to establish fair rules for conducting business. I would like this to continue and to be reinforced.

Internet has been extraordinarily successful because the cost of entry is low. Everybody can become a publisher, a news originator, play music, create a community, etc. These opportunities have caused major disruptions for existing businesses, like the music or the newspaper industries for example, which still have not yet figured out how to survive in such a modified environment. However, nobody is seriously proposing to go back and shut down the Internet! This is a situation for American ingenuity to figure out a way to prosper. The telecoms should not receive special protection from disruptive changes that benefit society as a whole, nor should they be allowed to inhibit such disruptive change from occurring.

Enabling the Future to happen: who owns the clouds?

A new paradigm is called "Cloud Computing": this strange metaphor is intended to evoke large numbers of computers cooperating together to do very complex tasks very rapidly. For example, Google and Amazon rely on cloud computing. But they own their clouds. We can imagine a future where clouds emerge as voluntary associations among Internet users, with disruptive applications and benefits for society as a whole that we can scarcely imagine today. Everybody would be able share resources, including their Internet telecom resources.

For example, consider how the peer-to-peer BitTorrent protocol works. BitTorrent allows many computers to voluntarily participate in the distribution of data to other computers. There is no centralized control over the distribution process. It's a way of using the Web to allow data to be distributed, via resources that the telecom companies would like to restrict in such a way that ordinary Internet users would be unable to join forces in this way.

The telecommunication companies want to be in control of the fluxes in order to charge depending on the speed connection. They want to be able to slow down traffic emanating from individuals and businesses that don't have business relationships with them. And then to charge more for higher speeds and specialized communication protocols (such as BitTorrent). We don't want to empower them to be in a position to decide who wins who loses and how much you have to pay to be a winner. BitTorrent would die if there would be no network neutrality.

ARPAnet and TCP/IP were developed as a telecommunication network without any single point of failure, in which there information would be automatically rerouted along whatever pathways remain after a nuclear attack. The Internet results from this project, and this is another reason of its success and pervasiveness. Today we need to guarantee that the networks remain reliable, even after it has been so widely expanded, with ways to flow information between people and organizations. The control that telecommunications want may eventually weaken the network, that will depend on the success or failure of the company that runs it. Here, without net neutrality, we are potentially creating another another instance of a company "too big to fail", because so many others would depend on them. Liberty demands that the people be allowed to form voluntary associations, in which they share information in any way that they please.

Society needs plentitude, telecoms need scarcity. Once upon a time, there was too much bandwidth, briefly, when Sprint's and MCI's new fiber optic networks came online. During that period, prices fell, and the telecom business model was under heavy pressure. They found ways to create artificial scarcity, to support their old model to be toll takers on the information highways.

The broadband providers are telling us that the costs are daunting and in order for them to maintain a profitable business, they have invented this notion of premium services. But the problem is that the value of their business is marginal compared to the revenue that could be generated by letting everybody thrive on an egalitarian Internet. So is it worth to sacrifice the ability to innovate just to allow a few gatekeepers to increase their profit? I personally don't think so.

Telecoms don't want to provide a utility. I think that's exactly what they should do.

Therefore I support the net neutrality proposed resolution.

Testimony presented to the Committee on Technology in Government, The Council of the City of New York, November 20, 2009

Oversight: Establishing Strong Network Neutrality Principles in Order to Protect the Internet

Presented by Colleen Gibney
ITAC

My name is Colleen Gibney, and I am the Technology Practice project manager for ITAC, The New York City Industrial & Technology Assistance Corporation. ITAC is an economic development organization with 21 years of helping NYC small businesses to grow and to create high-value jobs. ITAC is funded by New York State Foundation for Science, Technology and Innovation (NYSTAR) as the designated Regional Technology Development Center (RTDC) for the NYC Region. It is also a Manufacturing Extension Partnership (MEP) Center under a nationwide National Institute of Standards and Technology Program. We are one of three centers in the State funded to assist small R&D firms to apply for Small Business Innovation Research (SBIR) program funding from eleven Federal agencies. We also run sponsored programs for New York City companies, such as our City Council-funded MoveSmart/StayLean/GrowFast program, and our NYSERDA-funded NYC Energy Tech program to accelerate energy grid technology companies. We would like to take this opportunity to thank the Council for your consistent and generous support of MoveSmart/StayLean/GrowFast.

ITAC strongly supports the Committee's efforts to formalize strong network neutrality principles. We work with a high number of innovative software technology start-ups in sectors including healthcare, homeland security, defense, education, smart grid management, and

entertainment. Should net neutrality be overcome by a toll system with tiered Internet traffic, many of these start-ups would be unable to become competitive and to create the high-quality jobs we need in New York City.

ITAC has also worked with advanced manufacturers for over twenty years in New York. Should a tiered system come into operation, these companies, who often operate on lean budgets, would find that they would need to pay more to maintain a basic web presence. A free and open Internet will continue to allow these companies to build new web strategies—including manufacturing-on-demand—that will enable them to compete with larger players, both domestically and internationally.

Those large telecommunications and cable providers who would seek to end net neutrality have spent a great deal of money to have their concerns and their wish to expand their revenue models reflected in Washington. The small to mid-size technology and manufacturing companies with whom ITAC works do not generally have budgets for lobbyists—they are focused upon commercializing new innovations, competing in a relentless global marketplace, and hiring and retaining New York's best workers. We need to ensure that these companies get every chance to do this on a fast and open highway. Otherwise we stand to lose our best job opportunities at the side of the road.

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TESTIMONY BEFORE THE NEW YORK CITY COUNCIL COMMITTEE ON TECHNOLOGY AND GOVERNMENT ON RESOLUTION NO. 712-A ON NATIONAL NET NEUTRALITY RULES

NOVEMBER 20, 2009

I. INTRODUCTION

Good morning to developers, entrepreneurs, telecoms, academics, advocacy groups and the greater technology community. Council Members Fidler, Gerson, James, Liu, Sanders, and de Blasio, thank you for recognizing the importance of this issue and for sponsoring this resolution. Council Member Brewer, Council and committee staff members Kunal Malhotra and Sam Wong, thank you for your amazing work on this committee and commitment to continuing to address issues of importance to the technology community like Network Neutrality.

My name is Benjamin Kallos, I am here before you today as a co-founder of the Open Government Foundation, Inc. (the "Foundation"), a New York State not-for-profit which aims to bring greater transparency, accountability and openness to government by making information available online for all to see.

We are here today in response to your committee's call for testimony on two issues. First, will the Network Neutrality principles as articulated effectively obtain the goal of maintaining a free and open Internet? Second, commenting on resolution number 712-A of 2007, which asks the Federal Communications Commission ("FCC") and Congress to set firm Network Neutrality regulations.

It is important to clarify the question before this body, the FCC, and indeed Congress. On October 22, 2009 the FCC released a Notice of Proposed Rule Making opening a public comment period through January 14, 2010, with a reply comment period through March 5, 2010. In this notice the FCC states its intent to preserve a "free and open Internet" through a codification of the four principles articulated in its 2005 Internet Policy Statement best summarized as "any lawful content, any lawful application, any lawful device, any provider" with the addition of two new principles of non-discrimination and transparency as well as their application to include not only wired Internet but also non-wired Internet such as mobile wireless and satellite. It is important that the City Council, Congress as well as the FCC remain true to paragraph 14 of its notice:

> The rules we propose today address *users'* ability to access the Internet and are not intended to regulate the Internet itself or create a different Internet experience from the one that users have come to expect. Instead, our proposals attempt to build on existing policies (discussed below) that have contributed to the Internet's openness without imposing conditions that might diminish innovation or network investment. We seek to create a balanced framework that gives consumers and

providers of Internet access, content, services, and applications the predictability and clarity they need going forward while retaining our ability to respond flexibly to new challenges. (Emphasis Added).

Thus, this notice does not seek to change the Internet so much as preserve it as "free and open." This opportunity for rulemaking must not be treated by anyone as a Pandora's Box that somehow open's all regulation of the Internet to comment and criticism but rather our discussion must be limited to the two new principles and proposals, with first four principles treated as sacred.

II. LOOKING BACK ON THE INTERNET AS WE MOVE FORWARD

Whether you believe Al Gore or DARPA invented the Internet, most will agree that it is a product of the financial support of tax dollars from the United States and Internationally that has entered the public domain as "free and open" and must remain so. Being "free and open" has resulting in a "freedom to innovate" that makes the Internet an ideal free market with low barriers to entry because entrepreneurs does not need to secure permission or pay royalties to compete, and end to end connectivity where everyone has the potential to reach the same universal audience at no additional cost.

For simplification's sake, the Internet has historically consisted of content providers and the end user, each with their own access to the Internet. Content providers are billed for access by Internet Service Providers (ISPs) based "bandwidth" or the speed of their connection as measured by the amount information they can send at once and "traffic" which is a data transfer allotment or how much information they can distribute over the Internet in a specific period of time. You may have noticed that when you are downloading multiple files at once over the Internet, they all tend to slow down. The same is true for content providers. So, the more successful they are and the more traffic they have, the more bandwidth and traffic they need and purchase. As a high speed Internet user in the United States you don't have to worry about this, as most people can pay a lump sum to their cable or phone company for "unlimited" Internet access where you can download as much as you want. The model works because content providers are willing to bear the costs to get the information onto the Internet, users have been happy to pay a single fee for access, and both believed that information would be delivered as fast as possible between them.

Recently the Internet has begun to change, growing from mostly text based web sites with some pictures here and there to having increasing amounts of audio, video, and other bandwidth intensive real-time applications. Not only that, but with the Web 2.0 revolution, every Internet user has become a content provider. It has become common place for regular end users to record and upload YouTube videos, video and audio conference over Skype, make phone calls over Vonage, and even share files from their computer like the latest Linux distribution. Cable and phone companies now face increased costs from supporting its users who demand to be provided with the additional bandwidth necessary for being a content provider without paying for

additional traffic. Cable and phone companies now also face competition from each other as well as content providers who are currently allowed to compete with them at no added cost over the very Internet connection they are providing to their user. Some cable and phone companies such as Comcast have reacted by developing and implementing technology to control the flow of Information on the Internet though traffic shaping based on information type, giving priority to certain traffic while slowing down traffic of others. This traffic shaping has largely occurred without notice to the user, without a renegotiation of contracts or rates, and without disclosing how a user's Internet experience is being affected.

III. PRESERVING A FREE AND OPEN INTERNET

In response to the recent implementation of traffic shaping by cable and phone companies, on October 22, 2009 the FCC released a Notice of Proposed Rule Making opening a public comment period through January 14, 2010, with a reply comment period through March 5, 2010. In this notice the FCC states its intent to preserve a "free and open Internet" through a codification of the four principles articulated in its 2005 Internet Policy Statement with the addition of two new principles of non-discrimination and transparency as well as their application to include not only wired Internet but also non-wired Internet such as mobile wireless and satellite.

As mentioned earlier the FCC has not opened the first four principles best summarized as "any lawful content, any lawful application, any lawful device, any provider" for comment. Under the new non-discrimination principle a provider of broadband Internet access "would be required to treat lawful content, application, and services in a nondiscriminatory manner." It should be noted that the FCC states in their notice that cable and phone companies who provide broadband Internet access have a conflict of interest due to online competition and that implementation of this principle is necessary to protect the interests of the end user and the public. While this principle would seek to eliminate the bulk of current traffic shaping by cable and phone companies, they are still empowered to engage in "reasonable network management," which still might involve traffic shaping. The sixth principle seeks to provide accountability for the broad "reasonable network management" powers it is providing through transparency and the requirement that providers of broadband Internet access "would be required to disclose such information concerning network management and other practices as is reasonably required for users and content, application, and service providers to enjoy the protections specified in this rule making." The transparency principle in further detail requires that the provider of broadband Internet access must "make available relevant information regarding network management practices to the consumer who purchases their service; to content, application, and service providers, who must ensure that their offerings function on the Internet; and to the Commission." What is ground breaking about this principle is the opportunity to codify a concept of accountability to both the end user and the fellow community, in a broad departure from typical accountability that is only to a regulating agency.

As a non-profit dedicated to transparency, accountability and openness, we strongly support these two new principles, which together would scale back behavior that currently threatens a "free and open" Internet. We also believe the codification of such principles would help to begin an era of transparency, accountability and the concept responsibility to the consumer and the larger global community.

IV. NYC FRANCHISE OF CABLE, HIGH CAPACITY AND MOBILE TELECOMMUNICATIONS

While the New York City Council should be commended for holding a public hearing to consider a non-binding resolution on Network Neutrality directing Congress to take action the City could also use its power over phone and cable franchises to accomplish similar goals to Network Neutrality and Universal Broadband.

The New York City Charter empowers the Franchise and Concession Review Committee (FCRC) to review and approve franchise agreements through public hearing, Mayoral approval, registration by the Comptroller, and governing resolutions passed regularly by the New York City Council. Current franchises include Cable (Resolution 538 approved September 27, 2006), Local High Capacity Telecommunications (Resolution 1204 approved February 27, 2008), Mobile Telecommunications (Resolution 519 approved March 23, 2005), and Public Pay Telephones (Resolution 1043 approved September 17, 2003). The powers granted under these resolutions expire five years after their approval and can be amended, although all the franchises granted in accordance with the resolutions may have terms of up to fifteen years.

The importance of the FCRC and its negotiating ability in easily demonstrated by Deputy Mayor for Economic Development Robert Lieber who on April 29, 2008, announced a franchise agreement with Verizon to allow the phone company to begin offering cable television service to provide increased competition among cable companies for the benefit of the consumer. This franchise was granted in exchange for more channels, adopting concepts introduced by Comptroller William Thompson, Jr.'s "Cable Consumers Bill of Rights" for improved customer service protections, a five percent franchise fee on cable television revenues, a $10 million grant to NYC TV, a $4 million grant for Technology Education and Municipal Facilities, infrastructure improvements enabling public safety grade telecommunications, and most importantly bringing fiber optics to every street in the City by 2014, with 50 percent of the City completed by the end of next year. The Council should take notice of this last franchise agreement as an example for what may be accomplished through franchise negotiation.

In addition to calling upon the Federal government the City Council should call upon the Mayor and FCRC to use their franchise negotiation powers to have phone, cable, and mobile franchises provide universal access to the Internet, including communities with relatively low adoption rates, though programs to provide free or reduced rates for families of children attending public schools, New York City Housing Authority residents.

Similarly, while the FCC considers adding two new principles and codifying them the City should investigate its powers to require franchisees to abide by these six principles to the extent they are not pre-empted, as well as calling upon the Mayor and FCRC to indicate that a failure to comply with the spirit of the FCC's existing four principles, which would include the two previously implied new additions, will be considered negatively on future franchise renewal.

V. RESOLUTION NUMBER 712-A ON NATIONAL NETWORK NEUTRALITY RULES

The New York City Council is empowered to speak as a body on behalf of New York City's more than 8 million residents through resolution. We recommend that this resolution be updated from this version which was originally drafted in 2007 to be more technically accurate and to provide the comments sought by the FCC in their October 22, 2009 Notice of Proposed Rulemaking.

Please consider updating the resolution to provide a stronger enactment clause that specifically supports all of the FCC's six proposed principles, supports the inclusion of regulating wireless Internet, and opposing the implementation of "managed" or "specialized" services or "toll roads" that might degrade current Internet infrastructure. Please also consider including a communications clause in the resolution's enactment directing that the City Council participate in the public comment period on behalf of all residents of New York City by submitting this resolution before the FCC, as well as transmitting copies to the City's Congressional Delegation and Senators.

Thank you again for considering Network Neutrality. We look forward to continue working with the New York City Council to make our world a little more transparent bit by bit.

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712 A

☒ in favor ☐ in opposition

Date: 11/20/09

(PLEASE PRINT)

Name: BEN KALLOS

Address: 420 E 72ND ST

I represent: OPEN GOV FOUNDATION

Address: SAME

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

0712

I intend to appear and speak on Int. No. _____ Res. No. _____

☒ in favor ☐ in opposition

Date: 9/20/09

(PLEASE PRINT)

Name: Spencer Brown

Address: 435 W. 23rd St. Apt #2D

I represent: Eyebeam

Address: 540 W. 21st New York, New York 10011

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712A

☒ in favor ☐ in opposition

Date: 11/20/09

(PLEASE PRINT)

Name: EMMA Lloyd

Address: 540 W 21ST ST NY NY 10011

I represent: EYEBEAM ART + TECHNOLOGY CENTER

Address: 540 W 21ST ST NY NY 10011

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 1657-A Res. No. _____

☒ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Professor Nicholas Economides

Address: _____

I represent: NYU Stern

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 712A Res. No. _____

☒ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: HANNAH MILLER

Address: _____

I represent: MEDIA + DEMOCRACY COALITION

Address: 1133 19th St NW Washington DC 20036

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712

☒ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: JOSHUA BREITBART

Address: 74 RUTLAND RD BROOKLYN 11225

I represent: PEOPLE'S PRODUCTION HOUSE

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712-A

☑ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Fred Wilson

Address: 915 Broadway, Suite 1408, NY NY 10010

I represent: Union Square Ventures

Address: Same as above

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 0712-2007

☐ in favor ☑ in opposition

Date: Nov. 20, 2009

(PLEASE PRINT)

Name: Charles J Sanders

Address: 29 Kings Grant Way, Briarcliff Manor, NY 10510

I represent: The Songwriters Guild of America

Address: Same as above

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712 A

☑ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Jehangir Khattak

Address: 115 West 29th Street, NY 10001

I represent: New York County Media Alliance

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712

☒ in favor ☐ in opposition

Date: 11/20/09

(PLEASE PRINT)

Name: CHRIS KEELEY

Address: 74 Trinity Pl 10006

I represent: COMMON CAUSE/NY

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

71280

I intend to appear and speak on Int. No. _____ Res. No. _____

☑ in favor ☐ in opposition

Date: NOV 20, 2009

(PLEASE PRINT)

Name: COLLEEN GIBNEY

Address: _____

I represent: ITAC (TECH & MFG)

Address: 253 BROADWAY, NY NY

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712A-2009

☒ in favor ☐ in opposition

Date: 11/26/09

(PLEASE PRINT)

Name: Dimas De Jesus

Address: 3044 32Nd Street

I represent: (LISTA) Latinos in Information Sciences + Tech Ass.

Address: NYC

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. ~~3758~~ 712-A

☑ in favor ☐ in opposition

Date: 11/20/09

(PLEASE PRINT)

Name: MATTHEW ROSENBERG

Address: 10 DOWNING ST #6D

I represent: _____

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

712 G

I intend to appear and speak on Int. No. _____ Res. No. _____

☑ in favor ☐ in opposition

Date: 11/20/09

(PLEASE PRINT)

Name: JULY MACFIE

Address: _____

I represent: INTERNET SOCIETY

Address: PO BOX 1599, NYC 10159

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712-A

☑ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: JAY SULZBERGER

Address: 351 W 114th St. apt 2B

I represent: private individuals who do not want to be wire tapped

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712-A

☒ in favor ☐ in opposition

Date: NOV 20 . 2009

(PLEASE PRINT)

Name: TIMOTHY KARR

Address: HOBOKEN, NJ

I represent: FREE PRESS

Address: WASH. D.C.

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

0712

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☒ in opposition

Date: _____

(PLEASE PRINT)

Name: RICK CARNES

Address: 9692 CLOVERLAND DR. BRENTWOOD, TN.

I represent: SONGWRITERS GUILD of America / ARTS & LABS

Address: 209 10th STREET SUITE 321 NASHVILLE, TN.

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

1

I intend to appear and speak on Int. No. _____ Res. No. 712-A

☒ in favor ☐ in opposition

Date: 11/20/09

(PLEASE PRINT)

Name: James Vasile

Address: 1170 Union St, 11225

I represent: Software Freedom Law Center

Address: 1995 B'way, 10023

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712A

☐ in favor ☒ in opposition

Date: _____

(PLEASE PRINT)

Name: GORDON CHAMBERS

Address: 201 Adelphi St., Bklyn NY 11205

I represent: SELF

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712A

☐ in favor ☒ in opposition

Date: 11.20.09

(PLEASE PRINT)

Name: PHIL GALDSTON

Address: 309 W 104 ST, FC, MY, NY 10025

I represent: SELF

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712-A

☐ in favor ☒ in opposition

Date: 11/20/09

(PLEASE PRINT)

Name: ROBERT P. PUCKETT 12211

Address: 20 CORPORATE WOODS BLVD, ALBANY NY

I represent: NEW YORK STATE TELECOM. ASSOC. (NYSTA)

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712-A

☐ in favor ☑ in opposition

Date: 11-20-09

(PLEASE PRINT)

Name: Charles Davidson

Address: 41 Worth St., NY, NY 10013

I represent: ACLP @ NY Law School

Address: 41 Worth St., NY, NY 10013

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712-A

☐ in favor ☑ in opposition

Date: 11/20/09

(PLEASE PRINT)

Name: Howard Symons

Address: Mintz, Levin Washington, D.C.

I represent: CTANY (Cable & Telecommunications Association of NY)

Address: Albany, NY

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712-A

☐ in favor ☒ in opposition

Date: 20 November 2009

(PLEASE PRINT)

Name: Lawrence J. Spiwak

Address: 5335 Wisconsin Avenue, NW Suite 440, Washington, DC 20015

I represent: Phoenix Center for Advanced Legal & Economic Public Policy Studies

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712A

☒ in favor ☐ in opposition

Date: 20 NOV 2009

(PLEASE PRINT)

Name: JEAN LOOK 20036

Address: 1615 L St., NW Suite 520 WDC

I represent: FUTURE OF MUSIC COALITION

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card 712-A

I intend to appear and speak on Int. No. _____ Res. No. _____

☒ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Lowell Peterson

Address: _____

I represent: Writers Guild of America East AFL-CIO

Address: 555 W. 57th St, 12th Fl, NY 10019

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card 712-A

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☒ in opposition

Date: _____

(PLEASE PRINT)

Name: JOHN MAYO

Address: 7505 Royal Dominion, Bethesda

I represent: SOIF

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712-A

☑ in favor ☐ in opposition

Date: 11/20/2009

(PLEASE PRINT)

Name: Art Brodsky

Address: 818 N St, NW. Washington DC 20036

I represent: Public Knowledge

Address: none

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712A

☑ in favor ☐ in opposition

Date: 11/20/2009

(PLEASE PRINT)

Name: Justin Day

Address: 116 E 7th St #5

I represent: Blip.tv

Address: 407 Broome St 5th Floor

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card | 712-A

I intend to appear and speak on Int. No. _____ Res. No. _____

☑ in favor ☐ in opposition

Date: 11/20/2009

(PLEASE PRINT)

Name: Michal BIEZUNSKI

Address: 465 84th St Apt D3 Brooklyn NY 11209

I represent: Infoloom

Address: 465 84th St Apt D3 Brooklyn NY 11209

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. 712A-2009

☒ in favor ☐ in opposition

Date: 11/20/09

(PLEASE PRINT)

Name: Jennifer Mercurio

Address: _____

I represent: Entertainment Consumers Association

Address: 164 Danbury Rd Wilton CT 06897

Please complete this card and return to the Sergeant-at-Arms