

AN ACTION PLAN FOR AMERICA

USING TECHNOLOGY AND INNOVATION TO ADDRESS OUR NATION'S CRITICAL CHALLENGES

A report for the next administration



An Action Plan for America **USING TECHNOLOGY AND INNOVATION TO ADDRESS OUR NATION'S CRITICAL CHALLENGES**

*A report for the new administration
from the Benton Foundation*

by Jonathan Rintels

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The Benton Foundation works to articulate a public interest vision for the digital age and demonstrate the value of communications for solving social problems.

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EXECUTIVE SUMMARY

Persuasive research indicates that connecting our nation to broadband will bring remarkable economic, social, cultural, personal, and other benefits to our citizens. Citing this research, a bipartisan chorus of America's leaders has for years advocated the deployment across our nation of robust and affordable broadband access to the Internet. Taken together, the rhetoric and research tell a compelling story; that in the Digital Age, universal, affordable, and robust broadband is the key to our nation's citizens reaching for – and achieving – the American Dream.

Yet, America has failed to deploy universal, affordable, and robust broadband. When compared to the rest of the developed world, “[t]he United States is behind in broadband deployment, speed and price. Despite what some advocates and analysts claim, the United States is behind in broadband performance and its rank has been falling since 2001.” From a ranking of 4th in 2001 among the 30 Organization for Economic Co-operation and Development (OECD) countries in broadband penetration, the United States has “steadily fallen” to 15th in 2007. America also ranks 15th among OECD countries in broadband speed, averaging 4.9 Mbps, and 11th in the cost of broadband per Mbps.

This troubling trend will not reverse itself soon. America's global competitors are executing well-conceived and -financed national strategies to dramatically increase their competitive advantage in broadband over the United States, which has no national broadband strategy.

In the 21st-century global economy made “flat” by broadband, in Thomas Friedman's well-turned phrase, our nation faces a serious challenge to its global technological leadership, as well as its economic competitiveness. As many nations boldly strategize their rapid advance into the Digital Age by energetically embracing and exploiting the potential of broadband, America is being left behind. This challenge, every bit as serious as that which we faced in 1957 when the Soviet Union launched the first satellite into space, is our nation's “new Sputnik moment.”

Without strong federal leadership on the deployment of universal, affordable, and robust broadband, the broadband-enabled, Digital Age “American Dream” that other nations' citizens are already beginning to enjoy remains to Americans just a dream. Failing to deploy universal, affordable, and robust broadband denies a wealth of tangible economic and quality-of-life benefits to our citizens, including:

- Hundreds of Billions of Dollars in New Economic Development
- Over a Million New, High-Paying Jobs
- Increased Homeland Security and Public Safety
- Better Health Care at Lower Cost
- Enhanced Educational Opportunities
- Reduced Energy Consumption and Greenhouse Gas Emissions
- Reinvigorated Democracy and Government

To provide these essential benefits to Americans, and to answer the challenge of our nation's new Sputnik moment, the new Administration must launch a well-planned, concerted national effort – paralleling that which deployed telephone service, electricity, and interstate highways across the nation – to deploy robust and affordable broadband to every corner of our nation.

Starting on his first day in office, the new President should declare that the deployment of universal, affordable, and robust broadband Internet access to every American household is one of his Administration's top priorities. His Administration should then immediately appoint a blue-ribbon National Broadband Strategy Commission to design a coordinated and effective National Broadband Strategy (NBS), a “coherent road map of policies and goals that complement and accelerate efforts in the marketplace to achieve universal adoption of affordable high-speed Internet connections.”¹ The President should immediately appoint a Chief Technology Officer (CTO) based in the White House to work in conjunction with the Commission. The CTO will then be responsible for the execution of the Commission's completed NBS in the public sector, and will lead a cabinet-level task force of department and agency heads to execute the NBS throughout the federal government.

Most calls for the deployment of universal, affordable, and robust broadband focus on proposals to increase the supply of broadband. In “Reaching for the American Dream by Connecting Our Nation,” we recommend several initiatives that this new Administration and the NBS should undertake to stimulate broadband supply.

But while stimulating broadband supply is necessary to achieving the goal of universal, affordable, and robust broadband, it is not sufficient. The NBS must also promote initiatives to stimulate broadband demand. These include

programs to ensure that all Americans have access to the digital skills and tools necessary to realize broadband's enormous potential benefits. These programs also include initiatives that employ broadband-powered applications to address critical challenges facing our nation, including economic growth, job creation, health care, education, public safety, energy consumption and climate change, and others. In health care, for example, promoting telehealth and health information technologies will not only deliver better health care at a lower cost, but also stimulate the demand for broadband. To reduce energy consumption and environmental degradation, the NBS should promote initiatives that support telework and the construction of a smart electricity grid. In "Using Technology and Innovation to Address Our Nation's Critical Challenges," we recommend several initiatives to address these critical challenges that will have the added salutary benefit of stimulating demand for universal, affordable, and robust broadband.

By promoting both the supply of and the demand for broadband, a well-conceived NBS will establish a "virtuous circle" in which an increased supply of robust and affordable broadband stimulates creation of applications that produce wide-ranging, valuable social benefits that then cause citizens to demand even more robust and affordable broadband; which in turn stimulates greater investment in more robust broadband; which then stimulates the creation of even more beneficial applications that cause citizens to demand even more robust and affordable broadband. Strong federal leadership, expressed in a comprehensive NBS, is crucial to ending the stand-off between those ready to invest in the deployment of robust broadband when great technologies and applications emerge to take advantage of it, and those ready to invest in transforming technologies and applications and who are waiting for robust broadband to be built out.

By adopting a bold and imaginative action plan on Day One to connect all of our citizens to robust and affordable broadband, the new President will enable America to catch up to and surpass our global competitors on broadband, while at the same time utilizing technology and innovation to address our nation's critical challenges. The President will deliver to all our citizens the opportunity they seek for their children and themselves: to reach for the American Dream in the Digital Age.

RECOMMENDATIONS

1. On January 20, 2009, the first day in office, the new President of the United States should sign an Executive Order that gives high priority to exerting federal leadership on broadband policy. This Order should:

- a. Establish a National Broadband Strategy Commission, composed of members from the public, private, academic, nonprofit, and other sectors, that by January 1, 2010 should deliver to the President an ambitious, yet achievable, comprehensive National Broadband Strategy to deploy robust, affordable broadband to every household in America. The Commission should also lay out a roadmap and timetable to deploy within five years to the vast majority of American households modernized broadband networks that are as robust, reliable, and affordable as those of our global competitors.
- b. Appoint a White House-based Chief Technology Officer to work in conjunction with the Commission. The Chief Technology Officer (CTO) should take responsibility for the successful design and execution of the NBS throughout the public sector.
- c. Direct the Commission to include measurable deployment and subscribership goals in the NBS. The NBS developed by the Commission should set goals on broadband network deployment, subscribership, price, and speed. At a minimum, these goals should include:
 - i. By the end of 2010, every household in America will have access to robust and affordable broadband.
 - ii. By the end of 2015, the vast majority of American households will have affordable access to modernized broadband networks that are as robust as those of any other nation.
- d. Direct the Commission to propose broadband initiatives and applications that address the most pressing challenges facing our nation. As we discuss in subsequent sections, the demand for robust and affordable broadband will grow significantly if America utilizes broadband to:
 - i. Modernize our economy to compete globally;
 - ii. Reduce energy consumption and carbon dioxide gas emissions and address the threats that energy insecurity and environmental degradation pose to our nation;

- iii. Deliver better health care at lower costs by implementing telehealth and digital health information technology;
 - iv. Improve education through the use of advanced online technology tools;
 - v. Build a 21st-century public safety and national security telecommunications system; and
 - vi. Increase government transparency and empower greater citizen participation in decision making.
- e. Establish a cabinet-level interagency task force to execute the NBS throughout executive branch departments and agencies. Modeled on the Information Infrastructure Task Force, this task force should be made up of high-level representatives of federal agencies, including the Office of Management and Budget, in coordination with the CTO. The agencies should develop comprehensive plans and policies to quickly and effectively execute the NBS, including interagency efforts that will cut across bureaucratic silos and stovepipes.
- f. Direct the OMB to issue an annual report on the status of the execution of the National Broadband Strategy, with recommendations for additional steps and funding to ensure that the NBS realizes its goals.
2. The President should immediately on taking office promote policies to stimulate both demand for, and supply of, robust and affordable broadband, including:
- a. Direct the heads of all federal departments and agencies to take specific action to:
 - i. Ensure that affordable, robust broadband is available to all Americans;
 - ii. Include the use of broadband in meeting the mission of their agency;
 - iii. Cooperate with the National Broadband Strategy Commission, make the implementation of the NBS one of their highest priorities, and prepare action plans on initiatives their agencies are undertaking to help achieve the goals of the NBS; and
 - iv. Report annually to the President on the progress of these initiatives.
 - b. Direct the National Telecommunications and Information Administration to create a national online broadband mapping system that will aggregate useful and highly granular data on the nationwide availability, speed, and price of broadband;
 - c. Open underused spectrum currently reserved for both public and private use for a new generation of wireless devices that will provide robust broadband service over great distances and rough terrain without interference to existing licensed uses;
 - d. Support and co-fund state and municipal broadband initiatives to encourage the build-out and support of next-generation broadband networks. Eliminate state and local impediments to state-, municipal-, and community-funded deployment of broadband.
 - e. Support deployment of broadband to underserved communities and populations.
 - i. Modernize the federal Universal Service Program to support affordable, universal, landline and wireless broadband,² as well as the Rural Utility Broadband Loan and Loan Guarantee Program, Community Connect Broadband Grants Program, and similar programs to emphasize the build-out of next-generation broadband networks in rural areas.
 - ii. Stimulate the supply of broadband in low-income communities by requiring as a condition for receipt of federal funding that public housing and other public buildings have robust broadband access available to all residents and tenants.
 - iii. Initiate and expand programs to extend broadband to persons with disabilities, seniors, minorities, Native Americans, and other populations that are too often on the wrong side of the digital divide.
 - iv. Restore funding for the Technology Opportunities Program that will help develop transforming broadband applications to address the most significant and pressing challenges facing our society.
 - f. Stimulate private sector investment in robust broadband.
 - i. Accelerate depreciation of broadband equipment and tax credits for significant upgrades to existing network capacity.
 - ii. Issue federal “Broadband Bonds” to finance, in partnership with private entities, deployment in un- and under-served areas, as recommended in California by that state’s Broadband Task Force.³

- iii. Anchor Tenancy: Direct the General Services Administration's Public Buildings Service to assess anchor tenancy opportunities as a part of every agency's process to negotiate or renegotiate a telecommunications lease. Anchor tenancy can act as a catalyst, drawing providers to locations that have little or no access to broadband. By Executive Order, the President could require that agencies assess whether anchor tenancy could draw private providers to a surrounding unserved community or upgrade existing network infrastructure, if no other plans exist to do so.
- iv. Collocation Facilities: Direct the General Services Administration's Public Buildings Service to offer, at cost, in un- or under-served areas, small spaces on federally-owned properties on which collocation facilities can be constructed. This will both reduce one of the cost barriers and also create "carrier neutral" facilities into which companies can connect with both regional networks and other networks that connect to major Internet connection points in metropolitan areas.
- g. Support open access to the Internet for all users, service providers, content providers, and application providers to the maximum extent possible, while recognizing that network operators must have the right to manage their networks responsibly, pursuant to clear and workable guidelines and standards.
- h. Support federal leadership to eliminate issues and concerns that deter citizens from accessing the Internet. Promote online safety, privacy, and network security. Strongly enforce laws against online criminals, spammers, promoters of frauds, and other illegal actors.

REACHING FOR THE AMERICAN DREAM BY CONNECTING OUR NATION

As president, I will set a simple goal: every American should have the highest speed broadband access – no matter where you live, or how much money you have.

—Senator Barack Obama (D-IL)⁴

[T]hrough access to high-speed Internet services that facilitate interstate commerce, drive innovation, and promote educational achievements, there is the potential to change lives. These kinds of transformations of our way of life require the infrastructure of modern communication, and government has a role to play in assuring every community in America can develop that infrastructure.

—Senator John McCain (R-AZ)⁵

INTRODUCTION

Persuasive research indicates that connecting our nation to broadband will bring remarkable economic, social, cultural, personal, and other benefits to our citizens. Citing this research, a bipartisan chorus of America's leaders has for years advocated the deployment across our nation of robust and affordable broadband access to the Internet. Taken together, the rhetoric and research tell a compelling story; that in the Digital Age, universal, affordable, and robust broadband is the key to our nation's citizens reaching for – and achieving – the American Dream.

Yet, America has failed to deploy universal, affordable, and robust broadband. Compared to many of the other industrialized nations against which we compete in the increasingly interconnected global economy, our nation has steadily declined in rankings of broadband quality, availability, and price.

This failure is the result of a clear absence of strong federal leadership. “Broadband is no one's responsibility,” Tim Wu has observed, “and the buck keeps getting passed between industry, Congress, the White House, and the [Federal Communications Commission].”⁶

Illustrating the lack of federal leadership, President George W. Bush in 2004 established as one of his Administration's goals “universal, affordable access for broadband technology by the year 2007,” citing such significant benefits as a stronger, more competitive, and efficient economy; better pay and productivity for America's workers; improved health care; more educational and training opportunities; enhanced homeland security; and other benefits, noting that “[t]he spread of broadband will not only help industry, it'll help the quality of life of our citizens.”⁷

As the year 2007 came to a close, the Bush Administration announced that the President's goal

had been accomplished – all Americans had access to affordable broadband. Unfortunately, however, the Administration's claim turned out to be hollow and disingenuous; based on the near-universal availability of the same slow, expensive, and weather-dependent satellite “broadband”⁸ that had already been available back in 2004 when the President established his goal.⁹

The bottom line is that without strong federal leadership, deployment of robust and affordable broadband that would help all Americans realize the American Dream remains just that – a dream.

OUR NEW SPUTNIK MOMENT

In October 1957, as the Soviet Union's Sputnik satellite sailed across the night sky, America suddenly realized it was no longer the unchallenged global leader in science and telecommunications. Strong federal leadership answered this challenge. A post-Sputnik sense of urgency resulted in stunning technological achievements – from landing a man on the moon, to building up the nation's nascent semiconductor and computer industries, to laying the foundations for what we know today as the Internet.

Today, no new satellite orbits the earth to sound the alarm to Americans. But our nation is once again facing a serious challenge to its global technological leadership, as well as its economic competitiveness. In an interconnected world made “flat,” in Thomas Friedman's well-turned phrase,¹⁰ by broadband, America's competitors are executing well-conceived and -financed national strategies to dramatically increase their competitive advantage in broadband over the United States, which has no national broadband strategy.

A comprehensive review of the relative ranking of the United States versus the rest of the developed world

concludes unequivocally that “[t]he United States is behind in broadband deployment, speed and price. Despite what some advocates and analysts claim, the United States is behind in broadband performance and its rank has been falling since 2001.”¹¹ From a ranking of 4th in 2001 among the 30 Organization for Economic Co-operation and Development (OECD) countries in broadband penetration, the United States has “steadily fallen” to 15th in 2007. America also ranks 15th among OECD countries in broadband speed, averaging 4.9 Mbps, and 11th in the cost of broadband per Mbps.¹²

Most of the leading nations of Asia and Europe have adopted their own national broadband strategies and are aggressively building out their broadband, often utilizing ultra-fast 100 Mbps fiber-to-the-home connections that are over 100 times faster than the FCC’s newly revised classification of “basic broadband” speed. Such fiber connections, similar to Verizon’s FiOS project now being deployed in many cities in its service area, render obsolete the cable and DSL broadband connections that provide an average speed of 4.9 Mbps and dominate broadband service in the United States.

Faster broadband in other nations is “pushing open doors to Internet innovation that are likely to remain closed for years to come in much of the United States.”

In Japan, most citizens have access to broadband connections that are 8 to 30 times as fast as those available in the United States, yet cost less per month. Broadcast-quality TV over the Internet, high-definition teleconferencing, remote telemedicine, and advanced telecommuting are all not merely possible, but commonplace in many other countries today.¹³

In the United States, however, the widespread availability of broadband robust enough to power these applications is years away. Indeed, what many Americans think of as “broadband” is in many other countries too slow and feeble to even be called “broadband.”¹⁴ And, ominously, “the United States is likely to fall farther and farther behind the leading Asian and European countries on most key measures of success in broadband deployment.”¹⁵

Adding to concerns over the state of broadband in America is the fact that our nation’s growth rate in broadband adoption has tapered off to near zero, likely due to the nation’s faltering economy and the high cost of broadband. For Americans who live in households with incomes under \$20,000 annually, broadband penetration has actually fallen to 25 percent in early 2008 compared to 28 percent a year earlier.¹⁶ These are households that could benefit dramatically from the continuing education, job training, and job

search opportunities that access to broadband provides, as is described below.

The bottom line is that our nation is far from the goal of universal deployment of robust and affordable broadband that would enhance our competitiveness versus many other industrialized nations. As many nations boldly strategize their rapid advance into the Digital Age by energetically embracing and exploiting the potential of broadband, America is being left behind. This is our nation’s new Sputnik moment. It demands strong federal leadership.

WHAT’S AT STAKE?

As if the loss of America’s economic competitiveness were not alarming enough, our nation’s failure to deploy universal, affordable, and robust broadband has meant that a wealth of tangible economic and quality-of-life benefits being enjoyed by citizens in other nations are denied to ours. These include:

- Hundreds of Billions of Dollars in New Economic Development
- Over a Million New, High-Paying Jobs
- Increased Homeland Security and Public Safety
- Better Health Care at Lower Cost
- Enhanced Educational Opportunities
- Reduced Energy Consumption and Greenhouse Gas Emissions

Universal broadband that is affordable to all will also reinvigorate our democracy by connecting via the Internet all our citizens with each other, as well as with their government. The Internet provides an opportunity to include those who too often have been excluded from full participation in our economy and society, such as low-income, minority, rural, elderly, and disabled Americans. Using broadband technologies, all citizens could more easily and knowledgeably engage in civic affairs. Building out broadband to every American household, however, is not enough. All Americans must have access to the digital skills and tools necessary to realize broadband’s enormous potential benefits: better jobs, freedom to telework, access to online education and training, remote monitoring of health issues, and so much more.

A NATIONAL BROADBAND STRATEGY

Relying too heavily on the marketplace alone to deploy universal, affordable, and robust broadband has left millions of Americans without a robust and affordable connection to the Internet, denying them the opportunity to fully participate in – and take advantage of – the vast

benefits and advances of the Digital Age. To provide this opportunity, and to answer the challenge of our nation's new Sputnik moment, the new Administration must launch a well-planned, concerted national effort to deploy robust and affordable broadband to every corner of the nation. Without such an effort, paralleling that which deployed telephone service, electricity, and interstate highways across the nation, our citizens will fail to reap broadband's tremendous benefits and our nation will fall further behind its global competitors.

Starting on his first day in office, the new President should declare that the deployment of universal, affordable, and robust broadband Internet access to every American household is one of his Administration's top priorities. His Administration should then immediately begin the process of designing and successfully executing a coordinated and effective National Broadband Strategy (NBS), a "coherent roadmap of policies and goals that complement and accelerate efforts in the marketplace to achieve universal adoption of affordable high-speed Internet connections."¹⁷

It is vital to the success of the NBS that it include initiatives to eliminate the digital divide, and promote the adoption of transforming broadband technologies to address the difficult challenges faced by our nation in the areas of economic growth, job creation, health care, education, public safety, energy consumption and climate change, and others, as will be described later in this paper. When massive and wide-ranging solutions to these pressing national problems can be delivered to digitally-connected and Internet-savvy citizens, demand for robust broadband will increase substantially.

By promoting both the supply of and the demand for broadband, the NBS will establish a "virtuous circle" in which an increased supply of robust and affordable broadband stimulates creation of applications that produce wide-ranging, valuable social benefits that then causes citizens to demand even more robust and affordable broadband; which in turn stimulates greater investment in more robust broadband; which then stimulates the creation of even more beneficial applications that cause citizens to demand even more robust and affordable broadband. Strong federal leadership, expressed in a comprehensive NBS, is crucial to ending the stand-off between those ready to invest in the deployment of robust broadband once great technologies and applications emerge to take advantage of it, and those ready to invest in transforming technologies and applications and who are waiting for robust broadband to be built out.

By adopting a bold and imaginative action plan on Day One of his Administration to connect all of our citizens to robust and affordable broadband, the new President will enable America to catch up to and surpass our global competitors on broadband, while at the same time using technology and innovation to address our nation's critical challenges. He will deliver to all our citizens the opportunity they seek for their children and themselves: to reach for the American Dream in the Digital Age.

RECOMMENDATIONS

1. On January 20, 2009, his first day in office, the new President of the United States should sign an Executive Order that gives high priority to exerting federal leadership on broadband policy. This Order should:

- a. Establish a National Broadband Strategy Commission, composed of members from the public, private, academic, nonprofit, and other sectors, that by January 1, 2010, should deliver to the President an ambitious, yet achievable, comprehensive National Broadband Strategy to deploy robust, affordable broadband to every household in America. The Commission should also lay out a roadmap and timetable to deploy within five years to the vast majority of American households modernized broadband networks that are as robust, reliable, and affordable as those of our global competitors.
- b. Appoint a White House-based Chief Technology Officer to work in conjunction with the Commission. The Chief Technology Officer (CTO) should take responsibility for the successful design and execution of the NBS throughout the public sector.
- c. Direct the Commission to include measurable deployment and subscribership goals in the NBS. The NBS developed by the Commission should set goals on broadband network deployment, subscribership, price, and speed. At a minimum, these goals should include:
 - i. By the end of 2010, every household in America will have access to robust and affordable broadband.
 - ii. By the end of 2015, the vast majority of American households will have affordable access to modernized broadband networks that are as robust as those of any other nation.
- d. Direct the Commission to propose broadband initiatives and applications that address the most pressing challenges facing our nation. As we discuss in subsequent sections, the demand for robust and affordable broadband will grow significantly if America utilizes broadband to:

- i. Modernize our economy to compete globally;
 - ii. Reduce energy consumption and carbon dioxide gas emissions and address the threats that energy insecurity and environmental degradation pose to our nation;
 - iii. Deliver better health care at lower costs by implementing telehealth and digital health information technology;
 - iv. Improve education through the use of advanced online technology tools;
 - v. Build a 21st-century public safety and national security telecommunications system; and
 - vi. Increase government transparency and empower greater citizen participation in decision making.
- e. Establish a cabinet-level interagency task force to execute the NBS throughout executive branch departments and agencies. Modeled on the Information Infrastructure Task Force, this task force should be made up of high-level representatives of federal agencies, including the Office of Management and Budget, in coordination with the CTO. The agencies should develop comprehensive plans and policies to quickly and effectively execute the NBS, including interagency efforts that will cut across bureaucratic silos and stovepipes.
- f. Direct the OMB to issue an annual report on the status of the execution of the National Broadband Strategy, with recommendations for additional steps and funding to ensure that the NBS realizes its goals.
2. The President should immediately on taking office promote policies to stimulate both demand for, and supply of, robust and affordable broadband, including:
- a. Direct the heads of all federal departments and agencies to take specific action to:
 - i. Ensure that affordable, robust broadband is available to all Americans;
 - ii. Include the use of broadband in meeting the mission of their agencies;
 - iii. Cooperate with the National Broadband Strategy Commission, make the implementation of the NBS one of their highest priorities, and prepare action plans on initiatives their agencies are undertaking to help achieve the goals of the NBS; and
 - iv. Report annually to the President on the progress of these initiatives.
 - b. Direct the National Telecommunications and Information Administration to create a national online broadband mapping system that will aggregate useful and highly granular data on the nationwide availability, speed, and price of broadband;
 - c. Open underused spectrum currently reserved for both public and private use for a new generation of wireless devices that will provide robust broadband service over great distances and rough terrain without interference to existing licensed uses;
 - d. Support and co-fund state and municipal broadband initiatives to encourage the build-out and support of next-generation broadband networks. Eliminate state and local impediments to state-, municipal-, and community-funded deployment of broadband.
 - e. Support deployment of broadband to underserved communities and populations.
 - i. Modernize the federal Universal Service Program to support affordable, universal, landline and wireless broadband,¹⁸ as well as the Rural Utility Broadband Loan and Loan Guarantee Program, Community Connect Broadband Grants Program, and similar programs to emphasize the build-out of next-generation broadband networks in rural areas.
 - ii. Stimulate the supply of broadband in low-income communities by requiring as a condition for receipt of federal funding that public housing and other public buildings have robust broadband access available to all residents and tenants.
 - iii. Initiate and expand programs to extend broadband to persons with disabilities, seniors, minorities, Native Americans, and other populations that are too often on the wrong side of the digital divide.
 - iv. Restore funding for the Technology Opportunities Program that will help develop transforming broadband applications to address the most significant and pressing challenges facing our society.
 - f. Stimulate private sector investment in robust broadband.
 - i. Accelerate depreciation of broadband equipment and tax credits for significant upgrades to existing network capacity.
 - ii. Issue federal “Broadband Bonds” to finance, in partnership with private entities, deployment in un- and under-served areas, as recommended in California by that state’s Broadband Task Force.¹⁹

iii. Anchor Tenancy: Direct the General Services Administration's Public Buildings Service to assess anchor tenancy opportunities as a part of every agency's process to negotiate or renegotiate a telecommunications lease. Anchor tenancy can act as a catalyst, drawing providers to locations that have little or no access to broadband. By Executive Order, the President could require that agencies assess whether anchor tenancy could draw private providers to a surrounding unserved community or upgrade existing network infrastructure, if no other plans exist to do so.

iv. Collocation Facilities: Direct the General Services Administration's Public Buildings Service to offer, at cost, in un- or under-served areas, small spaces on federally-owned properties on which collocation

facilities can be constructed. This will both reduce one of the cost barriers and create "carrier neutral" facilities into which companies can connect with regional and other networks that connect to major Internet connection points in metropolitan areas.

g. Support open access to the Internet for all users, service providers, content providers, and application providers to the maximum extent possible, while recognizing that network operators must have the right to manage their networks responsibly, pursuant to clear and workable guidelines and standards.

h. Support federal leadership to eliminate issues and concerns that deter citizens from accessing the Internet. Promote online safety, privacy, and network security. Strongly enforce laws against online criminals, spammers, promoters of frauds, and other illegal actors.

USING TECHNOLOGY AND INNOVATION TO ADDRESS OUR NATION'S CRITICAL CHALLENGES

While stimulating broadband supply is necessary to achieving the goal of universal, affordable, and robust broadband, it is not sufficient. The NBS must also promote initiatives to stimulate broadband demand. These include programs to ensure that all Americans have access to the digital skills and tools necessary to realize broadband's enormous potential benefits. They also include initiatives that employ broadband-powered applications to address critical challenges facing our nation, including economic growth, job creation, health care, education, public safety, energy consumption, climate change, and others.

By promoting both the supply of and the demand for broadband, a well-conceived NBS will establish a “virtuous

circle” in which an increased supply of robust and affordable broadband stimulates creation of applications that produce wide-ranging, valuable social benefits that then cause citizens to demand even more robust and affordable broadband; which in turn stimulates greater investment in more robust broadband; which then stimulates the creation of even more beneficial applications that cause citizens to demand even more robust and affordable broadband.

In this section, we recommend several initiatives to address our nation's critical challenges that will have the added salutary benefit of stimulating demand for universal, affordable, and robust broadband.

ECONOMIC DEVELOPMENT AND JOB CREATION

Pick up a newspaper today and the front page is covered with troubling stories about our nation's flagging economy. Gas prices soar. Real estate values plummet. Foreclosures skyrocket. Layoffs escalate. Wages stagnate. Federal budget and trade deficits balloon out of control. The shrinking middle class finds itself increasingly at risk and drowning in debt. More and more American jobs – blue- and white-collar – are lost overseas to foreign workers earning lower wages in a world increasingly interconnected by high-speed data and communications networks.

In comparison with many other developed and emerging nations, America's steady decline in broadband penetration, speed, and price place our economy and workers at a serious competitive disadvantage. Economic and job creation success stories are more likely to take place not in the United States, but in countries with a more competitive combination of robust, affordable broadband and well-trained knowledge-workers. That is why in today's world, America requires a well-considered National Broadband Strategy. This is not just a matter of creating jobs and stimulating economic growth here at home; ultimately, it is a matter of economic necessity and survival in the globally-connected and competitive marketplace.

DEPLOYMENT OF UNIVERSAL, ROBUST, AFFORDABLE BROADBAND WILL GENERATE BILLIONS IN ECONOMIC DEVELOPMENT AND CREATE OVER A MILLION JOBS

Universal deployment and adoption of robust and affordable broadband will stimulate economic growth and create good-paying jobs, according to several private and government studies. For example, in 2001, Criterion Economics researchers, in a study underwritten by Verizon, concluded that in the United States, "deploying universal broadband could generate \$500 billion a year in added economic development."²⁰

In 2002, TeleNomic Research concluded in a study for the New Millennium Research Council that the deployment of universal, fast, and affordable broadband would also prove a boon to employment, responsible for creating an estimated 1.2 million permanent jobs, specifically:

- 166,000 jobs in the telecommunications sector;
- 71,700 manufacturing jobs generated by the direct purchase of network plant and equipment and customer premise equipment; and

- 974,000 indirect jobs created if a next-generation network were built.

Importantly, concludes the research, these would be "well-paid, high-skill jobs" that would provide "a welcome boost to our economy."²¹

In a 2006 study commissioned by the U.S. Department of Commerce, researchers concluded

The results support the view that broadband access does enhance economic growth and performance, and that the assumed economic impacts of broadband are real and measurable.

We find that between 1998 and 2002, communities in which mass-market broadband was available by December 1999 experienced more rapid growth in employment, the number of businesses overall, and businesses in IT-intensive sectors, relative to comparable communities without broadband at that time. . . .

The positive direction of broadband's impacts was found to be robust across the different models tested at the zip code level, including models of economically distressed areas such as the Appalachian region. Our findings thus support the conclusion that broadband positively affects economic activity in ways that are consistent with the qualitative stories told by broadband advocates. Economic development practitioners who have been spending their time or money promoting broadband have indeed been engaged in a worthwhile pursuit. . . . Broadband is clearly related to economic well-being and is thus a critical component of our national communications infrastructure."²²

Broadband usage and employment are strongly linked. A 2007 Brookings Institution report found that "for every one percentage point increase in broadband penetration in a state, employment is projected to increase by 0.2 to 0.3 percent per year. For the entire U.S. private non-farm economy, this suggests an increase of about 300,000 jobs, assuming the economy is not already at 'full employment.'"²³

In November 2007, the Sacramento Regional Research Institute reported, in a study commissioned by AT&T, that there was a "strong correlation between broadband growth in California and the number of new jobs available." Reviewing California's overall broadband adoption between 2001 and 2006, the study found that an

increase in broadband use was tied to an increase in jobs – more jobs were created than they would have during “business as usual.” The institute estimates that for every one percentage point of the adult population using broadband, the employment growth rate rises by 0.075 percentage points – the payroll growth rate also grows by up to 0.088 percentage points. Based on an estimate of “strong” broadband growth over the next several years (about 3.8 percent), SRRRI says that California could see a cumulative 10-year gain of 1.8 million jobs and \$132 billion in payroll.²⁴

Similarly, Connected Nation, which grew out of the ConnectKentucky broadband mapping, deployment, and adoption initiative, concluded in February 2008 that a seven percentage point increase in broadband adoption across the United States could result in:

- an additional 2.4 million jobs per year;
- \$662 million saved per year in reduced health care costs;
- \$6.4 billion per year in mileage saving from unnecessary driving;
- \$18 million in carbon credits associated with 3.2 billion fewer lbs. of CO₂ emissions per year in the United States;
- 3.8 billion hours saved per year from accessing broadband at home; and
- \$134 billion per year in total direct economic impact of accelerating broadband across the United States.²⁵

Numerous community case studies also provide persuasive evidence of the economic benefits of robust broadband deployment. One particularly striking illustration of the power of broadband to generate economic development is from Cedar Falls and Waterloo, two communities located side by side in the Cedar Valley region of Iowa. Unhappy with the pace of private broadband deployment in their community, local leaders in Cedar Falls chose to deploy a citywide municipal high-speed fiber network around that town. In nearby Waterloo, local leaders chose to rely only on broadband provided by the private local phone and cable companies, which was slower and not as universally available as the fiber deployed in Cedar Falls.²⁶ The result was that numerous companies and businesses relocated from Waterloo to Cedar Falls, creating new jobs, raising property values, and providing other economic benefits that were not enjoyed by Waterloo. Observed Waterloo Mayor John Rooff about the competitive advantages of Cedar Falls’s high-speed broadband network: “Fiber optics is the key to Waterloo’s future growth. In order for Waterloo with its businesses to move into the 21st century, we need fiber optic capability. . . . I believe it has hurt us economi-

cally to not be able to provide fiber optics to businesses locating in our city.”²⁷ Concluded the case study:

Although the implementation of Cedar Falls’ Communications Network is relatively young, Cedar Falls is already reaping economic and community benefits. . . . There may be no single thing more important in a community’s efforts to achieve economic well-being than to grasp the role that telecommunications plays in creating meaningful jobs, enhanced education and world class healthcare. Now, more than ever, the direct link is evident between advanced communications and productivity and economic development.²⁸

Studies of robust broadband deployment in Lake County, Florida,²⁹ Lafayette, Louisiana, Fort Wayne, Indiana, and other U.S. communities³⁰ all demonstrate similar economic and competitive benefits resulting from these investments.

Rural communities around the country that have access to robust, affordable broadband services are competing successfully for high-paying “knowledge work” jobs that might otherwise be exported abroad. This “farmshoring” of knowledge work to lower wage and lower cost-of-living areas of the United States, in contrast to “offshoring” that same work to foreign lands, is well illustrated by the experience of Watford City, North Dakota, a town where the nearest traffic light is 50 miles away. In Watford, life is slow, but the broadband is fast. A programming and call center operates out of an old John Deere tractor showroom there and programmers make \$40,000 a year, far above the prevailing wage rate in that remote western North Dakota town.³¹

In rural southwest Virginia, an area economically depressed by the loss of tobacco, coal mining, and furniture manufacturing jobs, local and regional officials joined forces to fund and deploy a state-of-the-art regional telecommunications infrastructure, giving current and new industries in the area a competitive advantage in a connected, global economy. Two IT giants, CGI and Northrop Grumman, soon thereafter announced that they would locate major telecommunications operations in the area, creating 733 high-skill, high-wage IT jobs and investing \$30 million in private funds. CGI reported that the average annual salary for its 300 employees would be about \$50,000, while Northrop Grumman estimated an average annual salary of \$40,000 for its 433 workers. Both figures are well above Russell County’s current average annual salary of \$27,111. In addition to the direct economic benefits, significant secondary and indirect benefits to the region have

been observed. Large new, unsubsidized housing developments have been built. A gourmet coffee shop opened, a new hotel was constructed, and plans were announced for the first 18-hole golf course between Abingdon and Tazewell.³²

Indeed, Virginia's efforts to develop high-tech, high-wage jobs in the southwestern parts of the state have been so successful that some fear there will be a shortage of qualified IT workers to staff the newly created positions. To address this problem, and to reunite families torn apart by the economic malaise of the region, a "Return to Roots Project" was created to bring home young Virginians who left the region in search of economic opportunity.³³

A NATIONAL BROADBAND STRATEGY WILL SPUR ECONOMIC DEVELOPMENT AND JOB CREATION

The qualitative and quantitative evidence is clear and consistent: at the individual, local/community, and national levels, the deployment of fast, reliable, and affordable broadband will stimulate tremendous economic development and create hundreds of thousands – if not millions – of good-paying jobs that might otherwise be lost or go offshore.

As the University of Pennsylvania's Joseph Bordogna writes, civilization is on the brink of a new economic world order. The big winners in this increasingly fierce global reach for leadership will not be those who simply make commodities faster or cheaper than the competition, ultimately leading to a downward-spiraling competition for low wages and lower margins. Rather, the winners will be those who develop talent, techniques, and tools so advanced that reaching a dimension of innovation beyond competition is ensured.³⁴

Increasingly, America needs to think in terms of fostering training, educational programs, and management systems that empower technology workers, build from its uniquely entrepreneurial culture, reinforce leadership in service industries with scientific discipline and data, and create unquestioned superiority in cutting-edge fields like nanotechnology, biotechnology, cognitive science, and information science and engineering. It means creating a workforce able and empowered to act on insight and experience, and an innovation system that is continually poised to deploy great ideas.³⁵

A well-educated population is essential to retaining America's competitiveness in the global economy. The ever-increasing knowledge and skill demands of the 21st

century require that secondary school preparation and requirements be better aligned with the knowledge and skills needed to succeed in postsecondary education and the workforce.

To promote significant and sustained economic development and job creation, and enhance America's economic and technological competitiveness versus other nations, the new Administration must take swift and bold action that will once again make the United States a world leader in advanced telecommunications infrastructure. As detailed above, on Day One of his Administration, the new President must issue Executive Orders that will result in the execution of a National Broadband Strategy to bring universal, affordable, and robust broadband to every household in America.

RECOMMENDATIONS

To help create jobs and stimulate U.S. economic growth, the President should:

1. Fully fund the America COMPETES Act including the National Science Foundation grant program for institutions of higher education that award associate degrees to recruit and train individuals from the fields of science, technology, engineering, and math to mentor female, minority, and disabled students in order to assist such students in identifying, qualifying for, and entering higher-paying technical jobs in those fields.
2. Set a national skills agenda to compete globally and to ensure a rising standard of living for Americans.
3. Implement provisions of the Food, Conservation, and Energy Act of 2008 aimed at extending broadband's reach into rural areas:
 - a. Budget \$25 million per year from 2009–2012 for loans and loan guarantees for the construction, improvement, and acquisition of facilities and equipment for the provision of broadband service in rural areas;
 - b. Establish the National Center for Rural Telecommunications Assessment to assess the effectiveness of Department of Agriculture programs aimed at increasing broadband availability and use in rural areas;
 - c. Direct the Secretary of Agriculture and the Chairman of the Federal Communications Commission to submit a report to Congress in June 2009 (and every three years thereafter) describing a comprehensive rural broadband strategy that includes:
 - i. These recommendations:

- Promote interagency coordination of federal agencies in regard to policies, procedures, and targeted resources, and streamline or otherwise improve the policies, programs, and services;
 - Coordinate existing federal rural broadband or rural initiatives;
 - Address both short- and long-term needs assessments and solutions for a rapid build-out of rural broadband solutions and application of the recommendations for federal, state, regional, and local government policy-makers; and
- Identify how specific federal agency programs and resources can best respond to rural broadband requirements and overcome obstacles that currently impede rural broadband deployment.
- ii. A description of goals and timeframes to achieve the purposes of the report.

HEALTH CARE

America's health care system is in crisis. The cost of health care soars out of control. Nearly 50 million Americans, including 8 million children, live without health insurance.³⁶ In 2006, U.S. health care expenditures grew 6.7 percent to \$2.1 trillion, or \$7,026 per person, and accounted for 16 percent of gross domestic product (GDP), greater than that of any other nation. Growth in health care expenditures is projected to rise 6.7 percent per year, far faster than wages, until the year 2017, when it will consume 19.5 percent of GDP.³⁷

Yet Americans are not living as long as citizens of many other developed nations that spend far less on health care. Average life expectancy at birth in the United States is 78.1 years. In Great Britain, where medical costs are just 8.3 percent of GDP and the annual per capita expenditure on health care is slightly over half that in the United States, life expectancy at birth is actually higher – 79 years. In France, life expectancy at birth is now 80.3 years, yet the health care share of GDP is just 11.1 percent. In Japan, health care makes up only 8 percent of GDP and the average life expectancy at birth is 82.1 years.³⁸

Many assert that Americans pay more for health care, yet are in fact less healthy. Consider that:

- The U.S. infant mortality rate is 6.9 deaths per 1,000 live births, twice as high as Japan or Sweden.
- About 70 percent of deaths and health costs in the United States are attributable to chronic diseases which are largely preventable. Yet, only half of recommended preventive services are provided to adults.
- The United States has fewer practicing physicians and nurses per 1,000 people than comparable countries.
- The obesity rate among adults is 30.6 percent, higher than any other developed nation, and 21 percent higher than second-place Mexico.³⁹
- Obesity among young people is near epidemic levels, causing large spikes in the incidence among children of high blood pressure, high cholesterol and painful joint conditions, and type 2 diabetes.⁴⁰

Telecommunications technology such as broadband offers a tremendous opportunity to make America healthier and allow Americans to live longer, while at the same time saving our nation what some have estimated to be *as much as \$165 billion a year, enough to insure 37 million individuals, more than three-quarters of all uninsured Americans.*⁴¹ Two of the most promising telecommunica-

tions applications that are already improving health care while at the same time reducing costs are “telehealth” and digital health information technology. Widespread adoption of these technologies will significantly stimulate both the build-out, and demand, for universal, affordable, and robust broadband.

TELEHEALTH

Although doctors rarely make house calls anymore, traditional health care still relies to a large extent on the in-person visit of an ailing patient to a health care provider. But such in-person visits can be inconvenient, painful, costly, or sometimes simply impossible, especially for very sick, elderly, or disabled persons, or those living in rural or low-income areas where doctors and clinics are scarce. Patients with chronic conditions who require periodic routine monitoring also end up making repeated, expensive trips to their health care providers. Each of these personal interactions consumes the time and resources of not only the patient and provider, but of the overall health care system.

“Telehealth” – using telecommunications technology such as broadband in the provision of health care – is already revolutionizing medical treatment. Telehealth technologies now “remotely monitor patients, facilitate collaboration between medical professionals, exchange medical data and images, and instantaneously provide efficient emergency service to remote areas.”⁴² Higher quality medical care is provided more conveniently to patients at a significantly lower cost, even while using America’s comparatively slow broadband networks. Examples include:

- Remote in-home monitoring of patients by health care professionals. In Pennsylvania, diabetic patients using a remote home monitoring system averaged hospitalization costs of \$87,000, versus \$232,000 for members of a control group who received only traditional in-person nurse visits.⁴³ A Veterans Administration study reported a 40 percent cut in emergency room visits and a 63 percent reduction in hospital admissions resulting from its remote home monitoring system.⁴⁴ Remote online monitoring on a daily basis of chronic illness, replacing periodic, weekly, or monthly trips to a clinic, is a particularly fruitful telehealth application, estimated to cut hospital, drug, and out-patients costs by 30 percent while delivering better quality care and quality of life.⁴⁵ Over

90 million Americans suffer chronic illness, and 7 out of 10 deaths are related to chronic conditions. Studies show that remote monitoring decreased the length of hospital stays from 14.8 days to 10.9 days, office visits by 10 percent, home visits by 65 percent, emergency room visits by 40 percent, and hospital admissions by 63 percent.⁴⁶

- Better Medicaid care delivered with significant cost savings. A telehealth program in Alaska cut Medicaid-reimbursed travel costs by 82 percent, while another in Arkansas saved millions in Medicaid costs and reduced infant mortality rates.⁴⁷
- Routine visits to overworked healthcare professionals are reduced while quality of care and quality of life are maintained or improved. In New York, health care providers using telehealth to manage congestive heart failure in home-bound patients experienced a reduction in overall health care costs of 41 percent. A reduction in these patients' physician office visits generated savings of more than \$115 million annually.⁴⁸
- Improved access to medical specialists in under-served and remote areas. Georgia's REACH (Remote Evaluation of Acute Ischemic Stroke) program uses high-speed broadband to save the lives of rural patients, allowing doctors to conduct an examination of the stroke victim, determine the type of stroke, and prescribe the correct medicine all via video conference between the Medical College of Georgia's neurology department and 10 rural hospitals.⁴⁹
- Reduced travel to and among medical offices, clinics, and hospitals.
 - Each year, 2.2 million patients are transported between emergency departments, incurring transportation costs of \$1.39 billion. Telehealth technologies could avoid 850,000 of those transports, resulting in cost savings of \$537 million a year.
 - Correctional facilities make 94,180 transports each year to emergency departments at a cost of \$158 million in transportation and visit costs. Telehealth technologies could eliminate almost 40,000 transports with a cost savings of \$60.3 million a year. Of 691,000 physician office visits from correctional facilities at a cost of \$302 million per year, 543,000 inmate transports could be avoided with a cost savings of \$210 million.
 - From nursing facilities, 2.7 million transports are made annually to emergency departments at a cost of \$3.62 billion. Telehealth technologies could avoid 387,000 transports with a cost savings of \$327 million. Of the 10.1 million physician office visits made annually from nursing facilities at a cost of \$1.29 billion for in-person physician office visits and transportation, 6.87 million transports could be avoided with a cost savings of \$479 million.⁵⁰
- Widespread, low-cost dissemination of health information to patients and consumers. At least 75 percent of Americans with access to the Internet search for medical and health information online. On an average day, one in nine of those with a broadband connection uses it to research online medical information. Patients are able to network with each other and exchange information online about their conditions.⁵¹
- Easier access to medical second opinions. Online second-opinion services offer patients the opportunity to receive a second opinion from medical specialists at prestigious institutions based on the medical records that they fax, mail, or send via the Internet. "In about 5% of the cases, we actually change the diagnosis of the patient. In 85% to 90% of the cases, we alter the treatment," says Jonathan Shaffer, managing director of e-Cleveland Clinic. "What we are able to do is give the patient more treatment options and hopefully give the patient more peace of mind."⁵²
- Substantial savings with a better quality of life for seniors and persons with disabilities. For the 70 million American seniors and persons with disabilities, telehealth technologies are estimated to generate substantial savings from lower medical costs, lower costs of institutionalized living, and generate additional output by more seniors and individuals with disabilities in the labor force. The cost savings and output gains total at least \$927 billion over the 25-year period from 2005 to 2030. This amount is equivalent to half of what the United States currently spends annually for medical care for all its citizens.⁵³

Telehealth could also play a dramatic role in attacking America's epidemic of childhood obesity and improving the health of millions of American children. The rate of obesity for those among ages 6 to 19 has more than tripled. Over one-third of the children aged 2 to 5 in affluent Loudoun County, Virginia are overweight. In some lower-income wards in nearby Washington, D.C., nearly half of all schoolchildren and pre-adolescents are overweight. It costs three times as much to treat a child with obesity as an average child. The nation's bill of care for overweight youth is \$14 billion annually. Yet our health care system has been reactive, treating the high-cost symptoms of obesity, including high blood pressure, high cholesterol and painful joint

conditions, and a huge spike in cases of type 2 diabetes, rather than proactively addressing the environmental root causes of the problem.⁵⁴

Using telehealth applications, patients and their caregivers could:

- Access educational information and applications to attack the environmental root causes and promote early intervention through online nutritional planning, healthy menus, calorie counters, and other proactive healthy-living tools at any time of the day or night;
- Video conference with online dieticians or other professionals, and have recurring physical checkups conducted remotely, thereby avoiding inconvenient and costly trips to clinics or doctors' offices for evaluation and treatment of their chronic condition;
- Participate in online exercise regimens individually tailored to their particular cases at times when they are not in school or at work;
- Shop at a "virtual" online grocery store that keeps track of calories and nutritional needs, then creates a healthy shopping list and prints it out for the patient to take to the real store; and
- Meet with mental health professionals and/or other obese youths in online counseling, support, and therapy sessions.

As technology improves and bandwidth increases, telehealth applications will deliver even more revolutionary advances in treatment, while substantially reducing costs. Today, in Japan, much of the nation is wired with superior high-speed fiber technology providing symmetric 100 Mbps bandwidth that is 8 to 30 times faster than most broadband connections in the United States. Such robust broadband enables pathologists at a large, urban hospital to treat patients in rural areas using high-definition video and remote-controlled microscopes that give sufficient richness of detail to enable a doctor to "make a definitive remote diagnosis of cancer." It also enables pathologists to see patients much more efficiently in a nation with a severe shortage of pathologists.⁵⁵

Jim Baller and Casey Lide illustrate how the potential of telehealth in America is constrained by our nation's comparatively slow broadband:

Under the FCC's former definition of "broadband" (200 Kbps), it would take nearly a full day to download a 10 minute diagnostic video clip. At current DSL speeds, it would take almost three hours. Moreover, because DSL and CMS are typically asymmetric – i.e., upload speeds

are much slower than download speeds – it would take much longer than three hours for the patient or his local doctor or health care facility with only DSL or CMS to upload the images to forward them to the reviewing health care facility. With a symmetric 100 Mbps broadband connection, it would only take three minutes to transmit the video clip.⁵⁶

Unfortunately, most of America does not have access to broadband connections that are fast enough to enable these or other bandwidth-intensive telehealth applications already in widespread use in other countries with superior broadband.⁵⁷

HEALTH INFORMATION TECHNOLOGY

Today's health care system is widely fragmented and hugely inefficient. Patients may be treated at multiple locations by multiple doctors who keep multiple paper records and fill out multiple paper forms seeking reimbursement from multiple insurance carriers. These inefficiencies not only lead to higher costs, they also result in poorer quality health care. Consider these statistics compiled by the *Business Roundtable*, an association of CEOs of leading U.S. businesses:

- As many as 98,000 people each year die unnecessarily because of preventable medical errors, more than die of breast cancer, AIDS, or motor vehicle accidents. One-fifth of these errors are attributable to the lack of immediate access to patient health care information.
- Nearly one in three Americans will experience a medication error in their lifetime. Approximately 1.5 million medication errors occur in hospitals each year. There are 2 million outpatient drug errors each year, and the error rate is forecast to increase to 3 million in 2020 and 3.7 million in 2030.
- Between 2003 and 2004, 22 percent of sick adults in America were sent for duplicate tests by different health care professionals.⁵⁸

Numerous quality-of-care and quality-of-life benefits will result from the widespread adoption of digital Health Information Technology (HIT) – uniform, interoperable technological standards that will network and digitize our health care system so that its fragmented parts can communicate with each other via broadband. According to the *Business Roundtable*, full implementation of HIT will:

- Empower patients to better monitor their own care and lifestyle habits, and to interact with health providers.

- Improve the management – and thus lower the cost—of chronic illnesses, since early and consistent treatment delays the onset of many symptoms.
- Enable people who live in under-served communities to gain access to treatment that they otherwise might not receive, given the lack of adequate numbers of health professionals and facilities in rural areas and the inner city.
- Engage children of aging parents (who may have to travel long distances to help care for their elders) to remotely participate in decision making and monitoring, using real-time video, voice, images, and data exchanged and conferenced among patients, care providers, and families.
- Introduce security and privacy protocols not possible under the current paper-based system.
 - With paper-based systems, anyone who can open a filing cabinet can view sensitive patient information (and even copy and distribute it), then return the papers without detection.
 - HIT establishes a firewall around patient data, requiring passwords and permission to gain access, and leaving an audit trail of who accessed the data, when, and why.⁵⁹

HIT delivers these significant qualitative benefits while substantially reducing the cost of health care. In 2005, a Rand Corporation study found that savings and efficiencies from the elimination of duplicate or unneeded lab tests and radiology screenings, better time management by health care professionals, the elimination of unneeded drugs, and other inefficiencies totaled \$81 billion a year in overall cost savings in the American health care system.⁶⁰ The Business Roundtable noted:

- *This translates to \$670 per household per year. For the median family in America, this would represent 25 percent of their total annual out-of-pocket outlays for health care.*
- *With the benefits of improved health outcomes included, the total savings could be as much as \$165 billion a year, enough to insure 37 million individuals, more than three-quarters of all uninsured Americans.*⁶¹

RECOMMENDATIONS

The new Administration should employ broadband to provide better quality health care and quality of life, at a significantly reduced cost.

1. Direct the Secretary of Health and Human Services to:
 - a. Define and catalog the types of entities that govern,

- oversee, operate, and/or create policy for the electronic exchange of health information and produce recommendations regarding the appropriate level of consumer participation and requirements for transparency that should apply to them;
 - b. Require institutions and providers to begin sharing health information electronically;
 - c. Set standards for electronic exchange of health information; these standards should focus on:
 - i. Quality improvement
 - ii. Care management
 - iii. Billing
 - iv. Decision support
 - v. Performance data reporting
 - vi. Research and population health initiatives, including disparities reduction efforts
 - d. Set standards for federal health information security and confidentiality; standards that should be guided by the following consumer-control principles:
 - i. Consumers should have easy access to review, add notations, and suggest corrections to existing information in their own records.
 - ii. Consumers should be able to limit which parts of their health information can be shared with which providers.
 - iii. Consumers should be able to limit how their personally identifiable medical information is used outside of care delivery (e.g., for research..
 - iv. Consumers should be able to easily designate others as proxies to act on their behalf (e.g., family member, caregiver, or guardian).
 - v. Consumers deserve an effective process and infrastructure for monitoring and certifying compliance with these common principles among organizations, initiatives, and technologies.
 - e. Encourage and facilitate the adoption of state reciprocity agreements for practitioner licensure to expedite the provision across state lines of telehealth services;
 - f. Expand the list of Medicare telehealth-originating sites to include mental health facilities;
 - g. Include as a home health visit for Medicare purposes telehealth services furnished to an individual by a home health agency;
 - h. Establish a demonstration project to evaluate the impact and benefits of covering remote patient management services for certain chronic health conditions;
 - i. Acting through the Director of the Office for the Advancement of Telehealth of the Health Resources and Services Administration, make grants to expand access

- via telehealth to health care services for individuals in medically underserved rural, frontier, and urban areas;
- j. Work with health plans, employers, HIT vendors and others to create and maintain a centralized resource center of grants, loans, insurance savings opportunities, incentive programs, and other financing options for HIT for providers;
 - k. Establish a consistent methodology for measuring telehealth and health information technology adoption and effective use, and analyzing and reporting data; and
 - l. Allow for electronic prescribing of controlled substances, with appropriate safeguards.
2. Modernize Medicare to facilitate telehealth service:
 - a. Remove Medicare's current geographic restrictions on the provision of telehealth services.
 - b. Expand the types of facilities authorized to participate in the Medicare telehealth program.
 - c. Allow for the provision of coverage of remote patient management services, including home health remote patient management services, for certain chronic health conditions.
 3. Reauthorize telehealth network and telehealth resource centers grant programs.
 4. Establish within the Department of Health and Human Services an Office of the National Coordinator for Health Information Technology and the Health Information Technology Resource Center to provide assistance for the adoption and use of interoperable health information technology.
 5. Allow the Centers for Medicare & Medicaid Services to make federally qualified health centers eligible to participate in demonstration projects related to health records and health information technology.
 6. Allow the Internal Revenue Code to treat qualified health care information technology as a depreciable asset.

EDUCATION

Too often, America educates its children for the challenges they will face in the global, knowledge-based 21st century using 20th-century technology and methodology. Other nations provide students with laptop computers, fast broadband connections, and state-of-the-art digital applications, infusing technology and innovation throughout their educational experiences. In contrast, the Bush Administration has proposed in its FY09 budget eliminating all funding for the Enhancing Education Through Technology program, designed to improve student achievement and boost students' digital literacy through the use of technology in schools.⁶²

The competitiveness and vibrancy of our economy, as well as our homeland security, depend on our ability to maintain a highly-skilled workforce.⁶³ We must educate new generations of digitally literate citizens to ensure they are able to compete successfully in today's global workforce and participate in our increasingly knowledge-based society.

Our education system, however, is failing to meet this challenge. In America's schools, Internet access is often far too slow, with insufficient bandwidth for online learning, collaborative work, video conferencing, and other educational applications. In some cases, schools still use dial-up Internet access. School technology is often antiquated, in short supply, and insufficiently supported. Distance learning over broadband is a distant dream. Online curricula is offline. Teachers are insufficiently trained to use technology in their classrooms, so that whatever technology is available to them languishes. Students are taught the basic 3 Rs, as required by the No Child Left Behind Act, but not the digital skills that will enable them to translate those 3 Rs into success in today's Information Age. The bottom line is that rather than "no child left behind," the failure to fully infuse technology and broadband throughout the education system has left behind many of America's children.

The new Administration should include in its National Broadband Strategy initiatives to promote the rapid adoption of technology and broadband throughout the classroom. It should also include initiatives to advance online learning and "digital excellence" training. In this way, the new Administration will not only stimulate broadband supply and demand, but deliver significant improvements in our nation's ability to educate its children.

INFUSE BROADBAND AND TECHNOLOGY THROUGHOUT AMERICA'S EDUCATION SYSTEM

Some proficiency in math and science is a prerequisite for over 80 percent of our nation's fastest-growing occupations. But, according to National Assessment of Educational Progress scores, fewer than one-third of America's 8th graders are proficient in math.⁶⁴ Approximately a quarter of 4th and 8th grades students are proficient in science. The numbers are even worse for 12th graders.⁶⁵

Of particular concern is the fact that so few of America's children are studying science, technology, engineering, and math (STEM) – areas that are key drivers of our nation's competitive leadership in technology-based industries. In 2005, Tapping America's Potential (TAP), a coalition of the nation's leading business organizations, established a goal of doubling by 2015 the 201,000 students then earning STEM bachelor's degrees from America's universities. Recently, TAP announced that "little real progress had been made" and in 2008 only 24,000 more STEM degrees had been awarded.⁶⁶ Today, only 7 percent of U.S. college students presently major in math or science fields; of all industries that use technology, education is rated at the bottom; and by 2010, assuming current trends continue, over 90 percent of all scientists and engineers will call Asia "home."⁶⁷

Infusing modern technology, including robust broadband, throughout the learning process will help reverse these troubling trends. Some of the impressive results observed include:

- Improved student achievement, attendance, and graduation rates, and decreased dropout rates;
- Gains on high-stakes tests that enable schools to meet AYP (Adequate Yearly Performance) and performance benchmarks under No Child Left Behind;
- Heightened school efficiency, productivity, and decision making;
- Advances in teachers meeting requirements;
- Improved student learning skills;
- Assistance in meeting the needs of all students, including those with special needs;
- Promotion of equity and access;
- Improved workforce skills; and
- Increased parent involvement.⁶⁸

The America's Digital Schools (ADS) 2006 report examining learning environments where each student and teacher has "one Internet-connected wireless computing device for use both in the classroom and at home" found that 88 percent of school districts where academic results were tracked report moderate to significant positive results. Other benefits were widely observed, including fewer dropouts and better attendance.⁶⁹

Access to technology and broadband, both at school and at home, can also help to ameliorate the unequal distribution of educational resources and opportunities available to different school districts, socioeconomic levels, regions, and institutions. In a mixed-income housing project in Washington, D.C., for example, after their classrooms and homes were wired for broadband, students were able to enroll in an IT skills training program that boosted their average income after graduation from \$9,800 to \$28,000.⁷⁰ "Schools in the low end or in the high end socio-economically need to look the same," says Nick Salerno, an assistant superintendent with the El Monte Union High School District. "We must provide the same opportunity for everyone."⁷¹

PROMOTE ONLINE LEARNING

Online learning, made possible by robust broadband, enables students in remote, smaller, or financially-strapped schools to take courses they otherwise could not access. In Chicago and Los Angeles, minority students take online courses to enroll in more high-level and higher-quality courses, with superior teachers, than may be physically available to them.⁷² In Greenville, South Carolina, when their physical school could not offer Latin, students instead enrolled in an online Latin course taught by a teacher at another district school.⁷³ In Nebraska, an education IT manager reports, "Our rural schools live and die by video distance learning. . . . It's the next best thing to a highly qualified teacher in a face-to-face environment."⁷⁴

In 2008, many college administrators report that as gas prices skyrocket, so does online enrollment, up as much as 40 percent as a result of students choosing to avoid the cost and time of driving.⁷⁵

Workers in today's mobile and globally-competitive workforce must be lifelong learners to keep up with developments in their fields or to transition to different fields. Online learning enables workers to overcome the barriers of time and distance, and take training courses at anytime and from anywhere in the country, at a pace that best suits their needs.⁷⁶

TEACH DIGITAL EXCELLENCE TO ALL STUDENTS

Technology and broadband are transforming the traditional educational experience. "Increasingly, the educational process involves Internet-based research, online collaboration with fellow students, videoconferences with professors and government officials in other states and countries, real-time video exploration of the galaxies or undersea expeditions. . . . Virtual field trips can take students and teachers sitting in their classrooms to faraway places, such as touring the Smithsonian National Air and Space Museum, experiencing a tribal dance in Africa, or scouring the depths of the Pacific Ocean in a submarine. . . . Homework can be researched using digital archives at the Library of Congress, where 3D objects can be examined from all angles."⁷⁷

But access to technology and broadband alone is not enough to transform students' educational experiences; they must also possess the digital skills necessary to effectively use that access. A student who has little or no Internet access or training growing up will be at a significant disadvantage at the college level where Internet proficiency is assumed.⁷⁸ Without digital proficiency gained from frequently using the Internet over a broadband connection both at home and at school, students may choose not to attend college at all.⁷⁹

There must be "inclusion" of all Americans in our increasingly digital society, so the digital divide is closed, as we discuss below in the "Reinventing Democracy and Government" section. But for America's students, the bar must be set higher. Digital excellence – demonstrated mastery of digital skills – must become as important an educational priority as learning the 3 Rs.⁸⁰ Included in digital excellence is "information literacy" – mastery of the skillset necessary to "mine" the Internet's almost limitless resources to secure useful information and solve problems.

RECOMMENDATIONS

The new Administration should infuse broadband and technology throughout America's education system and promote initiatives to advance online learning and digital excellence training.

1. Expand and reform the E-Rate program. The E-Rate program has been extremely effective in its mission of bringing the Internet to America's schools and libraries. But too often, that Internet access is so slow as to be obsolete and may be available on only one computer per school. The E-Rate program should ultimately provide free broadband

to all schools and libraries, as well as sufficient hardware and software for students to use it. Intermediate steps include lifting the E-Rate funding cap while simplifying its paperwork burden and bureaucratic complexity. E-Rate recipients should be allowed and encouraged to use E-Rate funds to create wireless broadband canopies that bring the school or library's broadband to the surrounding community. The program should support Internet broadband speeds of at least 10 Mbps per 1,000 students/staff, as recommended by the State Educational Technology Directors Association.⁸¹

2. Create and fund the Digital Opportunity Investment Trust and expand the Enhancing Education Through Technology (EETT) program. The Digital Opportunity Investment Trust will advance the high priority of bringing technology into the educational system, emphasizing the creation of educational content and software that incorporates the vast range of technologies available. It will also address the critical need to digitize and bring online the content of America's universities, museums, libraries, and other public institutions.⁸² The new Administration should also increase funding for the EETT program, designed to improve student achievement and boost students' digital literacy through the use of technology in schools.

3. Provide one laptop per child and support ubiquitous computing. The new Administration should provide federal funding to school districts that implement a one-to-one laptop program for students in grades 6 through 12 and provide funding for teachers, students, and parents who receive training in technology-rich educational services and applications.⁸³ It should also provide tax incentives and other support that encourage America's businesses to donate their old computers to economically disadvantaged families.

4. Support state, municipal, and school district efforts to bring robust broadband to schools. One of the world's largest installations of wireless local area networks in production today has been constructed by the School District of Philadelphia, the eighth largest school district in the United States. It now provides wireless Internet access at every school in the district.⁸⁴ As FCC Commissioner Michael Copps recently suggested,⁸⁵ the federal government should facilitate the expansion of these broadband networks beyond the schools to the nearby communities, as was done in Livermore Valley, California.⁸⁶

5. Appropriate funding for the National Center for Research in Advanced Information and Digital Technologies. The National Center will support a comprehensive research and development program to explore ways advanced computer and communication technologies can improve all levels of learning and "make learning more compelling, more personal, and more productive in our nation's schools."⁸⁷

6. Adopt action principles and goals formulated by top educators for all federal education programs.

- Technology should be promoted to the greatest extent possible in every federal education program and initiative.
- Standards for educational uses of technology that facilitate school improvement should be required, such as the National Educational Technology Standards developed by the International Society of Technology in Education.
- Proficiency in 21st-century skills should be emphasized in education policies, as well as professional development programs that foster 21st-century teaching and learning.⁸⁸

7. Support categorical funding for online learning initiatives and digital excellence initiatives.

ENERGY AND THE ENVIRONMENT

Skyrocketing energy prices, increasing dependence on unreliable foreign sources of energy, and global climate change all increasingly threaten our national security, health, and prosperity. For too many years, America has failed to address these critical challenges. Our nation's "energy policy" has been to have no energy policy. When the federal government's own scientists and experts attempt to write reports on the dangers of atmospheric pollution, elevated ozone levels, and other ecological threats, or draft meaningful rules to deal with those threats, the current Administration rewrites the reports to downplay the problems and waters down the rules.⁸⁹

By implementing a National Broadband Strategy that includes initiatives to help Americans utilize broadband to reduce energy consumption and carbon dioxide gas emissions, the new Administration can quickly and meaningfully address the threats that energy insecurity and environmental degradation pose to our nation. Taking strong executive action to deploy universal, affordable, and robust broadband; promote telework; and modernize our existing nationwide electricity system with innovative "Smart Grid" technology could rapidly reap substantial benefits.

UNIVERSAL, AFFORDABLE, AND ROBUST BROADBAND WILL REDUCE ENERGY CONSUMPTION AND BENEFIT OUR ENVIRONMENT

Increased utilization of robust broadband and the applications it enables can significantly decrease energy consumption and deliver impressive reductions in carbon dioxide emissions. After reviewing the impact that the widespread deployment of robust broadband throughout America would have on our economy and energy usage, a recent study published by the American Consumer Institute concludes that "the wide adoption and use of broadband applications [in the United States] can achieve a net reduction of 1 billion tons of greenhouse gas over 10 years, which, if converted into energy saved, would constitute 11% of annual U.S. oil imports." Specifically, the study finds:

- Business-to-business and business-to-consumer e-commerce are predicted to reduce greenhouse gases by 206.3 million U.S. tons.
- Telecommuting 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.

- Teleconferencing could reduce greenhouse emissions by 199.8 million tons, if 10 percent of airline travel could be replaced by teleconferencing over the next 10 years.
- Reduction in first-class mail, plastics saved from downloading music/video, and office paper from emails and electronic documents could reduce emissions by 67.2 million tons. For example, over the next 10 years, shifting newspaper subscriptions from physical to online media alone will save 57.4 million tons of carbon dioxide and other greenhouse gas emissions.
- In summary, a review of existing literature shows that the potential impact of changes stemming from the delivery of broadband is estimated to be an incremental reduction of more than 1 billion tons of greenhouse gas emissions over 10 years.⁹⁰

Similar energy and emission reductions were recently reported in a study conducted for Telstra, the formerly state-owned Australian telecommunications giant. The authors concluded that using telecommunications networks would lower the nation's total emissions by almost 5 percent, "making the use of telecommunication networks one of the most significant opportunities to reduce the national carbon footprint."⁹¹

One telling illustration of the power of broadband technology to reduce energy consumption and carbon dioxide emissions is provided by UPS, which uses sophisticated broadband applications to plot delivery routes for its trucks that turn right and not left whenever possible. This enables UPS drivers to take advantage of "right on red" traffic laws and reduce their idling time waiting for oncoming traffic to clear. That not only saves fuel, but it also results in improved safety because drivers are not turning left across traffic. Utilizing this broadband technology, the company estimates that in 2007 it saved 3.1 million gallons of fuel and avoided pumping 32,000 metric tons of greenhouse gases into the atmosphere.⁹²

Too often, unfortunately, information and communications technologies (ICT) are victims of what researchers at the American Council for an Energy-Efficient Economy (ACEEE) call the "ICT energy paradox," in which people tend to think of ICT applications as wasteful of energy rather than energy-efficient in the long run. To the contrary, however, the evidence shows:

For every extra kilowatt-hour of electricity that has been demanded by ICT, the U.S. economy increased its overall energy savings by a factor of about 10. These productivity gains have resulted in significant net savings in both energy and economic costs. The extraordinary implication of this finding is that ICT provides a net savings of energy across our economy.

Given that modern, digital ICT applications conserve energy and resources at a time when America suffers from a scarcity of both, ACEEE concludes that “as a nation we should commit to the realization of the energy-saving opportunities that new ICT opportunities provide.”⁹³

TELEWORK – SAVING TIME, MONEY, AND THE ENVIRONMENT

Increasing the amount of telework⁹⁴ performed throughout the public and private sectors could rapidly achieve significant reductions in energy consumption and carbon dioxide emissions. In addition, telework generates numerous other valuable personal and social benefits. Rush hour congestion is reduced. Fewer roads and offices are required. Workers enjoy more leisure time, boosting morale and productivity. Those who are elderly, disabled, and or have children in the home participate more effectively in the workforce. “Homeshoring” becomes a viable alternative to “offshoring” for businesses seeking to reduce costs. But a necessary prerequisite to realizing the full potential that telework can offer is universal, affordable, and robust broadband.⁹⁵

Broadband-enabled telework offers huge potential savings for both the environment and workers. Ninety-one percent of America’s workers (or 132.9 million people) use personal vehicles to commute to work. The American Consumer Institute estimates that these vehicles:

- Generate 30 to 50 percent of U.S. greenhouse gas emissions;
- Release 424 million tons of carbon dioxide into the atmosphere each year while being used for commuting, as well as 23 million tons of carbon monoxide, 1.8 million tons of volatile organic carbons, and 1.5 million tons of nitrogen; and
- Consume 44 billion gallons of gasoline per year.⁹⁶

At the price of \$4 a gallon, the cost of gas alone for these private vehicles is \$176 billion a year.

The Consumer Electronics Association estimates that using electronics such as personal computers and wireless networks to telecommute:

- Saves the equivalent of 9 to 14 billion kilowatt-hours of electricity per year (equal to the amount of energy used by approximately 1 million U.S. households every year); and
- could eliminate carbon dioxide emissions in an amount equal to taking 2 million cars off the road.⁹⁷

Work from home has untapped potential – and is an underserved market. Only 2 percent of the American workforce are full-time teleworkers, although 28.7 percent of employees work at home at least one day per month, and 44.8 percent have worked from home at some time.⁹⁸ Importantly, evidence indicates workers want to telework and are even willing to accept less pay to do so. A survey of 1,500 technology workers conducted by Dice Holdings, Inc., indicates that more than one-third of U.S. tech workers would accept pay cuts of up to 10 percent to work from home and avoid commuting to the office.⁹⁹

Some negatives about telework, however, whether real or perceived, must be addressed and overcome. Many employees are concerned that telework may harm their chances for promotions or that their employers prefer that they come to the office to make sure they are productively working.¹⁰⁰

At a time when telework could significantly reduce energy consumption and greenhouse gas emissions, the federal government’s workforce is actually reducing its telework participation. The U.S. Office of Personnel Management reports that of the 1.25 million federal workers who are eligible to telework, only 9 percent actually do. These teleworkers comprise just 6.12 percent of the total federal workforce. In 2006, the number of federal employees who teleworked actually dropped 7.3 percent to 110,592 from 119,248 in 2005, while the number of employees categorized as not eligible for telework leaped from 30 to 44 percent.¹⁰¹

One federal agency, however, the National Science Foundation, has over half of its employees teleworking, and reports that 87 percent of employees view teleworking positively. Importantly, 87 percent of managers report that the productivity of teleworking employees remains level or even increases. In addition, by not commuting, on average “each NSF teleworker reclaims 62 hours of their lives and saves \$1,201 a year. Extrapolating those savings across the agency, NSF teleworkers collectively spare the environment over 1 million pounds of emissions and save more than \$700,000 in commuting costs per year.”¹⁰²

These data suggest that, given sufficient opportunity, information, and high quality, affordable broadband, many more public- and private-sector workers potentially could – and would – telework. If only 10 percent more of the workforce regularly teleworked – roughly a doubling of today’s percentage – greenhouse gas emissions would be reduced each year by an additional 42.4 million tons of carbon dioxide, as well as 2.6 million tons of other pollutants. Over a 10-year period, the direct and indirect benefits of this additional telecommuting would prevent more than a half-billion tons of added pollutants from being released into the atmosphere and generate direct savings of “\$96.5 billion, including the cost of 4.4 billion gallons of gasoline each year.”¹⁰³

The effort to encourage federal workers to telework has been hampered because many employees do not have access to fast, affordable, and reliable broadband Internet access, a prerequisite for a successful telework initiative. Dan Matthews, one-time U.S. Department of Transportation CIO, says, employees need high-speed Internet access to work on large files, take part in videoconferencing and online chats with one or more co-workers. [Y]ou can’t work using dial-up Internet access.¹⁰⁴ Other reported barriers to increasing the numbers of federal employees who telework that must be addressed by the new Administration include:

- Inadequate marketing of telework to employees;
- Management resistance;
- Inadequate office coverage;
- Inadequate employee and manager training;
- Inadequate IT budgets; and
- Data and computer security.¹⁰⁵

SMART ELECTRICAL GRID – A BROADBAND-ENABLED, MONEY-SAVING COLLABORATION

Jerry Brous, a retiree, owns one of 112 homes in the Olympic Peninsula, west of Seattle, that as part of a pilot project were equipped with digital thermostats, water heaters, and clothes dryers fitted with computer controllers. With the thermostats and controllers linked to an Internet website, the homeowners could set their favorite home temperature, and how much variance from it they were willing to tolerate. They could also choose whether to buy more or less electricity depending on changes in pricing. Thus, they more precisely selected how to balance comfort and costs, and became active partners in managing the overall demands on the electricity grid. While the average household saved about 10 percent on its electric bill, Brous

saved about 15 percent, which added up to \$135 over a year.

“Your thermostat and your water heater are day-trading for you,” said Ron Ambrosio, a senior researcher at IBM, which provided software and analytics for the project.

“I was astounded at times at the response we got from customers,” said Robert Pratt, the Pacific Northwest National Laboratory’s program director for the demonstration project. “It shows that if you give people simple tools and an incentive, they will do this. . . . [E]ach household doesn’t have to do a lot, but if something like this can be scaled up, the savings in investments you don’t have to make will be huge, and consumers and the environment will benefit.”¹⁰⁶

Using Internet-based “smart grid” technology to efficiently manage energy production, distribution, and consumption is becoming one of the fastest-growing segments of IT. In addition to providing utilities and consumers with savings of up to \$70 billion over the next two decades, a Smart Grid will reduce our energy dependence and benefit our environment.¹⁰⁷ “Energy companies have been doing things in a very similar fashion for their first 100 years,” says Silver Spring Networks CEO Scott Lang. “But now there’s this convergence of devices that can talk and radio frequency technologies and processing power. It’s going to revolutionize the system. . . . To link them up we identified one standard: IP. The same kind of approach that makes the Internet work is going to make this work.”¹⁰⁸

In a Smart Grid, information flows “from a customer’s meter in two directions: both inside the house to thermostats, appliances, and other devices, and from the house back to the utility. Smart Grid is defined to include a variety of operational and energy measures – including smart meters, smart appliances, renewable energy resources, and energy efficiency resources.”¹⁰⁹ A 21st-century smart grid will

- Be “self-healing;”
- Be more secure from physical and cyber threats;
- Support widespread use of distributed generation, allowing customers to interconnect fuel cells, renewable generation such as wind, and other distributed generation on a simple “plug and play” basis;
- Enable consumers to better control the appliances and equipment in their homes and businesses;
- Interconnect with energy management systems in smart buildings to enable customers to manage their energy use and reduce their energy costs; and
- Achieve greater throughput, thus lowering power costs.¹¹⁰

In the *Smart Grid Newsletter*, Alex Yu Zheng enumerates these compelling energy and environmental benefits from Smart Grid deployment:

- Energy efficiency;
- New power plants and transmission lines delayed or unneeded;
- Wind, solar, and other sources of distributed generation that can be easily attached to the grid;
- Load curtailment, demand response, and energy storage that are required for integrating wind or solar power into the grid at high levels are enabled;
- Creation of a “clean” power market;
- Consumer incentives for conservation;
- Support for the increased load on the grid from next-generation hybrid and electric cars;
- Support for more intelligent appliances;
- “Manage” air pollution by flexible electricity pricing and other means; and
- Advanced metering to help calculate environmental footprints.¹¹¹

These Smart Grid benefits are predicated on one critical element – the intelligence supplied by millions of electricity consumers, distributors, and producers networked to each other by universally deployed and robust broadband access to the Internet.

RECOMMENDATIONS

The new Administration should use broadband technologies to meaningfully reduce energy consumption and improve environmental quality.

1. Create a special government Energy, Environment, and Technology working group, under the leadership of the White House Chief Innovation [should this be Technology?] Officer, to break down the bureaucratic silos separating energy, environmental quality, and information technology regulators and experts, and bring them together to realize the promise that broadband and information technology can bring to our nation’s challenges with energy scarcity and environmental degradation.

2. Direct the U.S. General Services Administration, the U.S. Office of Personnel Management, and the White House Chief Technology Officer to, within 100 days,

- Provide recommendations and assistance to all agency heads on ways to maximize voluntary telework without diminishing employee performance or agency operations, as well as ways to educate federal workers about the personal and social benefits of telework, including reduced

energy usage, a healthier environment, and improved employee morale;

- Establish and implement telework “best practices” for federal employees that will also serve as a model for adoption by state and local governments and the private sector;
- Prescribe, in coordination with the Office of Management and Budget and the National Institute of Standards and Technology, regulations to ensure the adequacy of information and security protections for information and information systems used in, or otherwise affected by, teleworking; and
- Maintain a central, publicly available telework website to be jointly controlled and funded by the General Services Administration and the Office of Personnel Management to inform federal employees of regulations, best practices, case studies, and other information relating to telework.

3. Direct each federal agency to:

- Appoint a Telework Managing Officer who will:
 - Advise the agency head and Chief Human Capital Officer on telework;
 - Educate supervisors, managers, and employees about teleworking;
 - Assume responsibility for the agency on teleworking matters; and
 - Develop and implement a program to identify and remove barriers to telework and to maximize telework opportunities in the agency.
- Establish goals for greater telework participation and permit qualified workers to telework at least 20 percent of the hours worked in a two-week period, or generally the equivalent of two work days.

4. Work with Congress and the Department of Energy (DOE) to appropriate funding for Smart Grid demonstration projects, such as those described but not funded in the Energy Independence and Security Act (EISA) of 2007. Real-world demonstrations will

- Determine the technologies that provide the most benefit for the investment;
- Provide the credible data needed by utilities and other investors to make the business case;
- Assist regulators in creating a regulatory environment that enables utility, consumer, and societal benefits to be fairly recognized while enabling utilities and others to fairly recover their investments;

- Educate consumers on the value of the technologies and their increased choices for electrical service; and
- Enable the industry to move beyond the current impasse.¹¹²

5. Direct the DOE to report on progress made on achieving the EISA's "national policy goal" of a nationwide Smart Grid and recommend additional steps necessary to reach the goal, such as adoption of a Smart Grid investment tax credit, demand reduction tax credit, accelerated depreciation, or other steps.

6. Recommend additional ways for the federal government to accelerate the adoption of Smart Grid technology, including using its purchasing power in the electricity market and increasing its purchasing of electricity from renewable energy sources, as called for by the Energy Policy Act of 2005.

PUBLIC SAFETY AND HOMELAND SECURITY

One of the highest duties of any nation's government is assuring the public's safety and security. One vital element in providing that safety and security is a strong and resilient communications system. The tragedies of 9/11 and Hurricane Katrina, however, starkly demonstrated that our nation relies on an uncoordinated, non-interoperable, and outdated emergency communications system that is highly vulnerable to catastrophic disruption and failure. In the 21st century, America's public safety and homeland security require 21st-century communications and information technology that are robust, ubiquitous, interoperable, resilient, and redundant.¹¹³

AMERICA NEEDS MODERN TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY TO IMPROVE PUBLIC SAFETY AND PROTECT HOMELAND SECURITY

Today's communications and information technology (IT) services are too often based on outdated technologies that are too slow to respond to – and recover from – emergencies, disasters, and systemic failures. Public safety and recovery efforts are impeded. Citizens who suddenly lose their access to information and first responders are endangered. For example, on 9/11, 95 percent of cell phone calls made at 11 a.m. failed to get through; the central office for the phone system cut off 300,000 landline phones; television stations were knocked off the air; and many first responders' radios failed. Yet only 2 percent of Internet addresses remained off-line for an extended period, illustrating the Internet's overall resilience to attacks as a result of its flexibility and adaptability. During Katrina, 38 critical Public Safety Answering Points failed, preventing 911 calls from being answered. Information sharing was impeded by the absence of data sharing standards and systems.

Those failures could have been avoided had IP-based voice and data communication services and infrastructure been used, public safety leaders say, citing their demonstrated information sharing value, and their resiliency and redundancy when properly deployed.¹¹⁴ As FCC Chairman Kevin Martin told the panel investigating the performance of the communications infrastructure during Katrina, "I would also like to see a greater use of IP technologies that are capable of changing and rerouting telecommunications traffic. In the event of a systems failure within the

traditional network, such IP technologies would enable service to be restored more quickly and would provide the flexibility to initiate service at new locations chosen by consumers."¹¹⁵

As Mark Lloyd has written, the goal of the federal government's broadband policy "should be first and foremost to ensure our ability to respond to threats to our homeland security and to natural disasters. ... Without ubiquitous broadband our first responders could be crippled by the lack of effective communications in the event of a terrorist attack or natural disaster."¹¹⁶

A 21st-century telecommunications infrastructure that is scaled to provide for our national defense would be universal, robust, interoperable, open, resilient, and redundant. Unfortunately, federal communications policy has failed to foster that universal and robust infrastructure because it views broadband and advanced telecommunications services as a consumer service best left to market-driven private business, rather than as critical to national defense, and therefore, a compelling public need.¹¹⁷

Numerous real world examples demonstrate that the universal deployment of robust broadband will improve our nation's homeland security and public safety. The collapse of the Interstate 35W Bridge in Minneapolis illustrates how broadband can weather a disaster and continue to provide reliable communications for first responders and the public. Craig Settles reported about the performance of that city's municipal Wi-Fi network, which at the time of the tragedy was still under construction:

When the concrete and steel span abruptly gave way in rush-hour traffic on Wednesday, August 1 [2007], the city's municipal network was only one quarter completed and that section had only been operational for two months. There were no prior drills by either the city staff, the network vendor (USI Wireless) or the general population for a crisis response involving the technology, though the city had planned to use the network for emergency response

As news of the bridge collapse spread, two separate response efforts were set in motion and later united: one by the city's CIO Lynn Willenbring, and the other by USI Wireless' CEO Joe Caldwell.

Willenbring called her IT team together immediately after hearing about the collapse and they provided basic support and services from their offices for the city's

emergency operations command center. The city's GIS (Geographic Information System) staff prepared maps to distribute via the network to the public to use and to send to the disaster site for city staff dealing with traffic and recovery efforts.

Caldwell called the City to find out how his company could help, but couldn't get through because the cellular network was jammed. He decided on the spot to open the entire network to be free for 24 hours for any citizen who could use it. Network traffic surged from 1000 subscribers to 6000 concurrent users. People with Wi-Fi-enabled telephones could make voice calls, and anyone with Wi-Fi devices could send instant messages, video, photos, e-mail or other data. The company also sent crews to install BelAir Networks equipment to cover then undeployed areas around the bridge area and also wireless cameras to help with recovery operations.¹¹⁸

Within 12 hours, using readily available communications equipment, extra access points, and video cameras, emergency workers had audio and visual access to the entire bridge collapse area. Minneapolis's entire municipal Wi-Fi network proved invaluable in the hours, days, and weeks to follow, connecting government officials, emergency workers, families with loved ones lost or injured in the collapse, and ordinary citizens.¹¹⁹

In Hermiston, Oregon, a 700-square-mile wireless broadband cloud around the Umatilla Chemical Depot, a highly dangerous site that is a tempting target for terrorists, allows public safety officials equipped with Wi-Fi-enabled laptop computers to monitor potential chemical leaks and allow first responders to direct evacuees safely from the field during emergencies.¹²⁰

Another benefit of the Hermiston wireless broadband cloud is if nerve gas does escape, officers in police cars equipped with laptops and the appropriate software can download data and receive images that display the gas cloud's direction and speed. First responders are able to communicate via Wi-Fi – there's no problem with incompatible radios and frequencies, as happened to the New York City first responders on 9/11. If there's a report of a burglary or a fire, first responders rushing to the scene can download floor plans of the building, live images from video monitors, and information about the alarm system.¹²¹

Broadband and broadband-enabled applications can tie together local community firefighters, police officers, ambulance crews, and other emergency workers in a single wireless communications network. In the future, police officers engaged in high-speed chases could get real-time

footage from helicopters. Bomb squads would be able to inspect dangerous sites remotely.¹²²

The smallest and most rural public safety agencies stand to benefit the most from broadband access to the Internet because it can give them access to the best information technology applications at a cost far more affordable than those available today. For example, with funding provided by the U.S. Justice Department through the Tribal Rural Law Enforcement Internet Project, a program that has existed in various forms since 1995, the Comanche Nation Police use broadband Internet access to seek help from other law enforcement agencies in preparing search warrants or investigating officers' deaths. The Project's listserv recently helped a Texas law enforcement agency prepare a subpoena and an Alaska agency research model curfew policies. The experiences of these rural public safety bureaus are textbook examples of ways broadband can improve everyday law enforcement performance and efficiency. But, astonishingly, rather than build on this Project's track record of success, the Justice Department recently announced it would not renew the Project's funding. Said one rural police chief whose department was about to lose its broadband Internet access, "I don't know how you replace it."¹²³

Universal, affordable, and robust broadband could bring many benefits in the event of a public safety or homeland security emergency. In the event of a major 9/11-type attack on Washington, or a flu pandemic or other emergency, offices could be inaccessible but employees would still be able to communicate via broadband-based applications. Federal workers using broadband-enabled phones could immediately work from home or other broadband-enabled locations, improving continuity of government. But without broadband at home, workers would remain isolated, unable to connect to each other or the broader network.¹²⁴

STRONG FEDERAL LEADERSHIP IS NECESSARY TO IMPLEMENT A NATIONAL BROADBAND STRATEGY THAT WILL ENHANCE PUBLIC SAFETY AND PROTECT HOMELAND SECURITY

Professor Jon M. Peha of Carnegie Mellon University, an expert on public safety communications systems, recently testified before Congress about the compelling public safety and homeland security rationale for a national broadband infrastructure:

When public safety communication systems fail, people can die. We had seen this occur after the 9/11 attacks,

after Hurricane Katrina, and in countless large and small emergencies throughout the country. Many of these tragic failures are avoidable.

In addition to suffering from much-discussed interoperability problems, the communication systems used by public safety are less dependable than they should be, less secure than they should be, and less spectrally efficient than they should be. Ironically, they are also more expensive than they should be, which means taxpayers pay extra for systems that are unnecessarily prone to failure.¹²⁵

Instead, Peha told Congress: *“First responders should have a single nationwide broadband communications system with technology that is based on open standards. This requires federal leadership.”*¹²⁶

The kind of leadership needed today was on display in 1956 when the federal government, in the National Interstate and Defense Highways Act, signed enthusiastically into law by President Eisenhower, committed to building a nationwide network of world-class, high-speed interstate superhighways to better provide for public safety and homeland security.¹²⁷ Today, in the Digital Age, for those same reasons, the federal government must exert that same kind of leadership to ensure the standards, shared services, and connections to a new world-class infrastructure of 21st-century telecommunications networks.

“All Americans need access to advanced telecommunications services in the 21st century,” Lloyd writes, “just as they needed access to an advanced highway system in the 20th century.” This is particularly true for all emergency organizations meeting critical public needs. Just as we connected schools to broadband at the end of the last century, we need to hook up the more than 100,000 emergency agencies in the nation. “Katrina and 9/11 remind us that access to advanced telecommunications service is a public need. We need national leadership to remind us of this, and insist on policies that address public needs.”¹²⁸

The right applications for the right networks

Achieving integrated and interoperable emergency response systems requires that 1) emergency organizations have access to broadband, 2) the networks serving this balkanized field interconnect, and 3) most importantly, the right data and applications can be transmitted over Internet networks.¹²⁹ However, there’s no one government agency charged with taking a comprehensive view of public safety and emergency response. And, too often, the agencies charged with different aspects of the emergency response focus too much on building networks, not the needed

standardization of data and applications that must run over them.

The commercial and military sectors are leading the way in creating and employing a “virtual safety enterprise”: the network-centric operations, cloud computing, managed services, service-oriented architectures, and the like, which are needed to tie together tens of thousands of disparate agencies, most of which have their unique communications and information technology.¹³⁰ If information companies could take on the safety market, treat it like a virtual enterprise, and develop standards-based managed application services for it, they would be able to cause major leaps forward in service to the public in emergencies large and small (and major overall cost savings). So far they have not been interested in advancing commercial, managed service solutions to this fractured market.

RECOMMENDATIONS

The new Administration should utilize broadband technologies to enhance public safety and protect homeland security.

1. Undertake a national effort to build a national 21st-century telecommunications system that will provide for public safety and homeland security similar to the effort undertaken 50 years ago to build our National Interstate and Defense Highway system. This effort should be guided by these overarching principles:

- First responders should have a single, nationwide, robust broadband communications system with technology based on open standards and redundant and resilient connections.
- All U.S. citizens should have access to emergency services and agencies using any device or mode commonly used in public communications.
- The network should provide emergency responders and citizens access to the information they need, when, where, and how they need it.

Specifically, this effort should include:

- Ensuring that local, state, federal, and tribal statutes, regulations, and overall policies promote, rather than delay, the creation of this system;
- Directing the Department of Homeland Security to mandate interoperable, broadband-based systems in all communications-related grants;¹³¹ and
- Evaluating and, if effective, continuing the Public Safety Interoperable Communications Grant Program¹³¹ at the National Telecommunications and Information Administration.

2. Convene a new blue-ribbon panel on emergency communications and information technology, such as that assembled by the U.S. National Science Foundation in 2003, to study the emergency telecommunications and IT systems and networks now operating across the nation. The panel should recommend to the Administration and Congress ways that those networks could be upgraded and supplemented to provide for the nation's public safety and the national defense in the 21st century.¹³³

3. Adopt the ComCARE E-Safety Program to enhance homeland security by helping bring 21st-century capabilities to emergency response, deploying integrated, interoperable, and interconnected wireline and wireless systems and applications.¹³⁴

4. Restore funding for the Tribal Rural Law Enforcement Internet Project.

5. Direct FEMA to create a Disaster Relief Mobile Services Unit to provide advanced telecommunications services to areas where the existing infrastructure has been devastated by disaster.

6. Appoint a national cyber security advisor to coordinate policy to secure information and information networks.

7. Adopt the recommendations of the Joint Advisory Committee on Communications Capabilities of Emergency Medical and Public Health Care Facilities to overhaul and update the communications systems of EMS, 9-1-1, and public health facilities, based on these principles:

- Encourage interoperable broadband networks.
- Improve interoperability through better interagency coordination.
- Enable consistent efforts through use of common standards and federal grant guidance coordination.
- Advance capabilities through better network integration.
- Ensure that first responders, health care personnel, and patients have ubiquitous access to broadband services and applications by fostering a regulatory environment in which private-sector companies build robust broadband networks and by providing targeted funding.¹³⁵

REINVIGORATING DEMOCRACY AND GOVERNMENT

Preceding sections of this paper have focused on the role that our nation's rapid deployment of universal, robust broadband can play in addressing several of the most complex and challenging problems that America faces. Building out broadband to every American household, however, is not enough. The new Administration must include in its National Broadband Strategy initiatives to eliminate the digital divide through a program of "digital inclusion" – which encompasses access to broadband for all Americans and the skills and tools required to effectively use it. The NBS should foster increased transparency and empower greater participation by citizens, while at the same time implementing more efficient "e-government" practices to generate cost savings in the billions of dollars. Promoting digital inclusion and shrinking the digital divide will stimulate broadband supply and demand, as well as transform and reenergize the federal government, connect policymakers to citizens, generate substantial cost savings, and reinvigorate our democracy.

DIGITAL INCLUSION

Sadly, America today is too often a society of digital exclusion where low-income, minority, rural, elderly, and disabled Americans have been left on the wrong side of the digital divide. Although 55 percent of adults in this country now have access to broadband at home,¹³⁶ figures show significant disparities for several key demographic groups. For example:

- Only 35 percent of homes with less than \$50,000 in annual income have broadband, while 76 percent of households earning more than \$50,000 per year are connected.
- Nearly 20 million Americans live in areas that are not served by a single broadband provider, while tens of millions more live in places where there is only a single provider for high-speed Internet access.
- Only 40 percent of racial and ethnic minority households subscribe to broadband, while 55 percent of non-Hispanic white households are connected.¹³⁷

Even more worrisome, the rate of broadband penetration for low-income families has actually dropped since 2007 as many have disconnected their broadband service during these hard economic times. For African-Americans, growth in broadband penetration has slowed dramatically compared to that for all citizens.¹³⁸

In terms of overall access to the Internet, the data tell a similar story of disparity and digital exclusion. While 73 percent of Americans nationwide have access to and make regular use of the Internet, several key demographic groups significantly lag the average:

- Only 59 percent of African Americans are online, compared with 79 percent of whites.
- Only 38 percent of Americans with disabilities are connected.
- Only 44 percent of people who have not graduated from high school are connected, compared to 91 percent of college graduates.
- Only 35 percent of people who are over age 65 are online, compared to 90 percent of those aged between 18 and 29.
- Only 56 percent of all Hispanics, and only 32 percent of those Latinos who speak only Spanish, use the Internet.¹³⁹

Many years into the oft-marveled "Information Age," the intensity of the digital divide is unmistakable even among our youth. Children with disabilities and those coming from minority and low-income backgrounds still often lack home access to a computer or the Internet. Using U.S. Census Bureau data, the Children's Partnership reports:

- Children in low-income families are half as likely to have a computer as children in households with annual incomes over \$75,000, are a third as likely to have Internet access, and a sixth as likely to have access to broadband.
- Home Internet access among children ages 7 to 17 varies widely by ethnicity. Only 41 percent of Native American youth, 43 percent of African-American youth, and 44 percent of Latino youth have access; compared to 75 percent of Asian-American youth and 80 percent of white youth.
- Among people age 15 or older, only 24.3 percent of those with disabilities use the Internet at home, compared to 50.5 percent of those without disabilities.
- Of school children, ages of 7 to 17, only 29 percent of those in households with annual incomes of less than \$15,000 use a home computer to complete school assignments, compared to 77 percent of those in households with annual incomes of \$75,000 or more.¹⁴⁰

Declares the Children's Partnership, "As the gap between rich and poor in the United States continues to grow, the ability to benefit from the opportunities delivered

through computers and the Internet can help a generation of young people move out of poverty. Digital opportunity for kids is the equity issue of the 21st century.”¹⁴¹

For children and adults with disabilities, computers and broadband Internet access offer enhanced opportunities to more fully participate in and engage with society. Yet persons with disabilities are actually less likely to own a computer or have access to the Internet. A survey of disabled persons 15 years of age or older showed:

- Only 44 percent with disabilities had a computer at home, compared to 72 percent of those without disabilities;
- Only 38 percent of those with disabilities had access to the Internet at home, compared to 64 percent of those without disabilities; and
- Only 24.3 percent of those with disabilities use the Internet at home, compared to 50.5 percent of those without disabilities.¹⁴²

With more and more of our society’s news, information, cultural, and civic life now taking place online, digital inclusion is increasingly necessary for citizens to fully participate in our democracy. As communities cut back on cable television’s public, educational, and government (PEG) local access channels, as Phoenix recently did,¹⁴³ or push PEG channels into a more expensive and exclusive cable package, as happened to a million households in the Tampa Bay area,¹⁴⁴ the Internet is taking on an increasing role and responsibility in engaging citizens in the affairs of their communities. Many localities, for instance, now stream or archive their governmental meetings on the Internet.¹⁴⁵

The need for digital inclusion of all our nation’s citizens to provide them the opportunity to fully engage in civic affairs was dramatically displayed on July 23, 2007 in Charleston, South Carolina. At The Citadel, the city’s military college, the candidates for the Democratic Party presidential nomination engaged in a first-of-its-kind presidential debate, in which they were questioned not by professional journalists but by members of the public who submitted over 3,000 questions via the video-sharing website YouTube.¹⁴⁶

The ability of citizens to use YouTube, and to meaningfully engage in community affairs over the Internet, is entirely dependent on their ability to access the Internet via broadband. But at Cooper River Courts, a public housing project close by The Citadel, few of the residents have access to broadband, or even a computer. “I am low income and computers are not low income,” says Marcella Morris,

an unemployed Cooper River resident. “I know how to use a computer. I just can’t afford one right now.”

Like most youngsters these days, Cooper River Courts resident Tiara Reid, 14, is web-savvy. She uses her school’s Internet access to communicate with her friends and do her homework. But when school is out, without Internet access at home, the distant library is the only place where she can go to get online. Says LaToya Ferguson, one of the few Cooper River Courts residents with Internet access at home, “You’re falling behind if you’re not online; now that’s the truth.”

Marcella Morris echoes that feeling of digital exclusion. “I could take my kids to other places on the Internet. Sometimes I feel shortchanged.”

That the broadband-required YouTube debate took place so close to the broadband-denied Cooper River Courts starkly illustrates the very real digital divide that exists not only in Charleston, but across our nation. And, disturbingly, that divide is not closing for many Americans; rather, it’s expanding.

“At one level, the YouTube debate shows that the Web has really become a centerpiece of American political culture,” says Lee Rainie, director of the Pew Internet & American Life Project. “At another level, it also shows that the debate is not for everybody. It’s certainly not available to all Americans.”

“I would argue that the digital divide is worse than it was 10 years ago,” says Andrew Rasiej, the founder of the Personal Democracy Forum website and co-founder of techPresident, a nonpartisan blog that tracks the online campaign. “Back then everyone – schools, businesses – was trying to get online. These days every single Fortune 500 company has its employees, its customers and its suppliers connected 24 hours a day, seven days a week. In the meantime, while our students have online access at school, many of them don’t have it at home.”¹⁴⁷

As more and more of our civic life takes place on the Internet, failure to close the digital divide will increasingly relegate those unable to participate online to a second-class “separate but equal” citizenship, threatening our democratic values and institutions. In 21st-century America, that is unacceptable.

In the “Education” section, we noted that digital excellence must include information literacy – mastery of the skillset necessary to “mine” the Internet’s almost limitless resources to secure useful information and solve problems. The new Administration should adopt policies to ensure that *all* Americans, not only children, should have the ability to:

- Know when you need information to help resolve a problem;
- Know from whom, when, where, and how to seek that needed information;
- Know how to differentiate between authentic and unauthentic information;
- Know how to organize information and interpret it correctly once retrieved; and
- Know how to use the information to solve the problem or make the decision.

EFFICIENT, TRANSPARENT GOVERNMENT CONNECTED TO ITS CITIZENS

By deploying universal, robust broadband and broadband applications, the new Administration has a tremendous opportunity to reenergize government, making it more efficient, transparent, accountable, and open to the active participation of the citizens it serves, while generating cost savings in the billions of dollars.

Governments at all levels are using broadband and information technology to deliver better “e-government” services to citizens at lower cost. Such cost savings and benefits are “enormous,” say Baller and Lide, although they concede that “given the many ways that e-government can be defined and implemented, it is difficult to make accurate estimates of its financial benefits.” They note that:

- The federal Office of Management and Budget reported to Congress that certain federal e-government initiatives resulted in benefits totaling \$508 million in fiscal year 2008.
- The United Nations has estimated that e-government initiatives can result in cost savings of 10–50 percent.
- The U.S. Department of Commerce, focusing only on savings in procurements, has estimated annual savings of \$49 billion by the federal government and \$58 billion by state and local governments.¹⁴⁸

In addition to more efficient e-government, infusing Web 2.0 technologies throughout government will enable citizens to monitor inefficiency, waste, fraud, and abuse in government spending and practices. It will also empower the public to more actively participate in governmental processes and decision making. The bipartisan Federal Funding Accountability and Transparency Act of 2006, sponsored by Senator Barack Obama and co-sponsored by Senator John McCain, was an excellent first step in this effort, creating USASpending.gov (aka “Google for Government”), which launched in December 2007. On USASpending.gov, the public can access information about

most federal grants, contracts, loans, and other financial information in a user-friendly format.

However, broadband applications enable so much more to be done. Much of the federal government’s data is buried in user-unfriendly and out-of-date websites and databases. For example, the Federal Communications Commission – ironically, the federal agency tasked to promote advanced telecommunications technologies – uses a website to communicate with the public that has remained nearly unchanged in design and structure since 2001. Searches for filings and materials are handicapped by an FCC-proprietary search engine that requires users to know specifics of a particular proceeding beforehand, such as its docket number or the source of the document. The content of the documents themselves is not searchable, even though those documents are generally part of the public record. Although Google, the private sector’s leading search engine, does not have access to the internal databases of the Commission, its ability to search the FCC’s website for relevant material does a “significantly better job of identifying relevant information” than the Commission’s own search function while also being more user-friendly.¹⁵⁰

Instead of having federal departments and agencies organize their data on creaky, outdated government websites, crippled by outmoded tools and technology, Robinson, et. al, argue,

if the next Presidential administration really wants to embrace the potential of Internet-enabled government transparency, it should follow a counter-intuitive but ultimately compelling strategy: *reduce* the federal role in presenting important government information to citizens. Today, government bodies consider their own websites to be a higher priority than technical infrastructures that open up their data for others to use. . . . It would be preferable for government to understand providing reusable data, rather than providing websites, as the core of its online publishing responsibility.¹⁵¹

By “*creating a simple, reliable and publicly accessible infrastructure that ‘exposes’ the underlying data,*” the government will empower the private sector, whether commercial or nonprofit, to present, organize, and manipulate that government data for citizens in a multitude of ways. While wikis, blogs, forums, comment pages, mashups, and other Web 2.0 innovations are difficult or impossible for the government to create or moderate on its own websites due to the plethora of laws and regulations agencies operate under, private websites and services that use government data are not so encumbered. Not-for-profit and commercial

websites featuring easily accessible databases of federal contracts, audit disputes, competitive bidding, criminal or civil violations, earmarks, lobbyist meetings, and other heretofore difficult-to-access or “inside” government data can shine an important light on decision making and help level the playing field for ordinary citizens. Opening up access to the government’s data so that citizens empowered by Web 2.0 tools (including those not yet developed) can analyze, scrutinize, and use it will make government more transparent, accountable, and responsive.¹⁵²

The new Administration must also promote more direct citizen participation in government decision making through the use of broadband applications. Public agency meetings should be streamed online, provide an opportunity for direct citizen input, and then be archived for future public access. “Town-hall” meetings with public officials should be held frequently, since they will no longer need to take place in a physical town hall, but can be held virtually online where citizens utilizing broadband can easily participate. Pending legislation and regulations should be easily searchable and accessible online with the public empowered to comment.

RECOMMENDATIONS

The new Administration should promote digital inclusion of all citizens, and an efficient, open, and user-friendly e-government interface that enables them to participate fully and knowledgeably in government decision making.

1. Provide tax incentives for closing the Digital Divide:

- Tax incentives for Americans who donate their old computers to economically disadvantaged families;
- Tax credits or subsidies for free or low-cost broadband Internet access for low-income households; and
- Tax incentives to businesses for digital training for their employees;

2. Address digital literacy:

- Require digital literacy training in all federal education and worker retraining programs; and
- Support state and local digital literacy programs, and programs that aid access to the Internet for persons with disabilities.

3. Mandate that all federal housing be wired for broadband. Simple access to Internet and broadband services significantly expands the public’s options in terms of employment, education, communication, and access to information.

4. Establish a National Youth Tech Corps to identify talented young people in technology and train them for community service projects in technology instruction and digital inclusion.

5. Support the online “Public Internet Channel,” now in beta at www.pic.tv, to serve as a “one-stop shop” for citizens seeking information and assistance in the areas of jobs and training, health, education, civic participation, and emergency preparedness.

6. Promote e-government programs that reduce costs and empower citizens to interact with their government online.

7. Bring more government information online in open formats that enable the private sector to present it to citizens in innovative and effective ways, empowering greater citizen involvement in policymaking. Using web 2.0 tools to create more transparency and make government data equally accessible to all, citizens will be able to track federal grants, contracts, earmarks, and the lobbyist contacts of government officials using websites, wikis, blogs, social networking, and other tools.

CONCLUSION

While other countries energetically embrace and exploit the potential of broadband through well-conceived and financed national strategies, our nation lags behind, with no broadband strategy whatsoever. As a result, America faces a serious challenge to its economic competitiveness, as well as its global telecommunications leadership, and our citizens are denied substantial benefits from broadband that citizens in other nations are already enjoying.

On assuming office, the new President of the United States must immediately address this challenge through a bold and imaginative action plan, including signing an Executive Order to design and successfully execute a National Broadband Strategy that will enable us to catch up to and surpass our global competitors on broadband, while at the same time utilizing technology and innovation to address our nation's critical challenges. By connecting all our nation to robust and affordable broadband, the new President will extend to our citizens the opportunity to reach for the American Dream in the Digital Age.

APPENDIX A: A BROADBAND ACTION PLAN

I. A NATIONAL BROADBAND STRATEGY

Starting on his first day in office, the new President should declare that the deployment of universal, affordable, and robust broadband Internet access to every American household is one of his Administration's top priorities. He should begin by leading the formation of a National Broadband Strategy.

1. On January 20, 2009, his first day in office, the new President of the United States should sign an Executive Order that gives high priority to exerting federal leadership on broadband policy. This Order should:

- a. Establish a National Broadband Strategy Commission, composed of members from the public, private, academic, nonprofit, and other sectors, that by January 1, 2010 should deliver to the President an ambitious, yet achievable, comprehensive National Broadband Strategy to deploy robust, affordable broadband to every household in America. The Commission should also lay out a roadmap and timetable to deploy within five years to the vast majority of American households modernized broadband networks that are as robust, reliable, and affordable as those of our global competitors.
 - b. Appoint a White House–based Chief Technology Officer to work in conjunction with the Commission. The Chief Technology Officer (CTO) should take responsibility for the successful design and execution of the NBS throughout the public sector.
 - c. Direct the Commission to include measurable deployment and subscribership goals in the NBS. The NBS developed by the Commission should set goals on broadband network deployment, subscribership, price, and speed. At a minimum, these goals should include:
 - i. By the end of 2010, every household in America will have access to robust and affordable broadband.
 - ii. By the end of 2015, the vast majority of American households will have affordable access to modernized broadband networks that are as robust as those of any other nation.
 - d. Direct the Commission to propose broadband initiatives and applications that address the most pressing challenges facing our nation. As we've discussed, the demand for robust and affordable broadband will grow significantly if America utilizes broadband to:
 - i. Modernize our economy to compete globally;
 - ii. Reduce energy consumption and carbon dioxide gas emissions and address the threats that energy insecurity and environmental degradation pose to our nation;
 - iii. Deliver better health care at lower costs by implementing telehealth and digital health information technology;
 - iv. Improve education through the use of advanced online technology tools;
 - v. Build a 21st-century public safety and national security telecommunications system; and
 - vi. Increase government transparency and empower greater citizen participation in decision making.
 - e. Establish a cabinet-level interagency task force to execute the NBS throughout executive branch departments and agencies. Modeled on the Information Infrastructure Task Force, this task force should be made up of high-level representatives of federal agencies, including the Office of Management and Budget, in coordination with the CTO. The agencies should develop comprehensive plans and policies to quickly and effectively execute the NBS, including interagency efforts that will cut across bureaucratic silos and stovepipes.
 - f. Direct the OMB to issue an annual report on the status of the execution of the National Broadband Strategy, with recommendations for additional steps and funding to ensure that the NBS realizes its goals.
2. The President should immediately on taking office promote policies to stimulate both demand for, and supply of, robust and affordable broadband, including:
- a. Direct the heads of all federal departments and agencies to take specific action to:
 - i. Ensure that affordable, robust broadband is available to all Americans;
 - ii. Include the use of broadband in meeting the mission of their agency;
 - iii. Cooperate with the National Broadband Strategy Commission, make the implementation of the NBS one of its highest priorities, and prepare action plans on initiatives their agencies are undertaking to help achieve the goals of the NBS; and
 - iv. Report annually to the President on the progress of these initiatives.

- b. Direct the National Telecommunications and Information Administration to create a national online broadband mapping system that will aggregate useful and highly granular data on the nationwide availability, speed, and price of broadband;
- c. Open underutilized spectrum currently reserved for both public and private use for a new generation of wireless devices that will provide robust broadband service over great distances and rough terrain without interference to existing licensed uses;
- d. Support and co-fund state and municipal broadband initiatives to encourage the build-out and support of next-generation broadband networks. Eliminate state and local impediments to state-, municipal-, and community-funded deployment of broadband.
- e. Support deployment of broadband to underserved communities and populations.
 - i. Modernize the federal Universal Service Program to support affordable, universal, landline, and wireless broadband,¹⁵³ as well as the Rural Utility Broadband Loan and Loan Guarantee Program, Community Connect Broadband Grants Program, and similar programs to emphasize the build-out of next-generation broadband networks in rural areas.
 - ii. Stimulate the supply of broadband in low-income communities by requiring as a condition for receipt of federal funding that public housing and other public buildings have robust broadband access available to all residents and tenants.
 - iii. Initiate and expand programs to extend broadband to persons with disabilities, seniors, minorities, Native Americans, and other populations that are too often on the wrong side of the digital divide.
 - iv. Restore funding for the Technology Opportunities Program that will help develop transforming broadband applications to address the most significant and pressing challenges facing our society.
- f. Stimulate private sector investment in robust broadband.
 - i. Accelerate depreciation of broadband equipment and tax credits for significant upgrades to existing network capacity.
 - ii. Issue federal “Broadband Bonds” to finance, in partnership with private entities, deployment in un- and under-served areas, as recommended in California by that state’s Broadband Task Force.¹⁵⁴
 - iii. Anchor Tenancy: Direct the General Services Administration’s Public Buildings Service to assess anchor tenancy opportunities as a part of every agency’s process to negotiate or renegotiate a telecommunications lease. Anchor tenancy can act as a catalyst, drawing providers to locations that have little or no access to broadband. By Executive Order, the President could require that agencies assess whether anchor tenancy could draw private providers to a surrounding unserved community or upgrade existing network infrastructure, if no other plans exist to do so.
- iv. Collocation Facilities: Direct the General Services Administration’s Public Buildings Service to offer, at cost, in un- or under-served areas, small spaces on federally-owned properties on which collocation facilities can be constructed. This will both reduce one of the cost barriers and also create “carrier neutral” facilities into which companies can connect with both regional networks and other networks that connect to major Internet connection points in metropolitan areas.
- g. Support open access to the Internet for all users, service providers, content providers, and application providers to the maximum extent possible, while recognizing that network operators must have the right to manage their networks responsibly, pursuant to clear and workable guidelines and standards.
- h. Support federal leadership to eliminate issues and concerns that deter citizens from accessing the Internet. Promote online safety, privacy, and network security. Strongly enforce laws against online criminals, spammers, promoters of frauds, and other illegal actors.

II. JOB CREATION AND ECONOMIC DEVELOPMENT

To help create jobs and stimulate U.S. economic growth, the President should:

1. Fully fund the America COMPETES Act including the National Science Foundation grant program for institutions of higher education that award associate degrees to recruit and train individuals from the fields of science, technology, engineering, and math to mentor female, minority, and disabled students in order to assist such students in identifying, qualifying for, and entering higher-paying technical jobs in those fields.
2. Set a national skills agenda to compete globally and to ensure a rising standard of living for Americans.
3. Implement provisions of the Food, Conservation, and Energy Act of 2008 aimed at extending broadband’s reach into rural areas:

- a. Budget \$25 million per year from 2009–2012 for loans and loan guarantees for the construction, improvement, and acquisition of facilities and equipment for the provision of broadband service in rural areas;
- b. Establish the National Center for Rural Telecommunications Assessment to assess the effectiveness of Department of Agriculture programs aimed at increasing broadband availability and use in rural areas;
- c. Direct the Secretary of Agriculture and the Chairman of the Federal Communications Commission submit a report to Congress in June 2009 (and every three years thereafter) a report describing a comprehensive rural broadband strategy that includes:
 - i. These recommendations:
 - Promote interagency coordination of federal agencies in regard to policies, procedures, and targeted resources, and streamline or otherwise improve the policies, programs, and services;
 - Coordinate existing federal rural broadband or rural initiatives;
 - Address both short- and long-term needs assessments and solutions for a rapid build-out of rural broadband solutions and application of the recommendations for federal, state, regional, and local government policymakers; and
 - Identify how specific federal agency programs and resources can best respond to rural broadband requirements and overcome obstacles that currently impede rural broadband deployment.
 - ii. A description of goals and timeframes to achieve the purposes of the report.
- iv. Decision support;
- v. Performance data reporting; and
- vi. Research and population health initiatives, including disparities reduction efforts.
- d. Set standards for federal health information security and confidentiality; standards that should be guided by the following consumer-control principles:
 - i. Consumers should have easy access to review, add notations, and suggest corrections to existing information in their own records.
 - ii. Consumers should be able to limit which parts of their health information can be shared with which providers.
 - iii. Consumers should be able to limit how their personally identifiable medical information is used outside of care delivery (e.g., for research).
 - iv. Consumers should be able to easily designate others as proxies to act on their behalf (e.g., family member, caregiver, or guardian).
 - v. Consumers deserve an effective process and infrastructure for monitoring and certifying compliance with these common principles among organizations, initiatives, and technologies.
- e. Encourage and facilitate the adoption of state reciprocity agreements for practitioner licensure to expedite the provision across state lines of telehealth services.
- f. Expand the list of Medicare telehealth originating sites to include mental health facilities.
- g. Include as a home health visit for Medicare purposes telehealth services furnished an individual by a home health agency.
- h. Establish a demonstration project to evaluate the impact and benefits of covering remote patient management services for certain chronic health conditions.
- i. Acting through the Director of the Office for the Advancement of Telehealth of the Health Resources and Services Administration, make grants to expand access via telehealth to health care services for individuals in medically underserved rural, frontier, and urban areas.
- j. Work with health plans, employers, HIT vendors, and others to create and maintain a centralized resource center of grants, loans, insurance savings opportunities, incentive programs, and other financing options for HIT for providers.
- k. Establish a consistent methodology for measuring telehealth and health information technology adoption and effective use, and analyzing and reporting data.
- l. Allow for electronic prescribing of controlled substances, with appropriate safeguards.

III. HEALTH CARE

The new Administration should employ broadband to provide better quality health care and quality of life, at a significantly reduced cost.

1. Direct the Secretary of Health and Human Services to:
 - a. Define and catalog the types of entities that govern, oversee, operate, and/or create policy for the electronic exchange of health information and produce recommendations regarding the appropriate level of consumer participation and requirements for transparency that should apply to them.
 - b. Require institutions and providers to begin sharing health information electronically.
 - c. Set standards for electronic exchange of health information; these standards should focus on:
 - i. Quality improvement;
 - ii. Care management;
 - iii. Billing;

2. Modernize Medicare to facilitate telehealth service:
 - a. Remove Medicare's current geographic restrictions on the provision of telehealth services.
 - b. Expand the types of facilities authorized to participate in the Medicare telehealth program.
 - c. Allow for the provision of coverage of remote patient management services, including home health remote patient management services, for certain chronic health conditions.
3. Reauthorize telehealth network and telehealth resource centers grant programs.
4. Establish within the Department of Health and Human Services an Office of the National Coordinator for Health Information Technology and the Health Information Technology Resource Center to provide assistance for the adoption and use of interoperable health information technology.
5. Allow the Centers for Medicare & Medicaid Services to make federally qualified health centers eligible to participate in demonstration projects related to health records and health information technology.
6. Allow the Internal Revenue Code to treat qualified health care information technology as a depreciable asset.

IV. EDUCATION

The new Administration should infuse broadband and technology throughout America's education system and promote initiatives to advance online learning and "Digital Excellence" training.

1. Expand and reform the E-Rate program. The E-Rate program has been extremely effective in its mission of bringing the Internet to America's schools and libraries. But too often, that Internet access is so slow as to be obsolete and may be available on only one computer per school. The E-Rate program should ultimately provide free broadband to all schools and libraries, as well as sufficient hardware and software for students to use it. Intermediate steps include lifting the E-Rate funding cap while simplifying its paperwork burden and bureaucratic complexity. E-Rate recipients should be allowed and encouraged to use E-Rate funds to create wireless broadband canopies that bring the school or library's broadband to the surrounding community. The program should support Internet broadband speeds of at least 10 Mbps per 1,000 students/staff, as recommended by the State Educational Technology Directors Association.¹⁵⁵

2. Create and fund the Digital Opportunity Investment Trust and expand the Enhancing Education Through Technology (EETT) program. The Digital Opportunity Investment Trust will advance the high priority of bringing technology into the educational system, emphasizing the creation of educational content and software that incorporates the vast range of technologies available. It will also address the critical need to digitize and bring online the content of America's universities, museums, libraries, and other public institutions.¹⁵⁶ The new Administration should also increase funding for the EETT program, designed to improve student achievement and boost students' digital literacy through the use of technology in schools.

3. Provide one laptop per child and support ubiquitous computing. The new Administration should provide federal funding to school districts that implement a one-to-one laptop program for students in grades 6 through 12 and provide funding for teachers, students, and parents who receive training in technology-rich educational services and applications.¹⁵⁷ It should also provide tax incentives and other support that encourages America's businesses to donate their old computers to economically disadvantaged families.

4. Support state, municipal, and school district efforts to bring robust broadband to schools. One of the world's largest installations of wireless local area networks in production today has been constructed by the School District of Philadelphia, the eighth largest school district in the United States. It now provides wireless Internet access at every school in the district.¹⁵⁸ As FCC Commissioner Michael Copps recently suggested,¹⁵⁹ the federal government should facilitate the expansion of these broadband networks beyond the schools to the nearby communities, as was done in Livermore Valley, California.¹⁶⁰

5. Appropriate funding for the National Center for Research in Advanced Information and Digital Technologies. The National Center will support a comprehensive research and development program to explore ways to advance computer and communication technologies can improve all levels of learning and "make learning more compelling, more personal, and more productive in our nation's schools."¹⁶¹

6. Adopt action principles and goals formulated by top educators for all federal education programs.
 - Technology should be promoted to the greatest extent possible in every federal education program and initiative.

- Standards for educational uses of technology that facilitate school improvement should be required, such as the National Educational Technology Standards developed by the International Society of Technology in Education.
- Proficiency in 21st-century skills should be emphasized in education policies, as well as professional development programs that foster 21st-century teaching and learning.¹⁶²

7. Support Categorical Funding for Online Learning Initiatives and Digital Excellence Initiatives.

V. ENERGY AND THE ENVIRONMENT

The new Administration should use broadband technologies to meaningfully reduce energy consumption and improve environmental quality.

1. Create a special government Energy, Environment, and Technology working group, under the leadership of the White House Chief Technology Officer, to break down the bureaucratic silos separating energy, environmental quality, and information technology regulators and experts, and bring them together to realize the promise that broadband and information technology can bring to our nation's challenges with energy scarcity and environmental degradation.

2. Direct the U.S. General Services Administration, the U.S. Office of Personnel Management, and the White House Chief Technology Officer to, within 100 days,

- Provide recommendations and assistance to all agency heads on ways to maximize voluntary telework without diminishing employee performance or agency operations, as well as ways to educate federal workers about the personal and social benefits of telework, including reduced energy usage, a healthier environment, and improved employee morale;
- Establish and implement telework "best practices" for federal employees that will also serve as a model for adoption by state and local governments and the private sector;
- Prescribe, in coordination with the Office of Management and Budget and the National Institute of Standards and Technology, regulations to ensure the adequacy of information and security protections for information and information systems used in or otherwise affected by teleworking; and
- Maintain a central, publicly available telework website to be jointly controlled and funded by the General Services Administration and the Office of Personnel Management

to inform federal employees of regulations, best practices, case studies, and other information relating to telework.

3. Direct each federal agency to:

- Appoint a Telework Managing Officer who will:
 - Advise the agency head and Chief Human Capital Officer on telework;
 - Educate supervisors, managers, and employees about teleworking;
 - Assume responsibility for the agency on teleworking matters; and
 - Develop and implement a program to identify and remove barriers to telework and to maximize telework opportunities in the agency.
- Establish goals for greater telework participation and permit qualified workers to telework at least 20 percent of the hours worked in a two-week period, or generally the equivalent of two work days.

4. Work with Congress and the Department of Energy to appropriate funding for Smart Grid demonstration projects, such as those described but not funded in the Energy Independence and Security Act (EISA) of 2007. Real-world demonstrations will

- Determine the technologies that provide the most benefit for the investment;
- Provide the credible data needed by utilities and other investors to make the business case;
- Assist regulators in creating a regulatory environment that enables utility, consumer, and societal benefits to be fairly recognized while enabling utilities and others to fairly recover their investments;
- Educate consumers on the value of the technologies and their increased choices for electrical service; and
- Enable the industry to move beyond the current impasse.¹⁶³

5. Direct the DOE to report on progress made on achieving the EISA's "national policy goal" of a nationwide Smart Grid and recommend additional steps necessary to reach the goal, such as adoption of a Smart Grid investment tax credit, demand reduction tax credit, accelerated depreciation, or other steps.

6. Recommend additional ways for the federal government to accelerate the adoption of Smart Grid technology, including using its purchasing power in the electricity market

and increasing its purchasing of electricity from renewable energy sources, as called for by the Energy Policy Act of 2005.

VI. PUBLIC SAFETY AND HOMELAND SECURITY

The new Administration should utilize broadband technologies to enhance public safety and protect homeland security.

1. Undertake a national effort to build a national 21st-century telecommunications system that will provide for public safety and homeland security similar to the effort undertaken 50 years ago to build our National Interstate and Defense Highway system. This effort should be guided by these overarching principles:

- First responders should have a single, nationwide, robust broadband communications system with technology based on open standards and redundant and resilient connections.
- All U.S. citizens should have access to emergency services and agencies using any device or mode commonly used in public communications.
- The network should provide emergency responders and citizens access to the information they need, when, where, and how they need it.

Specifically, this effort should include:

- Ensuring that local, state, federal, and tribal statutes, regulations, and overall policies promote, rather than delay, the creation of this system;
- Directing the Department of Homeland Security to mandate interoperable, broadband-based systems in all communications-related grants;¹⁶⁴ and
- Evaluating and, if effective, continuing the Public Safety Interoperable Communications Grant Program¹⁶⁵ at the National Telecommunications and Information Administration.

2. Convene a new blue-ribbon panel on emergency communications and information technology, such as that assembled by the U.S. National Science Foundation in 2003, to study the emergency telecommunications and IT systems and networks now operating across the nation. The panel should recommend to the Administration and Congress ways that those networks could be upgraded and supplemented to provide for the nation's public safety and the national defense in the 21st century.¹⁶⁶

3. Adopt the ComCARE E-Safety Program to enhance homeland security by helping bring 21st-century capabilities to emergency response, deploying integrated, interoperable, and interconnected wireline and wireless systems and applications.¹⁶⁷

4. Restore funding for the Tribal Rural Law Enforcement Internet Project.

5. Direct FEMA to create a Disaster Relief Mobile Services Unit to provide advanced telecommunications services to areas where the existing infrastructure has been devastated by disaster.

6. Appoint a national cyber security advisor to coordinate policy to secure information and information networks.

7. Adopt the recommendations of the Joint Advisory Committee on Communications Capabilities of Emergency Medical and Public Health Care Facilities to overhaul and update the communications systems of EMS, 9-1-1, and public health facilities, based on these principles:

- Encourage interoperable broadband networks.
- Improve interoperability through better interagency coordination.
- Enable consistent efforts through use of common standards and federal grant guidance coordination.
- Advance capabilities through better network integration.
- Ensure that first responders, health care personnel, and patients have ubiquitous access to broadband services and applications by fostering a regulatory environment in which private sector companies build robust broadband networks and by providing targeted funding.¹⁶⁸

VII. REINVIGORATING DEMOCRACY AND GOVERNMENT

The new Administration should promote digital inclusion of all citizens, and an efficient, open, and user-friendly e-government interface that enables them to participate fully and knowledgeably in government decision making.

1. Provide tax incentives for closing the Digital Divide:

- Grant tax incentives for Americans who donate their old computers to economically disadvantaged families;
- Give tax credits or subsidies for free or low-cost broadband Internet access for low-income households; and
- Make available tax incentives to businesses for digital training for their employees.

2. Address digital literacy:

- Require digital literacy training in all federal education and worker retraining programs; and
- Support state and local digital literacy programs, and programs that aid access to the Internet for persons with disabilities.

3. Mandate that all federal housing be wired for broadband. Simple access to Internet and broadband services significantly expands the public's options in terms of employment, education, communication, and access to information.

4. Establish a National Youth Tech Corps to identify talented young people in technology and train them for community service projects in technology instruction and digital inclusion.

5. Support the online "Public Internet Channel," now in beta at www.pic.tv, to serve as a "one-stop shop" for citizens

seeking information and assistance in the areas of jobs and training, health, education, civic participation, and emergency preparedness.

6. Promote e-government programs that reduce costs and empower citizens to interact with their government online.

7. Bring more government information online in open formats that enable the private sector to present it to citizens in innovative and effective ways, empowering greater citizen involvement in policymaking. Using web 2.0 tools to create more transparency and make government data equally accessible to all, citizens will be able to track federal grants, contracts, earmarks, and the lobbyist contacts of government officials using websites, wikis, blogs, social networking, and other tools.

APPENDIX B: DRAFT EXECUTIVE ORDER ON THE PRESIDENT'S COUNCIL ON BROADBAND, INNOVATION AND COMPETITIVENESS

Executive Order XXXXX of January 20, 2009

PRESIDENT'S COUNCIL ON BROADBAND, INNOVATION AND COMPETITIVENESS

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act (Public Law 110- 69) (“the Act”), it is hereby ordered as follows:

Section 1. *Establishment.* (a) There is established in the Executive Office of the President the “President’s Council on Broadband, Innovation and Competitiveness” (“Council”).

Section 2. *Functions.* (a) The duties of the Council shall include—

- (1) Development of innovation agenda.—
 - (i) In general.—The Council shall develop a comprehensive agenda for strengthening the innovation and competitiveness capabilities of the Federal Government, State governments, academia, and the private sector in the United States.
 - (ii) Contents.—The comprehensive agenda required by paragraph (1) shall include the following:
 - (A) An assessment of current strengths and weaknesses of the United States investment in research and development.
 - (B) Recommendations for addressing weaknesses and maintaining the United States as a world leader in research and development and technological innovation, including strategies for increasing the participation of individuals identified in section 33 or 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885a or 1885b) in science, technology, engineering, and mathematics fields.
 - (C) Recommendations for strengthening the innovation and competitiveness capabilities of the Federal Government, State governments, academia, and the private sector in the United States.
 - (D) A National Broadband Strategy, a coherent road map of goals and policies that complement and accelerate efforts in the marketplace to achieve universal adoption of affordable high-speed Internet connections. The National Broadband Strategy shall include:
 1. Goals on broadband network deployment, subscribership, price, and speed; these goals should include, at a minimum:
 - a) By the end of 2010, every household in America will have access to robust and affordable broadband,
 - b) By the end of 2015, the vast majority of American households will have affordable access to modernized broadband networks that are as robust as those of any other nation,
 - c) Access to the Internet should, to the maximum feasible extent, be open to all users, service providers, content providers, and application providers,
 - d) Network operators must have the right to manage their networks responsibly, pursuant to clear and workable guidelines and standards,
 - e) The Internet and broadband marketplace should be as competitive as reasonably possible.
 - f) U.S. broadband networks should provide Americans with the network performance, capacity, and connections they need to compete successfully in the global marketplace.

2. The appropriate roles of the private and public sectors in universal deployment of affordable, robust broadband networks; federal support might include tax incentives, grants, low cost loans, loan guarantees, universal service subsidies, efficient use of spectrum, and other approaches;
3. A vision for the evolution of broadband networks and their public and commercial applications;
4. The impact of current and proposed regulatory regimes on the deployment of affordable, robust broadband networks;
5. National strategies for maximizing the benefits of deployment of affordable, robust broadband networks, as measured by job creation, economic growth, increased productivity, and enhanced quality of life;
6. National strategies for developing and demonstrating applications in areas such as:
 - a. Modernizing our economy to compete globally;
 - b. Reducing energy consumption and carbon dioxide gas emissions and address the threats that energy insecurity and environmental degradation pose to our nation;
 - c. Delivering better health care at lower costs by implementing telehealth and digital health information technology;
 - d. Improving education through the use of advanced online technology tools;
 - e. Building a 21st-century public safety and national security telecommunications system; and
 - f. Increasing government transparency and empower greater citizen participation in decision making.
7. Online safety, privacy, security, and copyright issues.

(iii.) Initial Submission and Updates.—

- (A) INITIAL SUBMISSION.—Not later than January 1, 2010, the Council shall submit to Congress and the President the comprehensive agenda required by section 2(1).
 - (B) UPDATES.—At least once every 2 years, the Council shall update the comprehensive agenda required by section 2(1) and submit each such update to Congress and the President.
- (2) Monitoring implementation of public laws and initiatives for promoting universal, affordable and robust broadband networks; innovation; and competitiveness— including policies related to research funding, taxation, immigration, trade, and education that are proposed in this Act or in any other Act;
 - (3) Providing advice to the President with respect to global trends in broadband deployment and subscribership, competitiveness, and innovation and allocation of Federal resources in education, job training, and technology research and development considering such global trends in competitiveness and innovation;
 - (4) In consultation with the Director of the Office of Management and Budget, developing a process for using metrics to assess the impact of existing and proposed policies and rules that affect the use of broadband and innovation capabilities in the United States;
 - (5) Identifying opportunities and making recommendations for the heads of executive agencies to improve broadband deployment and subscribership, innovation, monitoring, and reporting on the implementation of such recommendations;
 - (6) Developing metrics for measuring the progress of the Federal Government with respect to improving conditions for innovation, including through talent development, investment, and infrastructure improvements; and
 - (7) Submitting to the President and Congress an annual report on such progress.

Section 3. Membership and Coordination. (a) Membership. The Council shall be composed of the Secretary or head of each of the following:

- (1) The Department of Commerce.
- (2) The Department of Defense.
- (3) The Department of Education.
- (4) The Department of Energy.
- (5) The Department of Health and Human Services.
- (6) The Department of Homeland Security.
- (7) The Department of Labor.
- (8) The Department of the Treasury.
- (9) The National Aeronautics and Space Administration.
- (10) The Securities and Exchange Commission.
- (11) The National Science Foundation.
- (12) The Office of the United States Trade Representative.
- (13) The Office of Management and Budget.
- (14) The Office of Science and Technology Policy.
- (15) The Environmental Protection Agency.
- (16) The Small Business Administration.
- (17) Any other department or agency designated by the President.

(b) Chairperson.—The Secretary of Commerce shall serve as Chairperson of the Council.

(c) Advisors.— Not later February 9, 2009, the National Academy of Sciences, in consultation with the National Academy of Engineering, the Institute of Medicine, and the National Research Council, shall develop and submit to the President a list of 50 individuals that are recommended to serve as advisors to the Council during the development of the comprehensive agenda required by section 2(1). The list of advisors shall include appropriate representatives from the following:

- (1) The private sector of the economy.
- (2) Labor.
- (3) Various fields including information technology, energy, engineering, high-technology manufacturing, health care, and education.
- (4) Scientific organizations.
- (5) Academic organizations and other nongovernmental organizations working in the area of science or technology.
- (6) Nongovernmental organizations, such as professional organizations, that represent individuals identified in section 33 or 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885a or 1885b) in the areas of science, engineering, technology, and mathematics.

(d) Designation.—Not later than 30 days after the date that the National Academy of Sciences submits the list of recommended individuals to serve as advisors, 50 individuals will be designated to serve as advisors to the Council.

(e) Requirement To Consult.—The Council shall develop the comprehensive agenda required by paragraph section 2(1) in consultation with the advisors.

(f) Coordination.—The Chairperson of the Council shall ensure appropriate coordination between the Council and the National Economic Council, the National Security Council, and the National Science and Technology Council.

(g) Meetings.— The Council shall meet on a semi-annual basis at the call of the Chairperson and the initial meeting of the Council shall occur not later March 2, 2009.

Section 4. General. (a) In order to more fully implement Section 1006 of the America Competes Act as Congress intended, this Executive Order specifically revokes and supersedes President George W. Bush's "Memorandum for the Director of the Office of Science and Technology Policy", dated April 10, 2008 designating the National Science and Technology Council responsibilities assigned to the Council on Innovation and Competitiveness in section 1006 of the Act.

THE WHITE HOUSE,
January 20, 2009.

ABOUT THE BENTON FOUNDATION

The Benton Foundation works to ensure that media and telecommunications serve the public interest and enhance our democracy. We pursue this mission by seeking policy solutions that support the values of access, diversity, and equity, and by demonstrating the value of media and telecommunications for improving the quality of life for all. The Benton Foundation does not accept unsolicited grant applications or offer general grants. We are a private foundation, an institutional hybrid, bridging the worlds of philanthropy, public policy, and community action. We assume diverse, crosscutting roles as nonpartisan knowledge broker, convenor, public-interest advocate, and policy analyst.

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