BRINGING AMERICA UP TO SPEED

States' Role in Expanding Broadband

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Dear Reader:

Broadband has earned the term "game changer," and it is easy to see why. Once considered a convenience, access to broadband Internet service has crossed the threshold to necessity. As increasing numbers of business, government and personal interactions move online, Americans who lack reliable, affordable, high-speed Internet connections may be left behind.

States recognize the potential of broadband to drive their economies and to help their residents and businesses compete in an increasingly global marketplace. Some states have been working for years to expand the public's access to and adoption of broadband, and many more expect the technology to play an important role in delivering a range of services—from education and health care to public safety and fair and accurate elections—more efficiently and effectively.

Universal, high-speed broadband access is a national goal, but to achieve it, states will need to ramp up their efforts. To propel them forward, the American Recovery and Reinvestment Act is providing states and their partners with $7.2 billion in stimulus funds. And a new National Broadband Plan, released in March 2010 by the Federal Communications Commission (FCC), has set ambitious goals that rely heavily on states, in partnership with federal and local governments, private-sector providers and nonprofit organizations.

This report, *Bringing America Up to Speed: States' Role in Expanding Broadband*, looks at the national push to ensure high-quality, high-speed broadband access for all Americans. The report highlights innovative state programs that served as models for the FCC's plan—and examines the myriad challenges all states will face if they are to play a key role in expanding this technology in unprecedented ways.

Bringing America Up to Speed builds on the Pew Center on the States' growing portfolio of research analyzing states' fiscal health and economic competitiveness. Our goal is to help policy leaders chart a path toward recovery today and sustainability tomorrow. We hope this report will inform and guide states as they seek to capitalize on broadband's promise.

Sincerely,

Susan K. Urahn
Managing Director, Pew Center on the States

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Overview: States' Role in Driving America's Broadband Future

In the digitally driven society of the twenty-first century, states recognize that broadband is a powerful technology that could help them compete more effectively in a global marketplace. Increasingly, they are looking to broadband as a potential vehicle for delivering quality education, public safety, health care and government services and for promoting economic growth by giving businesses the tools they need to thrive.

"I don't think you can overstate the impact that [broadband deployment] is going to have for economic development on a wide variety of levels," said Kelley Goes, secretary of commerce in West Virginia. Because the technology eventually will be ubiquitous, economic growth in rural areas without broadband will be "almost impossible," Goes said.[1]

Yet America lags behind much of the rest of the world in adoption of high-speed broadband. According to the Organisation for Economic Co-Operation and Development (OECD), the United States slipped from the top country in the world for broadband access in 2000 to 15th last year.[2]

Today, broadband is available to about 95 percent of Americans. But that figure masks wide geographic, economic and demographic disparities, and many experts say both the quality and speed of service in the United States need to be improved to keep pace with other nations. And only 65 percent of Americans actually have broadband at home. The remainder—approximately 100 million Americans—say they cannot afford it, do not know how to use it or believe it is irrelevant to their lives, among other factors.[3]

The unavailability of broadband is a specific challenge for about 14 million individuals in this country: The infrastructure is not in place for them to subscribe to broadband in the predominantly rural areas where they live. The direct cost of closing this gap is $23.5 billion, according to the Federal Communications Commission (FCC).[4] But America will pay a much higher price if it does not ensure universal access to high-speed broadband, according to a March 2010 study by the Digital Impact Group, a Philadelphia-based nonprofit organization dedicated to increasing broadband adoption, and Econsult Corporation, a Philadelphia-based economic consulting firm. The study estimates the total annual cost of "digital exclusion" at more than $55 billion per year in lost economic activity, and it estimates gains that would be made in areas such as e-government, energy, health care and transportation if broadband were ubiquitous. Increasing the use of broadband in health care would be worth $15 billion alone, the groups found.[5]

While broadband is transforming many aspects of Americans' lives—from how citizens apply for jobs to how they register to vote—these changes are relatively new, so not much is known about their ultimate impact. For example, as of 2005, 77 percent of Fortune 500 companies posted job openings and accepted applications only online, but the overall relationship between broadband access and employment is unclear.[6] And questions remain about what the appropriate roles are for government—including states—in expanding and promoting broadband.

Still, a growing number of states are devoting more time, attention and, in some cases, money to capture what they view as a powerful vehicle for growth. West Virginia is one of many trying to catch up.

Historically dependent on manufacturing, West Virginia has long been among the least-connected states in terms of broadband access, speed of service offered and the rate at which residents have adopted it.[7] State leaders believe that broadband has the potential to solve many of West Virginia's problems by enabling residents to live and work where they want without fear of being left behind by the rest of the world. But to date, the state's topographic, demographic and economic challenges have made it impractical for private providers to offer services to many areas at affordable rates, which in turn has limited access among residents and businesses to the geographically boundless economy of goods and services blossoming online.

West Virginia exemplifies the challenges that states with large rural populations face in ensuring that their residents have affordable access to high-speed, reliable broadband. Approximately 80 percent of West Virginia's residents live in areas that are classified as rural by the United States Department of Agriculture.

All that, however, may be changing. The American Recovery and Reinvestment Act of 2009 is pumping $7.2 billion in stimulus money into efforts to achieve universal broadband and tap into its potential applications. The funds are flowing to broadband providers, state and local agencies, nonprofit organizations and various public-private partnerships across the 50 states to help expand broadband access through the physical build-out of infrastructure and to support programs that spur more consumers to adopt it. The money also is boosting the capacity of states to collect better data and map existing broadband access and speeds within their borders.

The stimulus program also spurred the creation of a National Broadband Plan, developed by the FCC, which sets out goals for universally accessible, affordable broadband and strategies for achieving them. Released in March 2010, the plan makes hundreds of recommendations to Congress, the executive branch, federal regulators and state and local governments.

In West Virginia, a $126 million stimulus award to the governor's office to deploy broadband more extensively across the state may help make the vision for widespread broadband availability a reality in a shorter timeframe than many would have dared to hope. "What it does for West Virginia is it gives us a chance to truly be able to communicate with every area of our state and with the rest of the world," said Governor Joe Manchin, who in 2007 proposed a goal of having high-speed Internet in every county. "That was a tall order, but I knew that we needed to have that sort of vision for us to even start down the path."[8]

States Out in Front

State and local governments increasingly are looking to broadband as a way to gain a competitive advantage in a tough economy and as a means to deliver services more efficiently and effectively as budgets tighten. Their efforts also are critical to achieving the ambitious goals of the National Broadband Plan.

The plan calls for sweeping policy reforms; increased funding; action by federal, state, local and tribal governments; and partnerships with private-sector providers. Among other goals, it seeks to increase availability, adoption and the use of broadband for "national purposes"—such as economic development, health care, education, public safety and government transparency—all of which will require states to play a significant role (see sidebar, "The National Broadband Plan: Long-Term Goals"). The plan states[9]:

> *"[B]roadband in America is not all it needs to be...*
> *Broadband-enabled health information technology (IT)*
> *can improve care and lower costs by hundreds of billions*

of dollars in the coming decades, yet the United States is behind many advanced countries in the adoption of such technology. Broadband can provide teachers with tools that allow students to learn the same course material in half the time, but there is a dearth of easily accessible digital educational content required for such opportunities. A broadband-enabled Smart Grid could increase energy independence and efficiency, but much of the data required to capture these benefits are inaccessible to consumers, businesses and entrepreneurs. And nearly a decade after 9/11, our first responders still lack a nationwide public safety mobile broadband communications network, even though such a network could improve emergency response and homeland security."

Many state leaders agree. "Broadband is as important to economic development today as electricity was at the turn of the twentieth century—vital to our quality of life and essential for business, government and our communities," said Minnesota Governor Tim Pawlenty in a 2006 statement.[10]

If America wants to compete in an increasingly global economy, it will need to fully leverage broadband's potential. "We can imagine that the future of the Internet in large part is going to be video, and particularly 3-D video," said Richard Whitt, Washington, D.C., telecom and media counsel for Google. "It's going to be very interactive and involve many dimensions of different kinds of platforms. The things we think of as screens may no longer be the case; it may be that your entire house essentially becomes Internet-enabled."[12] Through its Fiber for Communities initiative, Google challenged governments, businesses and individuals in early 2010 to propose innovative uses for its experimental, ultra-high-speed network that is expected to be more than 100 times faster than typical Internet speeds. The company is planning to build and test the service with as many as 500,000 users in selected communities.[13]

Several major developments—the stimulus package, the National Broadband Plan and the Google gigabit initiative, among others—are converging to create an "environment that could evolve in many positive ways," said Jim Baller, a Washington, D.C.-based broadband expert and lawyer whose firm, the Baller and Herbst Law Group, advises several state and local governments on broadband and is working with Google on its initiative. "We are seeing significant progress at all levels of government. Many state and local governments have made a lot of progress in the last two years, and we're likely to see a lot more progress in the next two years."[14]

THE NATIONAL BROADBAND PLAN: LONG-TERM GOALS

The National Broadband Plan sets forth the following six long-term goals[11]:

1. At least 100 million U.S. homes should have affordable access to actual download speeds of at least 100 megabits per second and actual upload speeds of at least 50 megabits per second.

2. The United States should lead the world in mobile innovation, with the fastest and most extensive wireless networks of any nation.

3. Every American should have affordable access to robust broadband service and the means and skills to subscribe if they so choose.

4. Every American community should have affordable access to at least one gigabit per second broadband service to anchor institutions such as schools, hospitals and government buildings.

5. To ensure the safety of the American people, every first responder should have access to a nationwide, wireless, interoperable broadband public safety network.

6. To ensure that America leads in the clean energy economy, every American should be able to use broadband to track and manage their real-time energy consumption.

THE NEED FOR SPEED

The federal agencies that set the rules for qualifying for broadband stimulus money confronted a daunting question: How fast, exactly, should an Internet connection be to qualify as "broadband"?

They settled on a relatively low threshold of 768 kilobits per second for downloads and 200 kilobits per second for uploads. This is about the speed you would get from the cheapest plan from most providers of high-speed hookups that use existing phone lines, as opposed to cable.[15] The low bar presumably focuses the stimulus efforts on areas with almost no service at all. But broadband experts argue that the country soon must push for even faster speeds across the board for the United States to remain competitive with other industrialized countries.

"We're flat-out not competitive," said Jane Smith Patterson, executive director of North Carolina's e-NC Authority, an agency that promotes broadband in the Tar Heel State. Faster broadband "is very important to this country. This is the transport of knowledge and opportunity."[16]

Advocates are especially concerned that the United States is falling behind other developed countries in rolling out ultrafast Internet connections. They point out that Japan offers connections of one gigabit per second, which is fast enough to download a full-length movie in just 12 seconds. Google is launching an effort to bring similar speeds—100 times faster than typical connections in the United States—to as many as 500,000 Americans.[17]

Google's initiative may be innovative, but it will do little in the near term to change the fact that the United States is falling behind. In fact, the United States ranked 24th among developed countries in an OECD survey of 2009 advertised broadband speeds. The average U.S. speed of 14 megabits per second is roughly half the typical speed in Hungary and the Netherlands and well behind Japan, Portugal, France and South Korea. According to the OECD, Japan and Portugal boasted average advertised download speeds of more than 100 megabits per second.[18] A more comprehensive assessment by the FCC of just the United States showed that only 11.4 percent of all connections in the country were 10 megabits per second or faster. Across the states, broadband speeds vary considerably. As the availability gap narrows, improving the speed of the service will become increasingly more important (see Exhibit 1).[19]

Broadband programs in a handful of innovative states were models for the federal government.

California, for example, was an early leader among states in increasing broadband adoption and use, particularly in terms of mapping where broadband was available statewide and planning for expansion. In fact, Blair Levin, executive director of the Omnibus Broadband Initiative, which oversaw development of the national plan, acknowledged that the FCC culled ideas from the work of California's Broadband Task Force, whose final report, "The State of Connectivity," released in 2008, included comprehensive recommendations based on input from a variety of public and private-sector partners.[20] The task force also developed a sophisticated map of residents and their broadband access.

Those efforts since have enabled the state to better target resources to underserved populations. The state utility commission built off the task force's work when it created the California Advanced Services Fund, which promotes broadband in unserved and underserved areas through financial awards to providers.[21] "We were able to focus the money on those particular areas that were identified as underserved," said Rachelle Chong, special counsel of advanced information and communications technologies for California's Office of the State Chief Information Officer and a former California public utility commissioner.[22]

Minnesota's multi-pronged approach to broadband adoption and expansion also dates back a few years. In 2007, the state created the Minnesota Ultra High-Speed Broadband Task Force, representing both urban and rural areas. The group's final report, released in November 2009, recommended broadband access for all of the state's homes and businesses by 2015, tax incentives for individuals, businesses and organizations to increase digital literacy, and

financial assistance to help low-income people pay for services.[23] The legislature moved quickly to accept some of the recommendations, and in April 2010, Governor Pawlenty signed into law a bill that sets state broadband goals for deployment and speed, including ubiquitous access by 2015.[24]

Additionally, Minnesota is among a number of states that offer providers more flexible "alternative" regulation arrangements in exchange for their commitments to expand broadband deployment.[25] Also called incentive regulations, these arrangements typically allow regulated providers to earn larger profits; they also relax government review of proposed rate increases, if providers meet performance targets.

North Carolina, meanwhile, has worked for almost a decade to bring more people online. In 2000, it created e-NC Authority, the nation's first state broadband agency. The group has used partnerships with rural and urban communities and providers to expand broadband use. The state has complemented those efforts with technical education and training for local businesses. Between 2001 and 2007, its e-NC Business and Technology Telecenters provided free Internet access to 158,000 residents and helped create nearly 1,500 jobs in some of the most economically distressed, rural areas of the state.[26] The centers seek to increase economic development through technology—assisting both individuals and businesses by providing services such as one-on-one counseling, seminars and training, technical support, office space and resources for small, start-up companies, and public access to the Internet.[27]

"States have long historically viewed correctly that broadband is not just an enabler of economic development but really has the potential to be transformative for communities, whether it is education, health care or other ways that the Internet is used," said Eugene Huang, who served as director of government operations for the FCC's

Exhibit 1
HOW FAST IS YOUR STATE'S INTERNET?

States vary in the percentage of broadband connections at various speeds. The second column ranks the states on how close they are to the American Recovery and Reinvestment Act's goal (the "stimulus standard") of providing connections of at least 768 kilobits per second.

	Basic connection	Stimulus standard	High-speed connection	
	200 kbps +	768 kbps +	6 mbps +	10 mbps +
Hawaii	92.5	88.3	*	*
Oklahoma	90.2	84.8	28.0	3.0
Nevada	88.8	83.0	30.4	6.6
Maine	86.0	82.9	57.6	4.0
Florida	86.0	82.2	40.3	8.6
Louisiana	85.3	81.7	*	*
Wisconsin	87.8	81.2	27.8	6.4
Rhode Island	85.5	80.9	*	*
Connecticut	87.9	80.8	37.5	0.0
Illinois	87.9	79.6	31.9	7.5
Oregon	87.3	79.4	39.2	5.3
New York	83.1	79.1	56.4	55.6
Michigan	85.6	78.8	32.6	*
Utah	88.6	78.5	33.2	2.9
Washington	85.7	78.5	40.6	4.8
California	86.2	78.3	19.7	3.9
Texas	86.3	78.1	24.3	5.2
Colorado	87.8	77.5	39.0	1.5
Missouri	85.4	77.4	16.8	5.2
Minnesota	85.9	77.3	31.1	3.9
Kansas	83.3	77.0	33.7	3.8
Georgia	81.8	76.7	23.7	1.8
Kentucky	88.5	76.7	31.2	26.2
Arkansas	82.7	76.6	*	*
North Carolina	81.0	76.6	38.0	4.1
Massachusetts	81.5	76.4	46.9	11.0
Arizona	85.3	76.3	37.6	13.5
Indiana	84.3	76.2	32.6	13.9
Mississippi	85.4	76.2	*	*
Alabama	82.3	76.1	17.9	4.3
South Carolina	80.2	75.9	33.1	3.5
West Virginia	83.5	75.8	*	*
New Hampshire	81.1	75.7	54.6	3.7
Delaware	82.5	75.6	*	*
New Jersey	80.9	75.6	53.4	35.1
North Dakota	85.0	75.3	*	*
Iowa	87.0	74.6	*	*
Ohio	80.7	74.0	37.2	4.5
Pennsylvania	79.9	73.5	37.5	8.9
Tennessee	81.2	73.5	29	2.9
South Dakota	81.0	72.6	*	*
Idaho	81.6	72.4	*	*
Maryland	78.3	72.1	40.2	11.7
Nebraska	81.5	71.1	*	*
New Mexico	81.1	70.3	*	*
Virginia	78.8	69.5	38.0	21.5
Vermont	74.0	68.9	*	*
Wyoming	82.9	68.2	*	*
Alaska	76.0	58.9	*	*
Montana	72.9	57.9	*	*

Data as of December 31, 2008; *Data unavailable.
SOURCE: Federal Communications Commission.

National Broadband Task Force before moving to the White House to be a special advisor to the chief technology officer in March 2010.[28]

But, by some measures, many states lack capacity to develop and implement broadband policies and mapping. Only an estimated 15 states have broadband agencies or authorities, according to North Carolina's Patterson.[29] (Many, like e-NC Authority, are structured as quasi-state authorities, which gives them greater latitude

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>
> —Eugene Huang, special advisor to the chief technology officer at the White House

to partner with the private sector on mapping and data collection and grant applications.) And before the stimulus, only about a dozen states had created broadband maps that allowed them to know where the service was available within their borders. Just a handful had drafted detailed plans for expanding access or had launched efforts to explore broadband and its applications.[30] "If you don't have a group that is looking at [broadband] and keeping their eye on their target, your state will lose out in terms of its ability to have what I consider the technology of knowledge and information and light," suggested Patterson. "It is desperately important that states have this capacity and capability."[31]

In Arizona, Galen Updike, telecommunications development manager at the state's Government Information Technology Agency, noted that there are hundreds of employees within Arizona state government developing and executing policy in areas such as transportation and energy—but only a few working on broadband policy. Given the importance of broadband to states' economic competitiveness, Updike said, states should prioritize developing more internal capacity and expertise.[32]

New Mexico, meanwhile, is relying significantly on outside consultants and entities such as the 1st Mile Institute, a nonprofit organization focused on rural telecommunications, economic development and broadband consulting, to help develop and execute its broadband strategy. Richard Lowenberg, president of 1st Mile Institute, is concerned about the lack of internal capacity in New Mexico's state government. "I'm only one person," he said. "What is the state going to do if I'm hit by a bus?"[33]

Officials also recognize that they need to coordinate efforts more effectively and share more information across state lines. According to John Conley, executive director of Colorado's Statewide Internet Portal Authority, coordination across states has been weak. States are duplicating efforts "because we don't know what other states are doing," Conley said. "Part of that is we don't, as states, tend to look outside our own borders, and we think they cannot have a program that would work for Colorado in North Carolina. But…that in fact is now the case."[34]
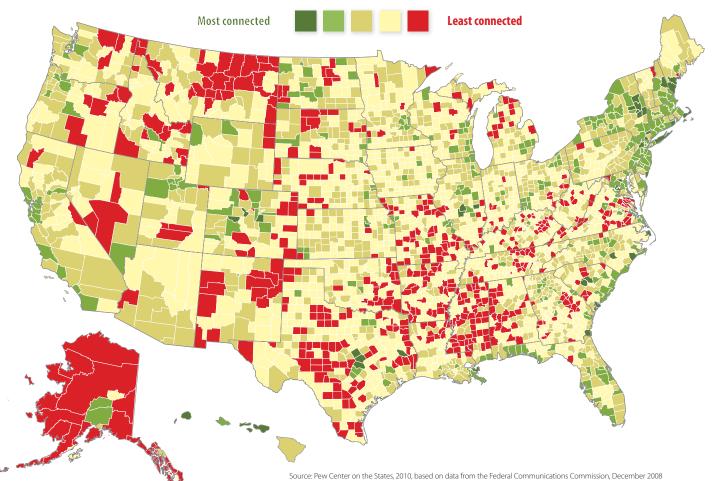
An Infusion of Support

The American Recovery and Reinvestment Act of 2009—and its $7.2 billion for broadband expansion—presented a unique opportunity for states to make a substantial leap by

expanding availability, access and the use of the technology to further education, health care delivery and other critical services. This federal money may jumpstart a number of broadband mapping, planning and expansion initiatives with significant potential for states as they grapple with the role that broadband will play in their economies, according to several experts.[35]

Through the Broadband Technology Opportunities Program (BTOP), the U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA) is distributing $4.7 billion to a mix of providers, state agencies, localities, nonprofit organizations and various forms of public-private partnerships. The money is being used to expand access to and adoption of broadband, from laying fiber in the ground to converting libraries and colleges into public computing centers, efforts that help introduce new users to broadband and demonstrate its relevance to their lives. The U.S. Department of Agriculture's Rural Utilities Service is using the remaining $2.5 billion to achieve similar ends in rural areas through its Broadband Improvement Program.

Exhibit 2
BROADBAND IN AMERICA

About 100 million Americans lack access to broadband at home. The reasons include cost, limited availability and users' lack of knowledge about how it works or how it is relevant to their lives. Urban households are much more likely to have broadband connections than are households in rural areas.

Most connected ▢▢▢▢▢ Least connected

Source: Pew Center on the States, 2010, based on data from the Federal Communications Commission, December 2008

Through the stimulus package, the federal government implemented the Broadband Data Improvement Act, which is enabling most states to develop their own plans for how to expand access to and adoption of broadband and to create detailed maps outlining the current state of availability, technology and speed. NTIA has $350 million at its disposal for mapping and planning, efforts that are inextricably linked. It has awarded mapping grants—requiring a 20 percent match— to all states and $500,000 each to most states for planning. All of the resulting data will feed into the National Broadband Map that will be made public in February 2011. NTIA announced in May 2010 that it will accept applications for ongoing state mapping efforts, with funding for an additional three years of data collection.

The data that states are being required to submit to NTIA are more sophisticated and comprehensive than the data underpinning most of the earlier state mapping efforts. The national map will comprise a number of layers: the geographic availability, types of technology and speed of broadband service—address by address—as well as public access points and a wide range of economic and demographic data.[36]

Including this level of granularity takes states far beyond simply mapping where broadband is available and where it isn't. Nationally comparable data about technology and speed will be particularly important as states seek to improve broadband reliability and speed in areas where some level of connectivity is already in place.

NTIA awarded its planning grants directly to states with a goal of helping them build long-term internal capacity. NTIA announced in May 2010 that it will allow states to seek additional funding for a range of planning-related activities, including state broadband task forces or advisory boards, technical assistance programs and initiatives to promote increased computer ownership and Internet usage.

"What you see today is the lead in each state being housed in a number of different places," said Anne Neville, director of the Broadband Mapping Program at NTIA and a former assistant secretary for economic development and technology for California. "You certainly see an economic development orientation, not that it didn't exist four or five years ago, but people were still struggling to be able to explain why broadband was really important."[37]

The more the states use the planning grants to help them develop their long-range visions for broadband deployment and usage, the better positioned they will be to achieve their goals. "If you don't have a holistic approach and…you don't have the statewide vision, you're increasing your chances of failure," said Charles Ghini, director of the Division of Telecommunications in Florida's Department of Management Services. "That's the way we've been going at it, the wrong way. We were too fragmented in Florida." In 2001, the state created a Digital Divide Council, but its funding and support disappeared soon after its creation.[38]

Missouri's planning grant is enabling the state to take a long-term perspective and develop a better coordinated, statewide approach, according to Robert Donnelly, business development manager for the Missouri Department of Economic Development. This is critical when making decisions about any type of public asset that will require continued investments over several years, Donnelly noted, adding that it is particularly true with a technological asset such as broadband that evolves quickly. As with transportation, Donnelly said, "you don't want to realize a few years down the road that you needed a four-lane highway when you only put in a two-lane road."[39]

Early, well-established planning efforts have made a difference in states such as California, Minnesota and North Carolina, where coordination among a variety of stakeholders has helped facilitate statewide approaches to expanding access to and the use of broadband. Once the stimulus was announced, this work helped avoid a free-for-all grab for the federal funds among competing private, nonprofit and public-sector players. Better yet, the states were well positioned to use the funds to build on their momentum. But for many other states, the lack of in-house capacity and expertise on broadband made it challenging to obtain or direct the stimulus funds.

NTIA asked governors for their input on all BTOP funding applications originating within their borders, regardless of whether they came from the public, private or nonprofit sector. Some states provided a list of preferred projects but offered no explanation or justification; some included a comprehensive list of projects, but removed applications by out-of-state entities because they lacked an established, on-the-ground presence in their state and appeared to be targeting multiple states with their entries. Others, such as North Carolina, were able to provide a wealth of information to NTIA, complete with a ranked list of projects and an independent analysis and explanation of each. "Those were certainly more compelling testimonials from the states than the ones that simply said, 'Here are the ones we like,'" said NTIA Chief of Staff Tom Power. Applications that demonstrated they had buy-in from the public and private sectors and sufficient capacity and know-how to complete complex projects have had a leg up in the funding process, Power said.[40]

West Virginia provides a case in point. At the time the stimulus was announced, the state had just completed a planning process that generated input from a variety of public and private-sector stakeholders, and it had developed a long list of projects to accomplish in the years to come.[41] The infusion of federal dollars will turn the state's plans—and in fact most of its wish list—into a reality in a matter of only 24 to 36 months, the time required by the legislation for states to complete projects funded by the monies.[42]

In addition to a $1.4 million mapping and planning grant and several smaller BTOP grants awarded to private-sector and nonprofit partners,[43] Governor Manchin's office received $126 million to add 2,400 miles of fiber to the state's existing public safety network, which includes the state's police and fire departments and other first responders, to connect more than 1,000 "anchor institutions" such as schools, libraries and government offices at a speed of up to 45 megabits per second. This in turn will help spur affordable broadband access by allowing local Internet service providers to link to the state's open network. Ultimately, the effort is expected to connect 700,000 households, 110,000 businesses and 1,500 anchor institutions across West Virginia to high-speed, reliable broadband that could dramatically bolster the economic competitiveness of many rural and largely unwired areas of the state.[44]

Completing these projects in three years may be challenging, especially for states with the highest levels of need. "Every state is approaching this differently partly because of their demographics and partly because of the supply of [telecommunications companies] in their state," said J. Stephen Fletcher, president of the National Association of State Chief Information Officers (NASCIO) and Utah's chief information officer. In Utah, for example, government entities and larger telecom providers have been enlisted to play a role because many of the small, rural telecommunications providers lacked the

capacity even to put together applications. "When we went out to our rural telcos, they were interested but they really didn't have the staff to write grant proposals," Fletcher said. "They told us, 'We really can't participate.' If the state didn't provide some of the capability, then they weren't going to be able to go forward with it."[45]

It also has been tough to get the money in hand to get projects under way. Applications for most broadband-related stimulus funding have closed, but as of April 2010, only $1.2 billion of the $4.7 billion allocated for BTOP and only $1.1 billion of the $2.5 billion allocated through the U.S. Department of Agriculture had been released in grants.[46] NTIA announced in May 2010 that it would reopen the application window for state and local governments to build public safety broadband systems with 700 MHz spectrum made available to them by a recent FCC decision. The federal government is required to obligate all of the funds by September 30, 2010.[47]

States' Crucial Role

The stimulus-funded projects come with high stakes. States' successes—or failures—will affect how they educate students, provide health care and protect the public, among other important outcomes. The FCC recognized broadband's role in the provision of services, dedicating a section of the National Broadband Plan to such "national purposes."

The FCC wants states to take a leading role in improving that service delivery. The plan makes hundreds of recommendations, many of which would dramatically affect states if implemented. Some are relatively narrow, but together they add up to potentially significant changes for governments and the public.

Many of the most relevant recommendations for states seek to eliminate policy barriers to the physical build-out of broadband infrastructure—such as access to the land needed to bury fiber and utility poles needed to hang it—and seek to

LOCALITIES GETTING IN THE GAME

Some municipalities, such as Lafayette, Louisiana, and Bristol, Virginia, have moved aggressively to expand broadband on their own. The two cities sought to fill the availability gap by investing in their own municipal networks and serving citizens directly, as they do with other public utilities, such as water and sewer systems. In some cases, a similar approach has had a major impact on economic development in rural communities. For example, after constructing a municipal fiber-to-the-home broadband system, Powell, Wyoming, was able to lure significant foreign investment. A South Korean venture capital firm has agreed to pay as much as $5.5 million to engage 150 certified teachers to teach English to South Korean students using high-speed video teleconferencing that will enable them to work from home.[48]

With the help of $9 million in state and federal grants, Bristol extended its fiber network to eight counties in Virginia's Coalfield region. That investment has helped bring new jobs to the area; for example, international IT consulting firm CGI and defense contractor Northrop Grumman cited the network in their decision to hire 700 additional technicians, consultants and call operators in nearby Lebanon, Virginia.[49]

Several years ago, a number of cities launched programs to provide wireless access to high-speed Internet to their residents for free or a reduced rate. That movement has died down significantly. But while high-profile projects were canceled in cities such as Chicago, Houston and San Francisco, some municipalities are continuing to experiment with this approach. Philadelphia revived its push for municipal Wi-Fi in December 2009, more than a year after a deal with EarthLink, a private provider, fell through. Corpus Christi, Texas, purchased back its network from EarthLink after the company backed out of a similar arrangement and has since saved money by using the network for electronic meter-reading.[50]

improve coordination among various public and private-sector entities. Levin said he sees a lack of consciousness about how seemingly unrelated public policies and regulations can have a major impact on broadband. For instance, whenever a road is dug up or a tower is built for any reason, state and local governments should be thinking about whether additional broadband access can be incorporated into the construction.[51]

Some of the plan's other recommendations are aimed at making life easier and more cost-efficient for state and local governments while supporting their broadband initiatives. For example, the plan recommends that the FCC streamline the application process for E-Rate, a grant program through which many schools have been connected to the Internet, and the plan also recommends that the FCC provide states with greater flexibility about how to use the funds. "If you go and talk to some of the state and local government folks who deal with education, the process for getting funds is incredibly tortuous," said the White House's Huang, who served as Virginia's chief technology officer under former Governor Mark Warner. "We have listened to those concerns."[52]

The FCC already has implemented at least one of these recommendations: School computing centers receiving E-Rate funding now can be made available for community use and digital literacy training outside of normal school hours.[53]

Additionally, the plan recommends that the federal government open its contracts for telecommunications services for use by state and local governments, enabling them to benefit from the massive purchasing power of the federal government and to reduce transaction costs incurred through their own complex contracting processes.[54] The federal government receives a discount of 20 percent to 50 percent of the going market rate for Internet connectivity and other communications services. State and local governments could expect to receive a similar discount if the change is made—a potentially significant savings for cash-strapped agencies.[55]

National Purposes: Why Broadband Matters

The potential reach and impact of applications for broadband service dwarf the novelty of checking e-mail at a restaurant or obtaining driving directions on a mobile phone. Faster Internet access could enable new ways of educating students and involving parents in homework. It could allow health care practitioners to have virtual visits with—and dispense medication to—patients in remote areas. It could allow businesses to expand their markets and reduce overhead costs. It could enable government to provide services more efficiently, and allow citizens to interact with government more frequently and

> "At the end of the day the most important thing about broadband is not the speed of the networks or the coolness of the devices, but it's how people use it."
>
> —Blair Levin, executive director of the Omnibus Broadband Initiative

more easily. Although many applications of the technology are too new to evaluate their ultimate effectiveness, just about every policy area that states manage could be affected by expanding broadband access and adoption. "At the end of the day the most important thing about broadband is not the speed of the networks or the coolness of the devices, but it's how people use it," said Levin.

"You can't use it without great networks and great devices, but it's that use that ultimately determines its value to individuals and to society."[56]

The National Broadband Plan identifies a wide range of vital areas it calls "national purposes"—business, education, energy conservation, government access, political process and public safety—that could be well served by government promotion of broadband access and use. The new national broadband strategy looks at, for example, how expanding broadband could make it easier to take a class, consult with a doctor or work from home for a company located across the continent.

The FCC is encouraging states, which have a huge stake in each of these areas, to play a prominent role in advancing the plan's goals. For instance, once broadband availability is expanded, federal officials expect states to streamline professional licensure rules to facilitate working across state lines, especially for doctors and teachers, and to revamp tax codes so online workers are not paying primary taxes in more than one state. The FCC also recommends that governments, including states, build more robust online services that would enable citizens to register to vote, learn about public spending or sign up for safety net programs without repeated trips to various offices. And the FCC is encouraging states to use their leverage—for example, as utility regulators that can mandate the installation of "smart meters" and as major health care purchasers that can insist on the use of electronic health records—to urge private industry to speed up its development and adoption of Internet-based technologies.

Several states already are extremely active in these "national purpose" arenas. Some state governments, for example, are looking at a variety of ways to deliver medical services to rural areas. The FCC's national plan addresses how broadband could bolster those efforts by allowing patients to visit doctors on video or by improving emergency response times for paramedics. The following is a closer look at the plan's national purpose goals and a sampling of state efforts in these areas. Many of the efforts are in their early stages, so the jury still is out on their effectiveness.

Health Care

Better use of broadband could improve the health care system by driving down costs and improving results for patients, the FCC says in its plan. The commission cited a 2007 study by the Center for Information Technology Leadership that said using video consultation instead of in-person doctor visits for prisoners, nursing home residents and hospital patients who need outside experts could save $1.2 billion annually.[57] The FCC also touted the potential benefits to patients from using remote monitoring devices to keep tabs on people who leave the hospital after a major medical crisis, such as a heart attack. Remote systems can allow doctors to see if a patient is putting on weight or showing other warnings that more heart problems are imminent, even before the patient complains of new symptoms. The commission pointed to studies that say just tracking patients who have four separate chronic conditions could save $197 billion over 25 years.[58]

The FCC also is pressing states to cut the red tape that could hamper the wider use of Internet-based medicine. In its move to promote long-distance health treatment, the commission wants states to loosen restrictions on licenses for out-of-state doctors and to promote the use of electronic prescriptions. States already have begun to act. A group of more than 20 states—from Alabama to

Alaska—is trying to make it easier for a doctor with a license in one state to practice in another, a key requirement in telemedicine, where the patient and doctor may be in different states. Officials from these states, convened by the National Governors Association's Center for Best Practices, have been working on streamlining the process. States have similar licensing requirements, for the most part, but minor differences "make it burdensome for physicians to obtain multiple licenses," the group, which is called the State Alliance for e-Health, wrote in 2009. "These differences also create inefficiencies and expensive redundancies in the licensure process for individual boards and the system as a whole."[59]

The alliance suggested using an online tool that would allow physicians to keep their professional histories up-to-date. Medical schools, hospitals and state regulators also could edit or verify records. That way, when a doctor wants to apply to practice in a new state, much of the paperwork chase would be eliminated.[60]

Although streamlined licensing is a goal that had state officials scrambling even before the FCC touted it, not everyone is convinced that the process of applying for out-of-state licenses is enough of an obstacle to prevent doctors from seeing patients remotely. Duane Houdek, executive secretary for the North Dakota Board of Medical Examiners, was involved in the alliance's efforts. "We want all the doctors we can get," he said.[61] But Houdek added that he has seen little evidence that the medical license process is hampering telemedicine in North Dakota, where even doctors from Australia provide remote care. Once all the paperwork is collected, North Dakota typically issues a provisional license within a week, Houdek said.

In the move to bring pharmacies online, Utah this spring passed legislation making it the only state to allow doctors to prescribe medicine to patients they examine online.[62] But the practice is limited to local

participants. To prevent fraud and ensure product safety, Utah lawmakers specified that the doctor writing the prescription, the drug store filling it and the online company connecting the two must have a physical presence in Utah.

The FCC also called on states to help develop the use of electronic health records, especially through Medicaid, the federal-state health insurance program for the poor. In California, the work of the broadband task force helped the state compete for and win a variety of federal funds related to e-health because it was able to demonstrate need with solid data, according to Chong of California's Office of the State Chief Information Officer. In addition to stimulus funds geared toward speeding the adoption of electronic health records, the state received $22 million through an FCC pilot project that will help create the California Telehealth Network. The network will connect more than 800 California health care providers in underserved areas to a state and nationwide broadband network dedicated to health care. "The goal is for the patient not to have to go back into the city as often," said Chong, noting that the ability to transmit diagnostic information, such as X-rays, electronically and to provide specialty support to remote areas via telemedicine has the potential to dramatically reduce health care costs.[63]

SPEED CAN SAVE LIVES

As the National Broadband Plan notes, broadband can improve lives by removing barriers of time and space. The ability to use instant information from around the world can improve even the most routine activities. The more crucial the activity, the bigger the benefits of broadband.

In emergency medicine, for example, high-speed Internet access can mean the difference between life and death. In northern Iowa, a young mother of two recently was rushed to a small community hospital with injuries sustained in a car crash, recalled Dave Lingren, interim executive director of the Iowa Communications Network.[64]

The mother's injuries, including a fractured skull, were severe. The hospital performed a CAT scan, but the staff had to send the images to specialists in Mason City because the hospital did not have its own radiologist. Unfortunately, the hospital's Internet connection was slow, and it took nearly half an hour for the CAT scans to download in Mason City. As soon as the specialists saw the images, they called the hospital and told the doctors there to drill into her skull. Without relieving the pressure, they said, the mother's brain would not function. But the call came too late. The mother had died 15 minutes before the radiologists called. "That," Lingren said, "is the state of broadband in rural Iowa."

The FCC and the Iowa Hospital Association are now building an online network for 89 rural providers to ensure that the same thing does not happen again. When the $10 million project is completed at the end of 2011, the network will be 30 to 300 times faster than current connections.

The National Association of State Emergency Medical Services Officials envisions a far more advanced scenario. After a car crash on a stretch of highway far from the nearest hospital, paramedics could start learning information about the accident before the ambulance even arrives, the group said in testimony to the FCC.[65] Onboard crash assistance equipment, such as OnStar, can help first responders prepare for the crash scene by providing data about the severity of damage, speed of the vehicle and roll-over information, said Kevin McGinnis, an advisor to the group.[66] Such systems may eventually provide photos and audio, too.

Paramedics also could find out, while still en route, whether a medical helicopter is available, whether there are beds available at nearby hospitals and whether specialists are on duty. Once a patient is in the ambulance, video feeds could allow doctors to monitor the crash victims and start ordering treatment, technology that already is being used in Baton Rouge, Louisiana, and Tucson, Arizona. Wireless sensors could monitor the patient's vital signs, and that data could be sent to the hospital instantly. An electronic health record could give doctors, nurses and paramedics their patient's medical history instantly.

It is a far-off vision, though, as most emergency departments today still employ the radio communications they used 35 years ago, McGinnis said. "You just can't do that on [today's] narrowband systems."[67]

Public Safety

According to the National Broadband Plan, the FCC intends to develop a comprehensive online network for public safety workers, which would link police, fire fighters, anti-terrorism teams and critical infrastructure units, including power plant workers. Similar plans have languished in the past, but the FCC hopes its new approach would give first responders the ability to use data. Developing such a network would come with a substantial price tag: Over the next 10 years, it would cost $12 billion to $16 billion to build and maintain the proposed network.[68] The commission also wants to revamp the nation's "outdated" 911 call centers to be able to alert the public during emergencies.[69]

One part of the FCC's plan for the public safety network set off alarms with state officials. The commission wants to auction a block of spectrum to commercial carriers, but only on the condition that those carriers would share it with public safety agencies. State and local officials argue that only public safety agencies should be able to use the block. Seven national organizations, including the National Governors Association and the National Conference of State Legislatures, said the commission's proposal "relies on untested technologies and new regulations that cannot ensure reliable and resilient communications capabilities to meet stringent public safety needs."[70]

At the state level, Oregon is building a $414 million communications network to enable its first responders to interact with each other, even in remote parts of the state. The project was prompted in part by FCC regulations requiring emergency radios to switch frequencies and use narrower channels by 2013 in an effort to use radio frequencies more efficiently. Oregon's plan involves building or upgrading radio towers at 265 sites and is designed to work with responders from four state departments as well as local agencies.[71]

Education

The National Broadband Plan is encouraging states to include digital literacy standards in their curricula so students learn to use online tools. The FCC also wants states to make it easier for K-12 students to take online courses, even if the teachers of those courses are in other states.[72] A series of proposals at the federal level, some included in the broadband plan and some that are already under way, would make computer labs at local schools and community colleges available to the larger community for Internet access. Alaska was the first state given permission to let schools that receive federal E-Rate subsidies for broadband connections to open their computer labs for local residents to use after school hours.

In an effort to bring technology into the classroom, Pennsylvania officials are working with the national nonprofit Public Broadcasting Service (PBS) to create and maintain digital learning libraries. The collections give students in the classroom access to content produced by PBS' more than 300 public television stations, both locally and nationally, that is relevant to their coursework. The libraries include video, audio, images, games and other interactive features.[73]

California Governor Arnold Schwarzenegger has been a vocal proponent of moving schools toward using free electronic textbooks. In 2009, the state determined that four digital textbooks—covering math and chemistry—met all of the state's curriculum standards, and another 10 met 90 percent of its standards. The state now is evaluating submissions from publishers for free electronic textbooks covering history, social sciences and higher-level math. Local school districts ultimately will determine whether to use the free materials. Schwarzenegger has stressed that the digital textbooks can be used in a variety of ways, and not all of them would require an

Internet connection. For example, students could read them on a computer or on printed pages distributed by the schools.[74]

Energy and the Environment

The National Broadband Plan instructs states to pave the way for developing a "smart grid" that enables customers to use the Internet to see their current and historical energy usage and the price of power. That information could help customers make better choices about how they use electricity and could spur a flurry of innovations from third parties—from iPhone applications that monitor a home's power usage to specialized freezers that make ice only at night. If states do not act on those changes soon, the FCC says, Congress should step in and get it done.

Texas is one state already moving forward aggressively in this area. Its utilities have installed more than one million "smart meters" that transmit information about electricity use wirelessly to the utility, eliminating the need for meter readers. Smart meters also can allow customers to see their electric usage before the bill comes, alert utilities to power outages and communicate wirelessly with household appliances, including monitors that instantly can show customers how much money they are spending on electricity. The Texas Public Utility Commission has overseen the transition, including setting rates and testing smart meters.[75] Consumers will pay for the new equipment over a long time. In the Dallas area, for example, the utility will bill them an extra $2.19 a month for the next 11 years.

Other states have been active in ways to integrate Internet technology with the power grid as well. In the wake of rolling blackouts that hobbled the state in 2000 and 2001, California regulators are pushing a series of wide-reaching changes, involving, among other things, how power is generated and

how much pollution is produced as a result. Millions of customers in the Los Angeles area are slated to complete the move to smart meters by 2012.[76] Meanwhile, in an energy conservation package passed in 2008, Pennsylvania lawmakers included a requirement to roll out smart meters over 15 years.[77]

"These questions of energy consumption and energy data access are going to be handled at the state level unless Congress steps in," said Nick Sinai, the FCC's energy and environment director for the broadband plan. "As forcefully as we can, we're trying to urge states to follow the lead of California, Texas and Pennsylvania."[78]

Economic Opportunity

To promote the growth of small businesses, the FCC is calling on the U.S. Department of Commerce to make it easy for regional managers to decide where to locate facilities by using integrated federal, state, tribe and local data online. The National Broadband Plan pushes for expanded outreach efforts to entrepreneurs, especially through mentorship programs now run by states and nonprofit organizations, and it also calls for states, the federal government and local governments to bear part of the cost of such outreach. As a model, the FCC highlighted a program called JumpStart in Ohio, a Cleveland-based initiative launched in 2004 that pairs experienced entrepreneurs with budding business leaders, especially women and minorities.[79] According to one analysis, in 2009 JumpStart and the four dozen companies it works with added $90 million to the local economy and accounted for 664 jobs.[80]

Another goal of the broadband plan is to eliminate situations that could subject online workers to taxes from two or more states. The FCC recommended that Congress simplify the state tax rules for mobile workers; legislation is currently stalled.[81]

Government Performance and Civic Engagement

The broadband plan recommends that Congress allow states and local governments to participate in federal communications contracts to save money. But it also encourages all governments to be more responsive online to their constituencies. The plan noted that the confusing array of state regulations for the 11 largest income-dependent safety net programs requires a typical family to fill out six to eight applications and visit six different government offices.[82] In Utah, however, a single state worker can process applications for Medicaid, food stamps and welfare benefits. Online access makes that possible, said Fletcher, NASCIO president and Utah's CIO. The state has 1,200 workers who determine eligibility for the safety-net programs; of those, about 400 to 500 work remotely all the time, using phones and the Internet, he said.

The national plan encourages all levels of government to use broadband to increase transparency by allowing citizens to participate in governing via the Internet. The FCC specifically recommends that states allow voters to register online and to update or transfer their registrations when they move. The commission also promotes expansion of programs that allow those in the military serving overseas to vote online for elections at home.[83]

Arizona became the first state to roll out an online voter registration system in 2002. The program,

called EZ Voter, connects the state's driver's license database with voter registration rolls, which helps reduce fraud. By 2008, about one-fifth of all of Arizona's voters had registered online, and the secretary of state's office says 60 percent to 70 percent of all new registrations were processed electronically. A study commissioned by the Pew Center on the States found that the arrangement saved money, too. In Maricopa County, where 60 percent of Arizonans live, an online application cost 3 cents to process, compared with 83 cents for a paper form. And Arizona voters who registered online also had slightly higher turnout rates than those who registered in person in the 2008 presidential election.[84]

Other states have followed Arizona's lead. Washington used a similar system in the 2008 presidential election; Colorado, Kansas and Oregon all have since started using online voter registration.[85]

One project to inform citizens that attracted much attention is KanView, the first of many online tools to help residents understand how their state tax dollars are spent.[86] The Web site allows visitors to see contracts, employee salaries and agency expenditures. Officials intend to improve the site to make it easier to navigate and search. "Our approach has been to put everything out there, every accounting transaction," said Kansas Secretary of Administration Duane Goossen. "It's not complicated in that sense. Everything is there."[87]

Disparity In Broadband Availability

Broadband is available to 95 percent of Americans, meaning that the infrastructure is in place for the vast majority to subscribe to broadband where they live. But that figure masks large disparities among states and localities, urban and rural areas, income levels, and racial and ethnic backgrounds. For instance, more than half of the states still have local jurisdictions where less than 50 percent of households have access to broadband speeds that meet the FCC's goals.[88]

The statistic also disguises other crucial gaps in speed and quality. Low speeds, poor connection quality, high prices and lack of competition among providers may often distress users who have nominal access to broadband, especially in rural areas. More than 50 percent of teachers say slow or unreliable Internet access presents obstacles to their use of technology in classrooms, according to the FCC's national plan. "Further, many business locations, schools and hospitals often have connectivity requirements that cannot be met by mass-market DSL, cable modems, satellite or wireless offers, and must buy dedicated high-capacity circuits such as T-1 or Gigabit Ethernet service" that can be difficult to acquire or prohibitively expensive, the plan stated.[89]

Ensuring broadband availability for the estimated 14 million Americans for whom subscribing to broadband is not an option—and improving the quality and speed of existing service—starts with infrastructure. Building out infrastructure for any new technology—from telegraph in the nineteenth century to digital television today—is always difficult. The process is fraught with disputes over land, laws and money. For broadband, the battle has already begun. While universal broadband access is a national goal, achieving it will depend on the states. For

them, ensuring that all residences, businesses, government offices and community institutions like libraries have access to high-quality, high-speed broadband means addressing a passel of technical, legal, economic and physical obstacles.

Minding the Gap

The first step to expanding broadband where it is most needed is mapping current access to high-speed Internet connections—who has them and at what speeds. The federal NTIA, responsible for developing a National Broadband Map by February 2011, has boosted states' mapping efforts by giving every state a grant through the federal stimulus package to fund these initiatives.[90]

Previously, about a dozen states had created broadband maps that showed them where the service was available within their borders.[91] But even for states that were early leaders on broadband mapping, such as California and Kentucky, the stimulus funding is improving the results, enabling much-needed updates and standardizing data collection across states. The National Broadband Mapping program relies on states to compile and submit data on half a dozen indicators:[92]

1. Availability of broadband service at the residence or business address level

2. Advertised and actual speeds of service

3. Technology used (e.g., cable, DSL, WiMax)

4. Average revenue per user

5. Location and capability of critical broadband-related infrastructure

6. Spectrum used by wireless broadband service providers

This work is technically complex and poses practical challenges because it requires the cooperation of all of a state's Internet providers. The resulting National Broadband Map and database will be searchable by location and will make public most of the information submitted by states.

> Ensuring broadband availability for the estimated 14 million Americans for whom subscribing to broadband is not an option—and improving the quality and speed of existing service—starts with infrastructure.

Several states have been successful at mapping existing broadband coverage and speeds despite the added difficulty that they cannot force private-sector providers to divulge proprietary details about their coverage. Massachusetts, for example, has negotiated non-disclosure agreements with providers, which is especially tricky because states are subject to public records laws. But the state has been able to entice the providers and offer them sufficient assurances, in part by pointing out the benefits to the providers themselves, such as identifying potential new customer populations, and the risks of not supporting the mapping effort. "[The providers] realized that they needed to be seen as part of the solution and not part of the problem," said Judith Dumont, director of the Massachusetts Broadband Institute.[93]

But states leading in broadband deployment are doing much more than simply identifying where broadband is and where it is not. Washington state, for example, is among several states combining information about broadband availability with economic and demographic data in their mapping work to help communities better use the infrastructure once it reaches them.[94] By overlaying education and economic data with where broadband is now and where it is planned for, state agencies and private entities more easily can identify areas where, for instance, people might need Internet-related job skills training or where the state's Department of Commerce can target business development efforts.

"Just the broadband map is not enough," said Angela Wu, Washington's Broadband Policy and Programs manager. "You have to put in the other data that makes it more robust."[95]

Navigating the Physical Challenges

Once states determine where new or better broadband access is needed within their borders, the array of obstacles to filling in the gaps is daunting. It is not as simple as running wire to a house. Officials and private-sector providers must juggle relationships and jurisdictional issues across federal, state, county and municipal agencies and departments. As the National Broadband Plan indicates, the cost of obtaining permits, leasing utility pole access and obtaining rights-of-way needed for broadband infrastructure across multiple jurisdictions can add up to as much as one-fifth of the cost of deploying fiber optic cable.[96] And most state and local governments agree that coordination across jurisdictions on infrastructure issues could and should be improved.[97]

Acquiring rights-of-way across multiple jurisdictions can be among the most time-consuming, costly and frustrating requirements. In states without coordinated and consistent rights-of-way arrangements, creating a robust network can drag on for several years or become prohibitively expensive.[98]

Some states have handled the problem by coordinating at the state level the rights-of-way that providers need. For instance, in an initiative to link broadband across the state, Michigan's METRO Authority took the reins to coordinate public rights-of-way across numerous cities and townships.[99] Each provider is required to report to the authority how much broadband line it runs and where the lines are located. The state bills those providers for the cost of the rights-of-way and reallocates the money to the cities and towns. Those municipalities, in turn, must report to the authority how they spent the funds (which must be spent on public rights-of-way maintenance and upkeep).[100]

The arrangement guarantees the broadband providers access to public areas and saves them the headache of coordinating with several jurisdictions. It also helps the municipalities, many of which do not have the staff or expertise to work through the technical issues associated with securing broadband rights-of-way.[101] The authority's role also enables it to act as a point of contact for everyone, so providers, municipalities, citizens and businesses can find out more efficiently who has and who needs broadband across the state.

As with rights-of-way issues, the pole attachment process—stringing telephone or cable wire or wireless attachments to some type of existing infrastructure, typically a utility pole—requires that numerous entities act in network to coordinate timing and cost, much like public and private-sector entities had to do when building and using the country's railroad system. Complicating the matter is that the 134 million utility poles nationwide have different owners and different regulations, depending on the state.[102] The FCC regulates only about 37 percent of the poles, while 19 states and the District of Columbia have chosen to exercise jurisdiction over some of the remaining equipment. Additionally, those owned by cooperatives, municipalities and non-utilities are exempt from FCC regulation.[103] Disputes over access to poles can drag out for years—even in states with those governed by the FCC—delaying deployment of broadband even longer.

In May 2010, to address some of these issues, the FCC adopted an order granting timely access to poles and clarifying the cost-, time- and space-saving techniques that communications providers may use when attaching to poles. At the same time, the FCC also sought comment for proposed rulemaking to reduce the disparity between telecom and cable provider attachment rates, to develop a specific timeline for the pole attachment process and to resolve disputes between stakeholders.

The National Broadband Plan calls for Congress to enact "a coherent and uniform policy" that would harmonize access rights and costs across the nation without impinging on state regulations that do not conflict with such a national policy.[104] Absent that national standard, some states have used their authority to take the lead in streamlining and clarifying the utility pole attachment process (much as the FCC's recent order does). Responding to a protracted dispute among stakeholders, New York's Public Service Commission issued an order in 2004 that essentially prescribes a timeline and path of recourse for pole owners and the entities seeking access.[105] The order settled the dispute at hand and also established a statewide procedure for attaching broadband infrastructure to existing utility poles, covering issues including access, timelines, costs and mediation. "It can streamline the process, can lower the cost and can improve the efficiencies all the way around," said Joseph Baniak, a utilities specialist with the state Public

Service Commission. "For those states that have certified to the FCC that they regulate utility poles, it is something they should look into if they haven't already."[106]

Still, Baniak warned that states should be careful about using rigid rules in their approaches, given fast-paced changes in technology. For example, providers use different types of wireless attachments, which may require officials to review access requests on a case-by-case basis.[107]

Other technological challenges remain as well. As the National Broadband Plan notes, developing policies that are technology neutral—meaning policies that are not based on any one particular technology as it exists at that moment and that regulations should include all different technologies that offer essentially the same service—should be a top priority for federal, state and local officials across the country to ensure that government is not restricting flexibility as technologies evolve.[108] But technological neutrality can be more challenging than it may seem because policies to address situations today can have unforeseen impacts that wind up affecting the broadband playing field.

In the pole attachment arena, for example, the sometimes patchwork history of telecommunications regulation means that some broadband providers—including landline, cellular and cable providers—may have less access rights than others (or no access at all), and access charges can be similarly imbalanced. Joshua Seidemann, vice president of regulatory affairs at Independent Telephone and Telecommunications Alliance, a group that represents mid-size providers, says more regulatory parity could lead to greater broadband availability in many unserved and underserved areas.[109]

Addressing these legal and regulatory barriers to access and rights-of-way will not close the nation's broadband gaps overnight, but would pave the way to doing so.[110]

Paying the Bill

Another challenge to broadband deployment is cost. The FCC estimates the direct cost of closing the gap at $23.5 billion, and a number of states are finding ways to help providers overcome that obstacle.[111] In many underserved communities, especially in poor and rural areas, broadband penetration by private providers remains economically unfeasible because the cost of deployment may be greater than the potential for revenue from consumers in those areas. The challenge of reaching 250,000 housing units in extremely rural areas across the country is particularly daunting, and accounts for more than half of the overall price tag. The cost of reaching these units is $13.4 billion, or an average of $53,600 per unit.[112]

> The Federal Communications Commission estimates it will cost $23.5 billion to make broadband available to the 14 million people who cannot subscribe to the service.

Some states have helped connect more of their residents by building out the network themselves to supplement existing and private infrastructure. For example, several years ago, Louisiana built a statewide network connecting its higher education institutions, including its community and technical colleges, and four universities in Mississippi. The state's commitment to invest

about $40 million over 10 years helped lead to $75 million in grants to researchers who were able to leverage the network for their work, said Donald Vandal, executive director of the Louisiana Optical Network Initiative (LONI).[113]

That network earned Louisiana in-kind credit when a consortium of state agencies and educational institutions applied for and received $80 million in federal stimulus money to build out a "middle mile" network—which links the core network to local access points—for underserved communities in rural Louisiana. The project will connect the existing LONI network to 17 impoverished parishes in the state, which include four Native American tribal areas.[114]

The state also will be contracting to "last mile" providers (who make the connection from the middle mile access point to each end-user customer) to deliver high-speed Internet to anchor institutions such as schools, libraries, hospitals and military installations, and will be leasing excess fiber networks as well. "Our major objective is getting those anchor institutions connected," Vandal explained, "but we hope that another primary benefit is the economic development spinoffs that result."[115]

Vandal, like many state officials, emphasizes the importance of public and private entities working together to address broadband availability challenges. Often, government leadership is needed to clear the fundamental economic or topographic hurdles to connecting unserved areas, but private providers still are necessary to actually install and use that fiber, and to build off that initial installation to reach extended user communities. Sustainable broadband policy solutions depend on those kinds of considerations, said Ray Baum, chairman of the Oregon Public Utility Commission. At a September 2009 FCC workshop focused on best practices for state and local governments, Baum said, "[W]e don't want the taxpayer

subsidizing rate payers because we got into this with public money and we found out we couldn't make it go. That's why the focus has to be on private-public partnerships with the public option as the last option."[116]

> The challenge of reaching 250,000 housing units in extremely rural areas across the country is particularly daunting. The cost of reaching these units is $13.4 billion, or an average of $53,600 per unit.

North Carolina's e-NC Authority spurs the sort of public-private partnership that Baum endorses, and it has made the Tar Heel State a leader in promoting broadband deployment and availability. Since 1999, the state has awarded more than 500 grants, most of which were made to public-private (and also nonprofit) partnerships. In 2007 and 2008 alone, the authority handed out more than $2 million to private providers who were required to match the money and use it to deliver broadband infrastructure and its applications to unserved and underserved communities. Through public-private and public-nonprofit partnerships, projects funded by e-NC Authority have connected 15 school systems in the state to broadband, increased the connection speed for 10 regional hospitals and deployed broadband in 10 of the most underserved counties in the state, among other outcomes.[117]
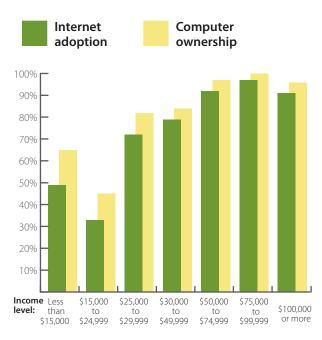
Besides sharing or building off existing networks, as in Louisiana, some states are identifying opportunities to leverage existing infrastructure in partnerships with private providers. With a

$28.8 million stimulus grant, Pennsylvania expanded the bandwidth on a public safety microwave network—a wireless broadband system primarily used by the state police—connected by towers, and it will rent some of that capacity to private providers.[118]

"Infrastructure tends to be the most expensive part of providing broadband," said Naomi Wyatt, Pennsylvania's secretary of administration. "If the state could make that infrastructure less expensive to providers, they could go where there aren't necessarily enough customers to justify large investments [of their own].…We'll make our network bigger and allow people to use that network. They can build off that and provide that last mile to customers."[119] Maximizing the existing microwave aerial towers also saved time and

money, Wyatt said, because the terrain in some parts of the state is not conducive to laying wire in the ground.

With grant programs similar to North Carolina's, some states have subsidized providers for the cost of deploying broadband. The California Advanced Services Fund promotes broadband in unserved and underserved areas through awards to Internet providers.[120] Similarly, Maine's ConnectME Authority has provided 18 grants to providers to bring broadband to unserved areas across the state in the more than two years since it was formed, with the potential to reach 27,000 households.[121] The authority has 31 more applications pending in its fourth grant-making round. Grants cover about half of the cost of a project and range from $50,000 to $150,000, although some have been as large as $500,000. The program is paid for by a small surcharge on in-state retail communications services that brings in about $1.2 million annually.[122]

The most attractive proposals, said Phillip Lindley, ConnectME's executive director, showcase and inspire creative partnerships between communities and providers. For instance, if a company gets free access to city property, such as the city hall roof, it might give the city free access to the Internet, Lindley said. "That kind of give and take shows everyone is working together." [123] The grants focus on building up access where it currently doesn't exist, but Lindley also acknowledged that the state has some underserved rural areas where broadband connections exist but are not as robust as users would hope.

States can support the deployment and availability of broadband in underserved areas in numerous other ways. Pennsylvania's Act 183, for example, requires telephone companies to

Exhibit 3
INTERNET USE IN NORTH CAROLINA

North Carolina has worked for more than a decade to bring more people online, especially through the state's e-NC Authority, the first state broadband agency.

Internet adoption — **Computer ownership**

| Income level: | Less than $15,000 | $15,000 to $24,999 | $25,000 to $29,999 | $30,000 to $49,999 | $50,000 to $74,999 | $75,000 to $99,999 | $100,000 or more |

Source: Pew Center on the States 2010, based on data from "North Carolinians Online" by Kenneth Wilson, East Carolina University, November 2008

offer broadband to their customers. As part of the 2004 law, the state also created funds, via assessments against providers that are capped at $5 million per year, to foster broadband demand in communities, to support outreach programs touting the benefits and use of broadband and to help schools gain access to broadband service.[124] Pennsylvania also leveraged its purchasing of voice and data systems through a statewide contract with providers and other technology sellers that allows local governments, schools, libraries and community colleges to take advantage as well.[125]

Huang, special advisor to the chief technology officer at the White House, explained a tactic that Virginia implemented when he was the state's chief technology officer: "We used funding from the tobacco settlement to help ensure that communities that would be impacted by the move away from tobacco agriculture would actually have access to broadband so that they could invest in their own future."[126]

Meanwhile, states including Ohio and Washington have encouraged providers to offer more broadband in exchange for the states' approval of mergers of telecommunications companies.[127] And Minnesota, Ohio and Vermont are among the states offering providers more flexible "alternative" regulation arrangements in exchange for broadband deployment commitments.[128] Also called incentive regulations, these arrangements typically allow regulated providers to earn larger profits or relax the hurdles providers must clear when proposing rate increases, provided they meet performance targets.[129]

Going aerial with cables—that is, attaching them to some type of existing physical infrastructure, such as a utility pole, a fire tower or even the rooftop of a government building—is usually cheaper than laying them in the ground, but "dig once" policies also cut costs. A Massachusetts Broadband Institute (MBI) project along I-91 in the western part of the state, for instance, came about when the institute learned that the state transportation department was installing a conduit for an IT-based traffic management system. The group worked out a collaboration to install some of its own fiber at the same time, and has since developed "dig once" policy memos with the transportation agency to take advantage of similar situations when rights-of-way already are acquired and shovels are going to be in the ground. "Anytime the ground is opened for any purpose, states need to be thinking about laying that conduit," said MBI's Judith Dumont. The agency also has a similar agreement with the Department of Conservation and Recreation to hang wireless equipment attachments on the state's fire towers.[130]

Fire towers are just one piece of the infrastructure puzzle; state and local governments have enormous untapped resources in existing infrastructure. Virginia law now requires state police to consider allowing wireless Internet service providers to use their towers.[131] And Florida is attempting to map both public and private infrastructure to better use it whenever possible.[132] As Oregon's Baum noted at the FCC's state and local workshop in 2009, "[W]e have a lot of infrastructure out there owned by utilities both public and private that's sitting there that could be better utilized than it is today if we get public cooperation, let alone private cooperation."[133]

To reduce the barriers and better leverage the underused resources at the local level, Virginia developed a "community toolkit" that, according to Karen Jackson, Virginia's deputy secretary of technology, helps municipal and county governments navigate the process for successful

broadband deployment. The toolkit explains the various technologies available, covers legal considerations, provides sample contracts, advises communities on broadband-friendly zoning, such as requirements for towers, and offers other relevant advice.

In short, said Jackson, it is a cheat sheet for local governments that want broadband. And there is evidence that it works.[134] Franklin County in southern Virginia, for example, was considering purchasing a wireless system for $500,000. Using the toolkit's "buy-down worksheet"—steps for leveraging what already is in place to reduce the cost—the county realized that existing towers and land for tower sites could reduce deployment expenses. The county ended up

spending $83,000. Jackson credits the toolkit with helping officials determine the assets they had available, the applications they were trying to run and whether they had the right kind of policies to make the plan work.[135]

In its national plan, the FCC noted that 18 states still have policies in place—from outright bans to procedural requirements—that constrain local efforts to build public broadband networks.[136] The intent of such policies generally has been to encourage and entice private-sector providers to fill the need. But in some low-income and remote areas, providers have not stepped in— leading the FCC to recommend that cities ought to have the flexibility to develop public networks if necessary.[137]

THE FUTURE OF WIRELESS BROADBAND

As technologies evolve and new broadband platforms develop, some states face the danger of falling further behind. Nowhere is that more evident than with wireless broadband. While 3G wireless service, or third-generation mobile telecommunications, is available in areas where 98 percent of Americans live, 40 percent of the country's land mass remains without 3G coverage.[138] Getting service to those dead spots is crucial because 3G infrastructure will be integral in the rollout of 4G networks, the next generation of wireless standards.[139]

For this reason, the FCC's National Broadband Plan recommends creating a Mobility Fund using money that currently supports high-cost legacy telephone networks to support the deployment of 3G networks in all states, bringing them up to a level of coverage on which future wireless platforms can be built.[140]

Concerns about speed, cost and reliability make unclear the degree to which wireless broadband will be able to compete with wireline broadband in the future. The National Broadband Plan calls for making 500 megahertz of spectrum—the scarce airwaves over which wireless signals travel—newly available for broadband within the next decade, enough to ensure spectrum for growing demand and developing technologies. By freeing up spectrum for broadband, the FCC hopes to spur wireless-wireline competition to satisfy the speed, cost and reliability needs of high-speed broadband users.

Greater wireless coverage could have an especially beneficial impact on closing the digital divide for minorities.[141] On a typical day, Hispanics and African-Americans are 50 percent more likely than Caucasians to access the Internet via handheld devices. In the case of African-Americans, handheld devices have helped significantly reduce the overall broadband access gap.[142]

Broadband Adoption: Bringing America Online

Just 65 percent of Americans subscribe to broadband at home, and that number varies dramatically from state to state. States realize the risk of a persistent digital divide: Increasingly, those who use broadband may be society's winners, and those who do not may pay a high price—in time, money, convenience, information and missed opportunities. "Broadband access for all is essential to meeting the information needs of communities in a democracy," Alberto Ibargüen, president and chief executive officer of the John S. and James L. Knight Foundation, said at a Knight-sponsored broadband forum in March 2010. "Without it, we'll end up with a new category of second-class citizens. With it, everyone will be able to harness the social and economic opportunities of the digital age."[143]

The group of people without broadband at home—an estimated 100 million Americans— tends to be less educated, lower wage-earning and older than those who use the service.[144] Of adults who are high school graduates, 46 percent use broadband at home, compared with 82 percent of those who attended or graduated from college.[145] Usage falls along similar income lines: Approximately 40 percent of households with earnings of less than $20,000 annually are broadband users, while 87 percent of households with incomes exceeding $50,000 use broadband at home.[146] Non-adopters also more frequently belong to minority or disabled populations or live in rural areas. In fact, individuals with disabilities make up 39 percent of non-adopters nationally.[147]

"Broadband holds tremendous potential to enable people with disabilities to communicate and connect with others; to engage as part of our national civic discussion, as online forums are becoming the town halls of the twenty-first century," FCC Chairman Julius Genachowski said in a speech in March 2010.[148]

Those who lack broadband access at home cite cost, digital illiteracy and the belief that broadband would not fundamentally improve their lives as reasons for failing to subscribe.[149] More than one-third of individual broadband

Exhibit 4
WHO IS NOT ON BROADBAND?

Even though broadband is available to 95 percent of the country, more than a third of Americans—about 100 million individuals—do not have broadband at home.

22% do not use the Internet

6% do not have Internet service at home

6% use dial-up Internet at home

Another 1% do not use the Internet but could not be placed in the above categories

SOURCE: Pew Center on the States 2010, based on data from the Federal Communications Commission's "Broadband Adoption and Use in America," February 2010

NOT BUYING INTO BROADBAND

23% of those without broadband have had exposure to high-speed Internet

SOURCE: Pew Center on the States 2010, based on data from the Federal Communications Commission's "Broadband Adoption and Use in America," February 2010

non-adopters—and nearly half of non-adopting families—explain that cost is the most significant barrier preventing their home use.[150] Many in this group want to subscribe but cannot afford the startup costs of hardware and software, regular maintenance and monthly access fees, said John Horrigan, consumer research director for the FCC's Omnibus Broadband Initiative, which developed the National Broadband Plan.[151] Digital literacy—understanding how to use the technology—is the second-most cited factor, with 22 percent of non-adopters listing it as the main obstacle to adoption. Relevance is the third reason, identified by 19 percent of non-adopters as their main hurdle.[152] To put this in perspective, even giving away broadband and computers would not close the adoption gap if recipients lack knowledge about and familiarity with the technologies.[153]

> Those who lack broadband access at home cite cost, digital illiteracy and the belief that broadband would not fundamentally improve their lives as reasons for failing to subscribe.

Lacking broadband can be particularly problematic in this economy. For instance, the Internet has revolutionized the process of applying for a job, and many companies accept applications only electronically, leaving those who are offline out in the cold when they are job hunting. "Ten years ago you went through the ads in the newspaper; you called people you knew," Horrigan said. "Today… if you don't have [Internet] access, you face a big hurdle in just applying for a job."[154]

Getting Citizens Online—Roles for State and Local Governments

Although the federal government is racing to achieve universal broadband access, planning and implementation at the state and local levels will be critical to its success.

"We understand that adoption, in the end, is a local issue," Horrigan said.[155] To help states and cities improve broadband adoption among their residents, NTIA awarded stimulus grants to combinations of state libraries, universities, education departments, cities, nonprofit organizations and private partners. The grants include nearly $57.2 million to provide public access to computers and training and about $109.9 million for adoption proposals.[156] "The best bet from the implementation perspective was to invest in states," said Karen Archer Perry, expert advisor of adoption and usage for the FCC's National Broadband Task Force.[157]

The FCC's plan credits several states for their broadband initiatives, including California, Georgia, Illinois, Kentucky, Maine, Massachusetts, Minnesota and New York.[158] But other states, such as Ohio, Pennsylvania and Virginia, also have developed and implemented strategies to increase the numbers of broadband users in their states.

Minnesota, for instance, created the Minnesota Ultra High-Speed Broadband Task Force, representing urban and rural parts of the state. The group's final report, released in November 2009, recommended broadband access for all Minnesota homes and businesses by 2015, tax incentives for individuals, businesses and organizations to increase digital literacy and financial assistance for low-income people to pay for services.[159] The legislature moved quickly to accept some of the recommendations, and in April 2010, Governor Pawlenty signed into law a bill that

sets state broadband goals for deployment and speed, including universal access by 2015, with a minimum download speed of 10 to 20 megabits per second and an upload speed of at least 5 to 10 megabits per second.[160]

Minnesota also is taking steps to expand broadband adoption among individuals with disabilities and is working to guarantee that disabled persons are provided with access and use of state equipment and sites.[161]

In North Carolina, a state with the second-largest rural population in the country, e-NC Authority has used partnerships with rural and urban communities and providers to help expand broadband usage.[162] "Our goal is to enable these folks to plan for themselves…and to help them as they move through the process, not do it for them," explained Patterson, executive director of e-NC Authority.[163]

Nursing homes have been an area of special interest in North Carolina. The McCain Internet Empowerment Project, named for a doctor who started the initiative after working with a number of nursing home patients, brought together North Carolina officials and Time Warner Cable to provide computers, affordable Internet access and user education. The program helped seniors at several nursing homes in the state learn how to use computers and to understand the Internet's value to their lives—critical skills, considering that 32 percent of those who do not use broadband at home are over the age of 65.[164] The training so inspired some of the senior citizens that they re-entered the workforce, Patterson said. Others now use the Internet to gather information to better interact with their physicians.[165] In 2007, the project expanded to several churches and a Salvation Army Boys and Girls Club.[166]

Exhibit 5
BARRIERS TO HOME BROADBAND

OVERALL COST

36%   66%

66% of the estimated 100 million Internet users without broadband at home said cost was a barrier. **36%** cited it as the primary barrier.

DIGITAL LITERACY

22%   47%

47% said lack of knowledge about how to use broadband was a barrier. **22%** cited it as the primary barrier.

RELEVANCE

19%   52%

52% said broadband's lack of relevance to their lives was a barrier. **19%** cited it as the primary barrier.

AVAILABILITY

5% 12%

12% said lack of availability was a barrier. **5%** cited it as the primary barrier.

11% said their primary reason for not having broadband was not in the above and **4%** listed a combination of the above as their primary reason. **3%** did not respond.

SOURCE: Pew Center on the States 2010, based on data from the Federal Communications Commission's "Broadband Adoption and Use in America"

DISABLED USERS LAG IN ADOPTION

A far greater share of disabled Americans lack broadband Internet at home compared to all Americans.

58%   35%

SOURCE: Pew Center on the States 2010, based on data from the Federal Communications Commission's "Broadband Adoption and Use in America," February 2010

North Carolina also has focused on expanding broadband adoption through technical education and training for local businesses, according to Patterson. Between 2001 and 2007, the state's e-NC Business and Technology Telecenters provided free Internet access to 158,000 residents and helped create nearly 1,500 jobs in some of the most economically distressed, rural areas of the state.[167] The centers seek to increase economic development through technology—assisting both individuals and businesses by providing services such as one-on-one counseling, seminars and training, technical support, office space and resources for small, start-up companies, and public access to the Internet. A preliminary evaluation of the centers conducted in 2008 found they had "helped businesses improve their employee skills, gain new customers and improve customer service."[168]

Some programs prioritize expanding Internet use at home among low-income populations. The NYC Connected Learning project received $22 million in stimulus funding to distribute 18,000 computers and to provide bilingual training and a one-year, free home broadband subscription to low-income sixth graders and their families. The program is expected to reach 40,000 individuals throughout the city.[169] "Resources in the home and interactions around learning between parents and children hold the greatest untapped potential for improving the outcomes for low-income students throughout the country," said Mark Malaspina, chief officer of operations and strategic partnerships at Computers for Youth, a nonprofit organization that works in five U.S. cities to improve at-home learning for low-income students.[170] The organization has partnered with New York City to carry out the stimulus grant.

The program's collateral benefit: exposure to broadband by parents, older generations in the home and extended family and friends. City officials estimate that 12,000 households will continue their subscriptions beyond the year of free service.[171] This project aligns with New York City's larger digital inclusion strategy, the Connected City Initiative, launched by Mayor Michael Bloomberg in October 2009, which uses technology to improve public services and to increase city-wide Internet use.[172]

Computers for Youth also is working in California to engage low-income non-users. There, with several partners, the group is using $7.6 million in broadband stimulus money to encourage Internet use among 34,000 low-income residents, including 15,000 households.[173] Meanwhile, California has been working to increase adoption and usage as well. The California Emerging Technology Fund, a nonprofit organization established to expand broadband use among underserved populations, is working in 25 low-performing middle schools to provide students with laptops and affordable broadband connections at home with training for the students and their parents. The group's program, called School2Home, started in August 2009 and is projected to include 100 schools by 2011, reaching more than 50,000 students.[174] The group also launched GetConnected!, a statewide public awareness campaign aimed at decreasing the digital divide. Its Web site, available in four languages, teaches visitors about broadband technology, from using a browser to performing more complex tasks, including ordering broadband services at home and making secure payments on the Internet.[175]

New Mexico—which in a 2008 study by the Kauffman Foundation and the Information Technology and Innovation Foundation ranked among the states with the fewest broadband users and slowest residential download speeds—also has been working on improving digital literacy and explaining broadband's relevance.[176] Using a nearly $1.5 million stimulus grant, the New

Mexico State Library has partnered with libraries in 15 communities to increase their computer center capabilities and to provide both staff and public training at these centers. The program is expected to reach 12,000 individuals across the state through expanded library services, a statewide broadband awareness campaign and a state broadband conference.[177] "It's really a great time for libraries because they are meeting this huge need," said Susan Oberlander, the New Mexico state librarian. "In some cases," she said, "I think it will be acceptable to have anchor tenants like the public libraries serve their communities, if it's just not possible to get enough broadband out to rural areas at an affordable price in a timely manner."[178]

Conclusion

Broadband, many observers believe, may well transform America in the twenty-first century as electricity did in the nineteenth. But the nation still has far to go. Availability and quality of the technology are improving, but the United States continues to lag behind other countries, and an estimated 100 million Americans lack broadband service at home.

Whether and how quickly the nation realizes broadband's potential depends heavily on states: specifically, their efforts to increase availability of the service among those who lack it, including building the necessary physical infrastructure; to spur adoption among those who do not yet use it; and to apply the technology to improve and expand health care, education, public safety, government transparency, elections and other essential services.

A number of powerful forces—from Google's Fiber for Communities initiative to the FCC's National Broadband Plan and a $7.2 billion infusion from the American Recovery and Reinvestment Act—are converging to fuel efforts to expand this powerful technology. For states, the net result is a heightened responsibility and opportunity to help position the United States to compete in a global economy that increasingly runs on broadband.

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