

Down Payment on Our Digital Future

STIMULUS POLICIES FOR THE
21ST-CENTURY ECONOMY

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EXECUTIVE SUMMARY

President-elect Obama and congressional leaders have concluded that a massive economic stimulus package focused on infrastructure is the best hope for pulling the U.S. economy out of the current recession. In the past, such stimulus efforts traditionally focused on highways and utilities, and these types of projects certainly belong in the new stimulus package. However, the incoming Obama administration and Congress must look beyond the interstate highways and start investing in the information superhighway. Just as President Eisenhower's economic policies brought Americans a national transportation system in the 1950s, President Obama's can connect Americans to a communications network fast becoming the foundation of the 21st-century economy.

Promoting the deployment of a national, forward-looking broadband infrastructure will provide substantial short-term and long-term economic benefits. This deployment effort will immediately create tens of thousands of new jobs in the telecommunications, manufacturing and high-tech sectors. In turn, a new, world-class broadband infrastructure will spark the creation of *millions more* jobs in nearly every economic sector connected to technology and communications.

In particular, these policies will provide substantial economic relief to the rural areas of America hit hardest by the current recession. They will also improve our global competitiveness — lifting us from 15th place (or by other measures, 22nd) among developed nations in broadband adoption. Increased broadband adoption — particularly if targeted to low-income users and households with school-age children — will also substantially increase short-term consumer spending. And it will ensure long-term economic growth by bringing those on the wrong side of the digital divide into the digital economy.

Though the Internet was born here, American consumers are not benefiting from broadband's full potential because our networks are slow and expensive compared to the rest of the world. This is largely because there is no meaningful competition in the American broadband marketplace, and network operators have no incentive to make substantial long-term investments. Broadband stimulus funding should only be used to build world-class networks unlikely to be deployed absent public investment. We recommend that stimulus funds be targeted at deploying broadband services capable of delivering actual (not advertised) speeds in excess of 100 Megabits per second (Mbps) in both upstream and downstream directions.

A broadband stimulus package must be carefully targeted and tied to public service principles that ensure that American taxpayers get a strong return on their investment. In this paper, we offer a set of proposals to expand the debate about broadband stimulus and provide a foundation for further discussion. We focus on a set of key public policy priorities:

- **Rural America** — building out “future-proof” networks to unserved areas.
- **Low-income users** — supporting affordable broadband connections, computers and tech training.
- **Global competitiveness** — upgrading our urban infrastructure to meet world-class standards.
- **Education** — promoting children's access to technology at school and at home.
- **Accountability** — ensuring clear standards of quality, affordability and competition.

The total cost of the stimulus policies described below will be \$44 billion, mostly allocated over three years. But the total level of new investment and economic activity created by these policies will be hundreds of billions of dollars. By implementing these policies, Congress and the Obama administration can both achieve much-needed economic stimulus and put America back on top in technology.

We strongly urge the Obama administration and Congress to include the following policies in their economic stimulus package:

Policies to Stimulate Broadband Supply (*Total Cost: \$38.2 billion*)

- **Universal Service Broadband Infrastructure Fund** (*\$15 billion over 3 years*)
Creating a grant program for rural broadband investment should be a top priority. Congress should implement the recommendation of the Federal-State Joint Board on Universal Service and create a Broadband Infrastructure Fund for “unserved” areas. This fund, overseen by the FCC and administered by the states, will provide capital to build networks in rural America. The fund will support projects capable of providing a minimum of 5 Mbps symmetrical service, with priority given to projects that can deliver speeds in excess of 50 Mbps. Implemented properly, the fund will eradicate the rural-urban digital divide, ensuring the universal availability of broadband.
- **Universal Service Mobility Infrastructure Fund** (*\$5 billion over 3 years*)
The rural broadband infrastructure grant program should extend beyond wireline networks to provide wireless connectivity. Congress should also implement the recommendation of the Federal-State Joint Board on Universal Service and create a Mobility Infrastructure Fund for “unserved” areas. This fund, overseen by the FCC and administered by the states, will focus on the deployment of mobile voice and data services in rural areas and along highway corridors. Congress should appropriate \$5 billion over three years for the Mobility Infrastructure Fund.
- **Accelerated Depreciation for Broadband Infrastructure Investment** (*\$1.5 billion over 3 years*)
Tax policies with clear benchmarks can serve to target investment in particular kinds of networks. This program follows a standard tax-incentive model, but ties benefits to a high bar of performance. It will foster the deployment of advanced broadband services in urban areas and to “underserved” rural homes by lowering the effective cost of deployment via accelerated depreciation of capital investments. The program will be structured so that investment in more robust technologies leads to higher levels of allowable depreciation. This design will maximize the deployment of world-class quality networks by targeting incentives to projects that deliver 100 Mbps symmetrical service.
- **Information Superhighway Tax Credit Program** (*\$1.5 billion over 3 years*)
This tax incentive program is designed to trigger investment in advanced broadband services in urban areas and to “underserved” rural homes by lowering the effective cost of deployment via broadband investment tax credits. The program will be structured so that only investment in high-capacity technologies will qualify for tax credits. To qualify, a project must deploy broadband technology that is capable of delivering a minimum of 20 Mbps to end-users. Higher levels of credits will be given to projects that deploy 100 Mbps symmetrical services. The program also offers incentives to non-dominant carriers to deploy high-capacity fiber-optic “backhaul” networks.
- **Competitive Fiber Tax Incentive Program** (*\$5 billion over 3 years*)
An innovative idea that has been successful abroad, this proposal is designed to deploy world-

class fiber-optic networks which are shared by multiple competitors. This program would award higher levels of investment tax credits and accelerated depreciation to entities that deploy more than a single strand of fiber to an end-user for the purpose of selling the fiber to a competitive provider. In addition, the program would allow all taxes on sales of the additional fiber to qualifying third parties to be completely deferred for five years. This approach would spur competition in the broadband market, encouraging demand and innovation.

- **Bonds for Broadband Program** (*\$10 billion*)

This program will pay the interest on qualifying short- to medium-term corporate bonds issued specifically for certain types of broadband infrastructure investment. This program will be particularly attractive to Competitive Local Exchange Carriers (CLECs) and other nontraditional telecommunications companies, which could foster substantial investment in the uncompetitive special-access market. By covering only the interest of these corporate bonds, the \$10 billion allocated could lead to substantially higher amounts of investment in broadband infrastructure. To qualify for this program, a project must be capable of delivering speeds in excess of 50 Mbps to end-users.

- **Interoperable Broadband Public Safety Program** (*\$200 million*)

The FCC has set aside 10MHz of high-value spectrum in the 700MHz band for the explicit purpose of creating a nationwide public safety broadband network, as recommended by the 9/11 Commission. The FCC envisions the network operating under a sharing arrangement, with the private entity covering the network construction costs. But at auction this year, no bidder met the reserve price. Congress should provide a one-time, \$200-million grant to help construct this network or, alternatively, award the spectrum directly to public safety agencies using the \$200 million to fund public safety network equipment purchases.

Policies to Stimulate Broadband Demand (*Total Cost: \$5.8 billion*)

- **Lifeline/Linkup Broadband Pilot Program** (*\$1.2 billion over 3 years*)

Current government programs that provide financial support for low-income telephone services should be extended to broadband. Congress could implement the FCC's proposal for a pilot project extending the Universal Service Low Income Program to support broadband for low-income households. The pilot program would cover 50 percent of the cost of broadband Internet access installation, including a broadband Internet access device, up to \$100, and cover any interest payments on any remaining balance in a deferred payment plan. The program would also provide a \$10 monthly discount on a broadband subscription.

- **E-Rate@home Program** (*\$3 billion over 3 years*)

The current Universal Service Schools and Libraries program (a.k.a. "e-Rate") allocates over \$2 billion annually to support the installation and subscription costs of advanced telecommunications services in schools and libraries. But when many children go home, they have no computers or broadband access. Congress should implement an "e-Rate@home" program, targeting funds for the purchase of laptop computers at e-Rate schools and support the construction of Wi-Fi networks that extend library and school broadband connections for free to surrounding neighborhoods.

- **Every Child Online Tax Deduction Program** (*\$1 billion*)

This program would allow households with qualifying children (under age 18) earning less than \$60,000 in taxable income during 2009 to deduct the cost of home Internet access up to \$180

and deduct up to \$200 in qualifying Internet access device expenditures.

- **Broadband Data Improvement Act Funding** (*\$300 million over 3 years*)
Congress recently passed legislation to promote broadband deployment and adoption by mapping broadband availability through the collection of comprehensive data. However, no money was appropriated to implement the programs established in the bill. By funding the public-private programs envisioned by this already approved effort, Congress can ensure that broadband stimulus funding is directed to the areas where it is needed most.
- **Rural Development Community Connect Grant Program** (*\$150 million over 3 years*)
Congress should appropriate \$50 million per year over three years to this USDA-led program for the explicit purpose of constructing and/or funding community centers (including libraries) that will offer free broadband services and technology training, with an emphasis on training for families with children and senior citizens.
- **Health Care and Public Service Digital Modernization Program** (*\$150 million over 3 years*)
President-elect Obama has expressed the desire to use the stimulus legislation to increase efficiency in our nation's health care system by bringing record-keeping and other health care services into the digital age. There is a similar need to modernize the customer service systems at local and state governmental agencies. Such modernization would vastly improve productivity in the general economy, replacing long lines with easy-to-navigate, Web-based service portals. Congress should establish a program, overseen by the NTIA, that supports modernization at health care facilities and local and state agencies.

Oversight, Accountability and Results

Though the stimulus is needed quickly, and though it is almost certain that legislation will be crafted in haste, Congress must not simply write blank checks to industry. To maximize the effectiveness of scarce taxpayer resources, oversight and accountability measures must be established. If the public is to become a financial partner in our broadband networks, the private owners of those networks must be held to public service standards.

In particular, mechanisms should be established to ensure that any tax incentives or grant monies are used to fund *new* broadband deployment projects. This requirement will ensure that the stimulus funds are used to create new jobs, not to prop up the stock prices of telecommunications companies. All of the grant programs and tax policies we recommend must be available to all telecommunications providers, including municipalities, nonprofits, and non-incumbent carriers.

Further, stimulus money must be tied to strict build-out schedules and affordability and capacity requirements. This level of public investment should return a network that is world-class — not simply an incremental improvement over the status quo. The Internet service these subsidies are designed to support also must be an open, freely competitive platform for ideas and commerce.

We offer these proposals as a starting point — not the bottom line. Our hope is to expand the public debate and the deliberative process on broadband stimulus proposals to include a wide variety of ideas that have been put forward or are coming soon. Though we strongly believe that principles of accountability, future-proof quality, and public service priorities must guide any final legislation, this set of ideas should serve as a foundation for policymakers and the public.

INTRODUCTION

President-elect Obama and members of the congressional leadership agree that infrastructure construction should be a primary component of a meaningful economic stimulus package. There is also broad agreement that achieving the goal of universal broadband access is key to our nation's long-term economic prosperity. The challenge for the incoming administration and Congress is crafting a broadband infrastructure stimulus policy that achieves measurable outcomes and maximizes the efficient use of scarce taxpayer funds.

While there are certainly many good programs that deserve funding, we urge Congress to only promote those policies that provide substantial short- and long-term economic stimulus while serving other important policy goals. Broadband deployment and adoption fits this profile.

Figure 1: Policies that Provide Economic Stimulus and Achieve Desired Social Outcomes

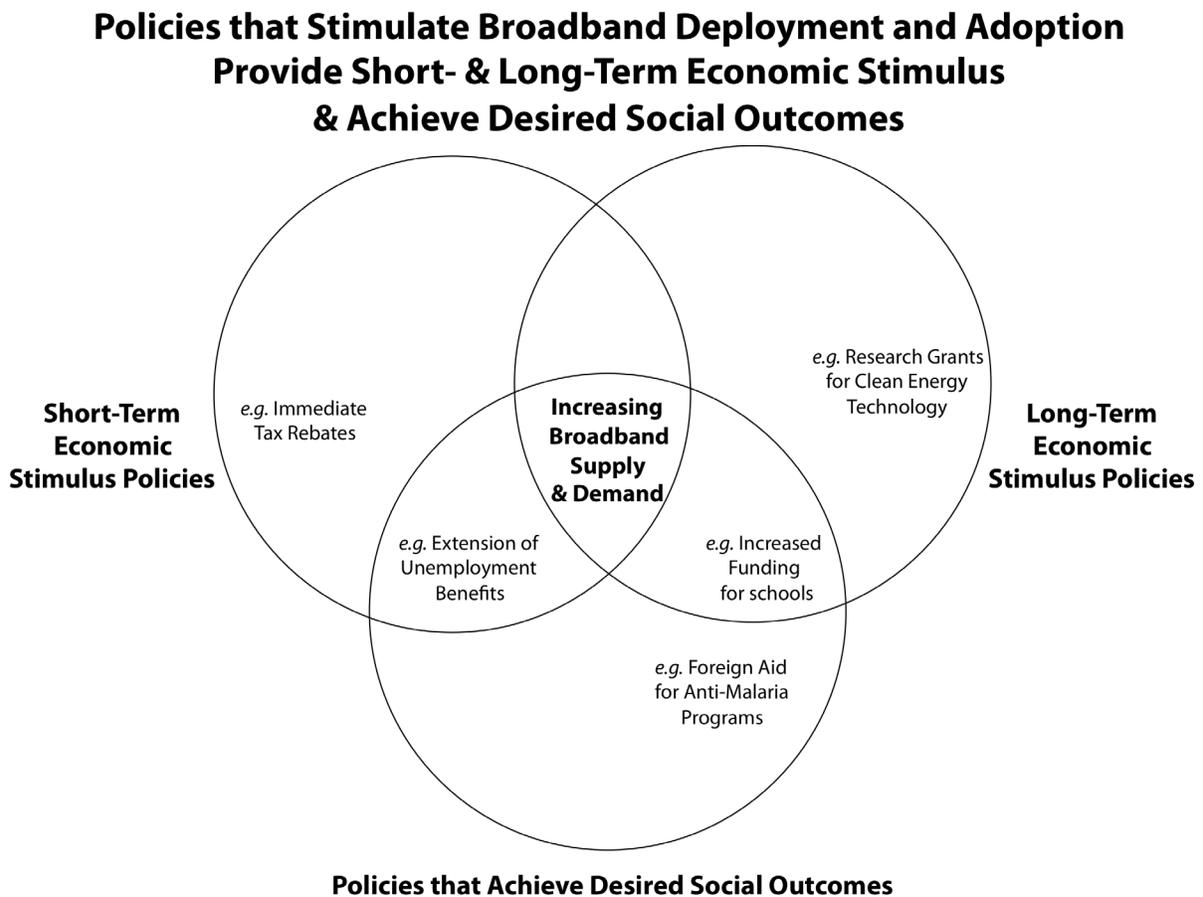


Figure 2: Economic Stimulus via Broadband Deployment

	Policies to Increase Broadband Supply	Policies to Increase Broadband Demand
Short-Term Economic Stimulus	<p><u>Job Creation:</u> Labor required to procure, produce, deliver, install and maintain new broadband infrastructure</p> <p><u>Production of Raw Goods:</u> Telecom equipment (fiber optic cable, switches, routers, computers, antennas, power supplies, etc); construction equipment; customer premise equipment; other electronics</p>	<p><u>Job Creation:</u> Customer service jobs (activation, installation, billing); retail jobs (equipment vending); wholesale jobs (equipment procurement and delivery); computer training and repair</p> <p><u>Production of Raw Goods:</u> customer premise equipment; telecom equipment</p>
Long-Term Economic Stimulus	<p><u>Job Creation:</u> Largest gains in education, finance, health care, high-tech, marketing, real-estate sectors; other new telecommuting jobs; e-commerce jobs; green jobs such as smart grids</p> <p><u>Production of Raw Goods:</u> replacement of network durable goods and other capital investment</p>	<p><u>Job Creation:</u> Jobs supporting increased e-commerce and ICT activity; new telecommuting jobs; online business creation and expansion for products and services</p> <p><u>Production of Raw Goods:</u> innovation creating demand for manufacturing of new customer premise equipment;</p>

Solving America’s Broadband Problems: Availability, Adoption and Value

Achieving universal broadband adoption is a top priority for the Obama administration as well as many members of Congress. These leaders recognize broadband will be a key driver of the global economy — and that America’s current digital divide leaves this nation particularly vulnerable to future economic instability. Though the 1990s saw a precipitous decline in the U.S. manufacturing sector, we created millions of new jobs and remained a global economic leader precisely because of the high-tech economy. But now our declining position in the global broadband market threatens our economic future. We must do something to reverse course.

The overall U.S. broadband problem is characterized by three components: lack of universal availability, lack of universal adoption, and a market with services that have relatively low value compared to other countries.

- **The Availability Problem:** Less than 10 percent of U.S. homes remain unserved by any terrestrial broadband provider. The remaining 90-plus percent of households can purchase “broadband” from one or more providers — in most case from either their local telephone or cable provider.

The cost of deploying broadband service to the 6 to 8 million homes completely off the grid is substantial — on the order of \$20 to \$30 billion. The availability problem will only be solved by substantial public investment, as the up-front capital costs needed to deploy service in these areas cannot be recovered quickly enough to attract sufficient private investment.

- **The Adoption Problem:** A consumer's decision to purchase broadband service is based on the answer to a simple question: Is the service worth the cost? This value proposition is obviously heavily influenced by price and income constraints. Millions of low-income homes would purchase broadband if the initial and monthly subscription costs were not so steep. Public policies aimed at lowering the barriers to adoption by low-income households — particularly those with children — can address this aspect of the adoption problem. But millions of other Americans who could afford broadband just don't perceive the service as worth the cost. This group mostly consists of those who have yet to adopt home computer technology and is heavily populated by older, pre-baby boom generations who have also lagged behind in adoption of other technologies such as cellular phones and cable TV. Policies aimed at education and training can help bring these constituencies online.
- **The Value Problem:** The services available to most Americans are far slower and more expensive than those available in many other countries. The root of this problem can be traced to the fundamental lack of meaningful competition in the American broadband market. U.S. consumers have been subject to a market where monopoly cable and monopoly telephone companies only make incremental network investments and largely avoid head-to-head competition for broadband services. While 100 Mbps symmetrical broadband services are available for less than \$30 per month in other countries, Americans are lucky to get service faster than 10 Mbps for nearly twice the price. The value problem can be overcome with policies that promote meaningful market competition or that entice providers to make substantial capital investments in their networks.

Deploying Future-Proof Broadband Networks

There is near-universal agreement among stakeholders that stimulus funding should only be used to support infrastructure deployment that would not have occurred for many years without public support. But it's not enough to bring third-tier service to unserved rural areas or simply speed up deployment of industry projects already planned with out public support. To address the totality of America's broadband problems, the broadband stimulus package should aim to foster the deployment and adoption of a truly world-class, future-proof broadband network.

What constitutes a future-proof broadband service? To answer this question, Congress should look to its own definition, laid out in Section 706 of the Telecommunications Act of 1996. The Act defined the term "advanced telecommunications capability" as "high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology."¹

Currently, the best available compression technology requires approximately 5 Mbps (i.e. 5 million bits per second) in bandwidth to transmit reasonably high-quality, high-definition video content.² Thus, to be eligible for broadband stimulus support, we recommend requiring the *minimum* level of broadband service quality be 5 Mbps in both the downstream *and* upstream directions.³

However, while a 5 Mbps symmetrical definition is adequate in 2008, it may not be fast enough for 2018. Thus, we recommend that broadband stimulus policies be structured to provide substantial incentive (and financial support) for the deployment of networks that have substantially higher capacities. This recommendation is not radical: Both houses of Congress have considered resolutions calling for adopting policies to encourage the universal deployment of 100 Mbps symmetrical services over the next few years.⁴

In addition, because of the substantial initial deployment costs, the broadband market can be characterized as a natural monopoly. We should not expect to see multiple facilities-based operators enter the market. That is indeed the case in most of the world and is largely the case in the United States, where (largely by historical accident) the market is a cable-telco duopoly. There is no indication that wireless solutions will ever supplant the speed, reliability and scalability of wired networks.

Thus, policymakers seeking to create genuine competition face a quandary: Do they employ access policies like those envisioned in the 1996 Telecom Act (and used successfully in Europe)? In the United States, there is an institutional reluctance to using access policies in the broadband context. First, though a duopoly market hardly qualifies as a competitive market, policymakers are very unwilling to use access policies unless there is a clearly defined monopoly. Second, there is a widely held (but perhaps erroneous) belief that access policy deters investment.

We believe that stimulus policy can be structured to ensure the construction of competitive *and* future-proof broadband networks. We suggest that the stimulus policies be structured to create substantial incentive for companies to deploy more than a single strand of fiber-optic cable to an end-user premise (and/or more than a single strand of fiber-optic cable *passing* an end-user premise). The company deploying the fiber-optic cables would then offer its own retail services over the primary strand of fiber, while maintaining the option of selling the secondary strand of fiber to a third party or to the end-user. This approach is currently being used in Switzerland by the telecom operator Swisscom with the backing of the Swiss government, which recognizes this is a method of preventing the establishment of a communications monopoly.

Following the Money

Congress must not simply write blank checks to telecommunications industry. Establishing the strict service-quality guidelines discussed broadly above (and in more detail below) is paramount for the purpose of maximizing the effectiveness of scarce taxpayer resources. It goes without saying that this massive public investment should return a network that is world-class — not simply an incremental improvement over the status quo. But it is also imperative that oversight and accountability mechanisms be established, and that the public be a part of this process. In short, if taxpayers are footing the bill, they should be able to easily determine what they're getting in return for their investment.

First, mechanisms should be established to ensure that any tax incentives or grant monies are used to fund new broadband deployment. For example, we recommend that any company wanting to take advantage of tax incentive stimulus policies (such as accelerated depreciation) be required to submit previous and current capital deployment plans to the Treasury Department. This protection will make certain that the stimulus funds are used to create new jobs, not simply underwrite projects that would have occurred absent any public support.

Second, we strongly recommend that any project using stimulus funds (either direct grants or tax offsets) be tied to strict build-out schedules and be subject to mandatory audits. This is why most of our policy recommendations discussed below are three-year programs. A three-year timeline not only recognizes the realities of network construction, but also provides policymakers with the ability to ensure accountability during the fund allocation process. Those seeking funding will be required to provide ongoing progress reports and be subject to audits to obtain release of further funds.

Third, the accountability and oversight process should be just as modernized as the networks being constructed. Each agency responsible for fund oversight should coordinate with the NTIA to create an online Web portal where citizens can review exactly how their tax dollars are being used.

Finally, to ensure the most basic level of consumer protection, all networks that are constructed with or supported by broadband stimulus funding must be an open, freely competitive platform for ideas and commerce.

POLICIES TO STIMULATE BROADBAND SUPPLY

1. UNIVERSAL SERVICE BROADBAND INFRASTRUCTURE FUND AND MOBILITY INFRASTRUCTURE FUND

The Scope of the Rural Broadband Problem

Any policy designed to promote broadband deployment in the nation's unserved areas must begin with an accurate assessment of broadband availability and the potential costs of achieving universal broadband deployment. The FCC recently implemented substantial changes to its broadband data collection efforts that will greatly enhance the agency's ability to define the precise scope of the rural broadband problem and effectively target universal service support. All providers will report this new data beginning in 2009. However, there is enough data available now to provide a broad characterization of the scope of the rural broadband problem.

A 2006 study by the Government Accountability Office (based on 2005) data concluded that 9 percent of Americans were not served by any terrestrial (i.e. non-satellite) broadband provider.⁵ This estimate is based on analysis of survey data and FCC Form 477 data.

The National Cable and Telecommunications Association estimates that 99 percent of U.S. households are passed by cable television service,⁶ and FCC Form 477 data indicates that 96 percent of homes where cable service is available have access to cable modem service.⁷ From this, we conclude that as many as 95 percent of U.S. homes can purchase cable modem broadband service; but at least 6 million of the nearly 118 million U.S. households lack the ability to subscribe to cable modem broadband.⁸

Of course it is possible that some of these homes that lack cable modem access can purchase DSL service. Form 477 data indicates that 82 percent of Incumbent Local Exchange Carrier (ILEC) lines are DSL capable.⁹ But Form 477 provides no estimate of how the cable modem and DSL availability figures overlap. So while there may be DSL service available in areas without cable modem service (and vice versa), based on the 2006 GAO study and the above data, we estimate that there are between 6 million and 8 million unserved homes. This represents approximately 7 percent of all U.S. households.

Next year, with better data, the FCC will be able to estimate the number of U.S. homes considered "underserved," or unable to purchase a broadband connection comparable in speed and price to what is commonly available to the majority of consumers.¹⁰ The number of underserved homes likely is substantially higher than the number of unserved homes, probably between 10 to 20 million.

The Investment Required to Achieve Universal Broadband Availability

How much will it cost to deploy broadband to all unserved areas? Answering this question first requires defining a standard of "broadband." To ensure the maximum effectiveness of stimulus funding in unserved areas, we recommend these funds be used only to construct "future proof" infrastructure. While we do not propose the specific type of technology that stimulus funding should support, for the purposes of cost estimation we will choose fiber-to-the-home (FTTH) technology. We do this for two reasons: First, FTTH currently is the only consumer technology deployed that is capable of offer-

ing dedicated symmetrical bandwidths approaching (or exceeding) 100 Mbps — a bandwidth that is arguably “future-proof”. Second, when conducting a cost-estimation we feel it is prudent to be conservative — i.e. to overestimate when possible. Being a wireline technology, FTTH is likely to have initial deployment costs that exceed fixed wireless or 4G mobile wireless (or any other wireless) technologies. FTTH is also likely to have higher initial costs than fiber-to-the-node (FTTN), copper-based solutions like VDSL, but lower ongoing and maintenance costs. Third, in terms of immediate economic stimulus, deployment of FTTH will require more upfront labor and capital expenditures than wireless or copper-based solutions. Thus, the immediate jobs creation potential of FTTH exceeds all other technologies.

Using FTTH as the proxy technology for cost estimation, we suggest that the 6 to 8 million unserved homes can be connected at a median cost ranging between \$2,000 and \$5,000 per home.¹¹ Thus, the total funding needed to serve all currently unserved homes could be as little as \$12 billion or as much as \$40 billion, with the likely cost falling somewhere between \$20 to \$30 billion. The question is what’s the best approach for stimulating this level of investment in rural unserved areas?

Tax Incentives Alone Will Not Lead to Broadband Buildout Where It Is Needed Most

While tax incentive policies provide an administratively easier method for directing stimulus funding, this approach will only result in minimal deployment of broadband infrastructure in unserved areas beyond that already planned by telecommunications providers. These areas remain unserved for a reason: The upfront fixed costs are too high to be recovered in any reasonable amount of time. Tax policies like accelerated depreciation and investment credits are most effective at stimulating investment in projects that have short- to medium-term return on investment (ROI) potential. For most of this nation’s unserved areas, the ROI is still too long-term even with the tax benefits of accelerated depreciation or investment credits. For these areas, the most viable solution to the availability problem is direct funding of infrastructure deployment through grants.

The Short Time Frame Requires Off-The-Shelf Policy Options

There is universal agreement that a substantial economic stimulus package must be implemented as soon as possible. But with this hurried pace comes the risk of enacting policies that fail to adequately achieve stated goals or have unintended consequences. This risk favors the use of off-the-shelf policy options that have already been vetted and debated by stakeholders.

The only agencies with experience in overseeing funding of telecommunications projects in unserved areas are the Federal Communications Commission (FCC), the National Telecommunications and Information Agency (NTIA; part of the Commerce Department), and the Rural Utilities Service (RUS; part of the Department of Agriculture).

We believe the FCC, and to a lesser extent the NTIA, are the most appropriate agencies for overseeing broadband stimulus policy targeted at high-cost rural areas. Unlike the USDA, the FCC has decades of experience in implementing universal service policies. The FCC also has close working relationships with state utility commissions and telecommunications providers. Finally, the FCC is the only entity, via its data collection efforts, that will possess the information needed to accurately and efficiently *target* the broadband and mobility funds.

In addition to being the expert agency in this arena, the FCC has an off-the-shelf policy that is the most appropriate vehicle for directing stimulus to achieve universal broadband deployment. As a part of a comprehensive effort to modernize and reform the Universal Service Fund (USF), the Federal-State Joint Board on Universal Service (“Joint Board”)¹² provided a series of recommendations to the FCC in November 2007, and the FCC solicited public comment on these proposals. In November 2008, the Commission, as required by law, responded to the Joint Board, declining to implement its recommendations. However, the proposals were not rejected based on merit. The Commission simply failed to reach a consensus on the broader issue of comprehensive USF reform of which this was one component.

Universal service reform is a complicated subject, and reforms should not be made in haste. However, there is no reason to delay implementing the least controversial aspect of the Joint Board’s comprehensive proposal — the creation of funds to support the construction of broadband and mobile wireless networks in unserved and underserved areas.

The Ideal Vehicle: USF Broadband and Mobility Funds

Though Congress directed the FCC to ensure that its universal service policies keep pace with advancements in technology, the Universal Service Fund does not currently provide *any* explicit support for broadband infrastructure or services. The FCC’s failure to modernize its policies has stranded nearly 20 million Americans in areas that are not served by any broadband providers and has left millions more in areas with substandard services that are years behind what’s available to urban consumers.

The Joint Board rightly concluded that the primary barrier to broadband availability in rural areas is the high fixed deployment costs — costs that because of low customer density cannot be recovered in a manner that attracts private investment. The Joint Board thus recommended that the FCC create a Broadband Fund to provide grants for the construction of new broadband facilities in unserved and underserved areas. The Joint Board also recommended that a similar Mobility Fund be created for the construction of infrastructure that extends mobile wireless voice services into unserved areas. Though there is some disagreement in the public record on the details of these funds, there is near universal agreement that this is an appropriate and wise approach to achieve the goals of universal service as established in the statute.

The Joint Board recommended that the FCC and the Universal Service Administration Company (USAC) oversee these two funds, but that state public utility commissions or other state agencies should make the ultimate grant allocation decisions. The Joint Board also recommended an incentive-based approach that would entice states to offer matching funds.

Though the Joint Board left some of the implementation details up for further comment, it did recommend an annual funding level of \$300 million for the Broadband Fund and \$1 billion for the Mobility Fund. These monies would be collected through the current USF contributions mechanism — an assessment on the interstate long-distance revenues of carriers, which is a cost passed through to consumers on their monthly bills. One of the chief criticisms of the Joint Board’s proposal was the low level of funding allocated to the Broadband Fund. The Joint Board conceded that the amount of funding was more of a reflection of their inability to increase the overall size of the USF and their unwillingness to reallocate support away from traditional phone service. The need for substantially greater resources in the new Funds is well established.

Implementing and Adequately Supporting the Broadband and Mobility Funds

The Joint Board's funding recommendation for the Broadband Fund is far too low to achieve any measurable success. As discussed above, this funding recommendation was more a reflection of practical constraints rather than an accurate assessment of need. Unless there is a comprehensive overhaul of the USF, it will never be able to achieve the goal of universal broadband. This is simply because the current contributions mechanism for the USF cannot sustain any increased burden. Economists have for years provided evidence of the inefficiencies associated with funding universal service via assessments on long-distance services. Economists universally agree that the method for funding universal service that results in the lowest level of economic distortion is to fund the program with general tax revenues. With this in mind, it is clear that using the stimulus package to support the Broadband Fund and Mobility Fund offers an ideal method for circumventing the stalled USF reform debate.

However, the FCC has not implemented the Joint Board's recommendations to create the Broadband and Mobility Funds. Thus, if the incoming administration and Congress intend for the Commission to oversee broadband economic stimulus, then Congress must establish the Joint Board's recommended Broadband and Mobility Funds in the stimulus package. Because the FCC does not have grant-making authority, the stimulus legislation would have to appropriate funds to NTIA, which could allocate monies to state agencies, via USAC.

We recommend that the congressional stimulus package appropriate up to \$15 billion to the Broadband Fund and \$5 billion to the Mobility Fund. Funds will be awarded over a three-year period. The results will be immediate for job creation in the construction of new networks and ongoing in the economic growth associated with the expansion of broadband adoption in rural America.

Minimum Standards for Unserved Areas

Unserved areas create a particular challenge for policymakers when considering the appropriate service quality or speed thresholds that will be eligible for funding. To foster equity between rural and urban areas, policymakers should only support projects to build future-proof networks. But this objective cannot be absolute, as the cost of serving the most remote homes in the most challenging geographic areas can be astronomical.

Thus, we recommend the Broadband Fund be administered as follows:

- **Geographic Boundaries:** For the Broadband Fund, an "unserved area" is generally considered to be a Census Block Group (CBG) where terrestrial "non-dial-up Internet service" is not available to more than 10 percent of the occupied residential premises.¹³ A "completely unserved area" will be defined as a CBG where terrestrial non-dial-up Internet service is only available to less than 10 percent of the occupied residential premises.¹⁴ A "severely unserved area" will be defined as a CBG where terrestrial non-dial-up Internet service is available to more than 10 percent of homes, but less than 50 percent of homes. A "moderately unserved area" will be defined as a CBG where non-dial-up terrestrial Internet service is available to more than 50 percent of homes, but less than 90 percent of homes.
 - Because the definition of "underserved home" is dependent upon the quality of service available at that particular home, it is possible to have a "served area" that consists completely of "underserved homes". Thus, when we speak of "underserved areas," we are generally refer-

- ring to an area that has some level of broadband service available but where speeds of that service are well below any “reasonably comparable” standard.
- When establishing RFP guidelines, the FCC should direct states to place priority on projects targeted at completely unserved areas; secondary priority will be given to projects targeting severely unserved areas; last priority will be given to projects targeting moderately unserved areas.
 - ♦ Projects targeting severely unserved and moderately unserved areas should focus on extending the same level of service throughout the entire service area. In other words, these projects should address underserved homes in addition to the unserved homes. For example, if a project is aimed at a CBG where 384 kbps DSL is available to 50 percent of the homes in the CBG, then the Broadband Fund support would be used to extend 5 Mbps service to all homes in the CBG — including those who already receive 384 kbps DSL.
 - ♦ An RFP must propose to deploy service to all the homes in a Fund-eligible CBG according to the guidelines discussed below.
 - ♦ Only one grant will be awarded for each area.
 - For the purposes of the Mobility Fund, we recommend funding be prioritized to projects that target those CBGs where mobile voice service is not available in any of the populated areas of the CBG (i.e., partially covered CBGs would not be eligible for funding).
 - ♦ Because there are so few CBGs that meet this definition, we recommend that funding be prioritized to deploying 4G-level mobile broadband services to CBGs where this level of service is unavailable. In general, 4G-level mobile broadband services are those that are of the same quality level as WiMax or LTE services.
 - ♦ Projects that target deployment of mobile voice services along interstate, state, and county highways would be eligible for funding.
 - ♦ Only one grant will be awarded for each area.
 - **Speed Guidelines:** We also recommend that the FCC establish strict speed quality guidelines in the RFP process.
 - For unserved, severely underserved and moderately unserved CBGs, a Broadband Fund-eligible project must deploy services that are capable of delivering a minimum of 5 Mbps in both the downstream and upstream directions, and it should be capable of scaling efficiently to a minimum of 50 Mbps in the downstream and 20 Mbps in the upstream direction. The states will have discretion when considering a proposal’s scalability, but criteria will include additional costs for upgrades, both to the producer and to the consumer.
 - This level of service must be deployed to a minimum of 90 percent of the unserved homes in an unserved, severely underserved, or moderately underserved area.
 - ♦ For the remaining 10 percent of unserved homes in an area, a minimum of 8 percent of homes must be served with broadband that offers a minimum of 10 Mbps in the downstream direction, and a minimum of 2 Mbps in the upstream direction.
 - ♦ The final 2 percent of homes in a Fund-eligible area may be served with satellite broadband service capable of a minimum of 1 Mbps in the downstream direction only if the

per-home cost of serving these remaining premises exceeds five times the average cost of serving the other 98 percent of unserved homes in the CBG.

- Speeds will be defined on an “up to” basis, but as a guaranteed minimum speed that can be delivered (between the customer premise and first point of aggregation within the network) a minimum of 90 percent of the time.

2. ACCELERATED DEPRECIATION FOR BROADBAND INFRASTRUCTURE INVESTMENT

Policies that allow for accelerated depreciation entice capital investment, as they allow companies to partially defer payment of corporate income taxes. Normally, capital investments are depreciated over the productive lifespan of the asset, in recognition of the fact that the asset has productive value beyond the year in which the investment is made. Accelerated depreciation shifts the effective productivity of the asset into the early years of the investments lifespan, substantially lowering a company’s tax liability in the period immediately after the investment is made. From the perspective of the government (as tax collector), policies allowing accelerated depreciation are a cost-effective method for encouraging capital investments, because each dollar of forgone tax revenue represents many more dollars in capital deployed.

For reasons discussed above, accelerated depreciation policies are unlikely to lead to appreciable broadband investment in unserved rural areas. They will be most effective at enticing investment in served areas by companies with substantial access to capital and significant tax liabilities.

With this in mind, we recommend accelerated depreciation for broadband investment as follows:

- Investments in end-user broadband networks that are capable of offering a minimum of 20 Mbps in the downstream direction and a minimum of 5 Mbps in the upstream direction may be depreciated by 50% in year one, 25% in year two, and 25% in year three.
- Investments in end-user broadband networks that are capable of offering a minimum of 100 Mbps in the downstream direction and a minimum of 100 Mbps in the upstream direction may be depreciated fully (100%) in year one.
- If the investment is in an unserved CBG (as defined in the previous section), any investments capable of offering a minimum of 5 Mbps in the downstream direction and a minimum of 1 Mbps in the upstream direction may be depreciated by 50% in year one and 50% in year two.
- If the investment is in an unserved CBG, any investments capable of offering a minimum of 5 Mbps in the downstream direction and a minimum of 5 Mbps in the upstream direction may be depreciated fully (100%) in year one.
- Speeds will not be defined on an “up to” basis, but as a guaranteed minimum speed that can be delivered (between the customer premise and first point of aggregation within the network) a minimum of 90 percent of the time.
- “End-user broadband networks” can be considered to be traditional “last-mile” networks that offer services between a retail network provider’s local point of presence and a residential or business premise. The total depreciable investment can also include any investment in deployment of new “special-access” or “middle-mile” network infrastructure (that which connects a retail network provider’s local point of presence and a public or private network peering exchange) that is needed to facilitate the delivery of the last-mile service.

- Investments in network infrastructure projects that do not include “last-mile” deployment may qualify for the program. Investment in deployment of new “special-access” or “middle-mile” network infrastructure (that which connects a retail network provider’s local point of presence and a public or private network peering exchange) that are not a part of a last-mile deployment project, and are of a minimum of an OC-12 service level¹⁵ may be depreciated by 50% in year one and 50% in year two — only if the carrier is considered to be a non-dominant carrier for the service area.
- The size of the Accelerated Depreciation for Qualifying Broadband Infrastructure Investment Program will be capped at \$1.5 billion over 3 years. Because of this constraint, we recommend that a process be established within the Treasury Department for companies to pre-qualify for the program based on deployment plans. Eligibility for years two and three will be based on audits of the previous year’s deployment.
- In order to create further incentive for private capital investment, deployment plans offered by governmental, non-profit and non-dominant carriers will be given priority in years two and three. However, if a dominant incumbent takes advantage of the program in year one, then they will receive equal priority to all other applications in years two and three.

3. INFORMATION SUPERHIGHWAY TAX CREDIT PROGRAM

Investment tax credits have higher value than tax deductions (like accelerated depreciations), because credits directly reduce the amount of taxes owed rather than reducing a company’s total taxable income. Thus the costs to the government of tax credits are higher than tax deductions, but the investment incentives created are also higher. Like accelerated depreciation, investment tax credits are also unlikely to have a measurable impact on rural broadband deployment, though they will be more effective than depreciation policies. Investment tax credits will be most effective at enticing investment in served areas by companies with substantial access to capital and significant tax liabilities.

We recommend the following structure for the “Information Superhighway Tax Credit Program”:

- If the investment is in an unserved CBG (as defined above), any investments in end-user networks capable of offering a minimum of 5 Mbps in the downstream direction and a minimum of 1 Mbps in the upstream direction will qualify for a 50 percent nonrefundable tax credit.
- If the investment is in an unserved CBG, any investments in end-user networks capable of offering a minimum of 5 Mbps downstream and a minimum of 5 Mbps upstream will qualify for a 75 percent nonrefundable tax credit.
- If the investment is in an unserved CBG, any investments in end-user networks capable of offering a minimum of 100 Mbps downstream and 100 Mbps upstream will qualify for a 90 percent nonrefundable tax credit.
- Investments in end-user broadband networks that are capable of offering a minimum of 20 Mbps downstream and a minimum of 5 Mbps upstream will qualify for a 15 percent nonrefundable tax credit.
- Investments in end-user broadband networks that are capable of offering a minimum of 100 Mbps downstream direction and a minimum of 100 Mbps upstream will qualify for a 50 percent nonrefundable tax credit.

- Speeds will not be defined on an “up to” basis, but as a guaranteed minimum speed that can be delivered (between the customer premise and first point of aggregation within the network) a minimum of 90 percent of the time.
- “End-user broadband networks” can be considered to be traditional “last-mile” networks that offer services between a retail network provider’s local point of presence and a residential or business premise. The total depreciable investment can also include any investment in deployment of new “special-access” or “middle-mile” network infrastructure (that which connects a retail network provider’s local point of presence and a public or private network peering exchange) that is needed to facilitate the delivery of the last-mile service.
- Investments in network infrastructure projects that do not include “last-mile” deployment may qualify for the program. Investment in deployment of new “special-access” or “middle-mile” network infrastructure (that which connects a retail network provider’s local point of presence and a public or private network peering exchange) that are not a part of a last-mile deployment project, and are of a minimum of an OC-12 service level will qualify for a 50 percent nonrefundable tax credit — only if the carrier is considered to be a non-dominant carrier for the service area.
- The size of the Information Superhighway Tax Credit Program will be capped at \$1.5 billion over three years. Because of this constraint, we recommend that a process be established within the Treasury Department where companies obtain pre-approval for the tax credit. Credits for deployment in years two and three will be based on audits of the previous year’s deployment.
- In order to create further incentive for private capital investment, deployment plans offered by governmental, non-profit and non-dominant carriers will be given priority in years two and three. However, if a dominant incumbent takes advantage of the program in year one, then they will receive equal priority to all other applications in years two and three.

4. COMPETITIVE FIBER TAX INCENTIVE PROGRAM

Traditional telephone and cable television networks exhibit features of a so-called natural monopoly market. Because of the substantial initial fixed deployment costs, it is socially inefficient for a second telephone provider or cable operator to “overbuild.” The ability for telco and cable companies to use their existing infrastructure to offer broadband services is the primary reason most Americans are served by just two broadband providers.

If policymakers wish to see a market with more than two competitors offering world-class, future-proof broadband service, then they must enact policies that force network operators to offer wholesale access, or they must pay for the construction of additional networks. Policymakers are understandably reluctant to embrace either of these options.

Stimulus policy offers a third way, which will ensure the construction of competitive and future-proof broadband networks. If a network operator is undertaking the substantial costs of fiber deployment, the incremental costs of deploying more than a single strand of fiber is minimal. Therefore, stimulus policy can be structured to create substantial incentive for companies to deploy more than a single strand of fiber to each end-user premise. Further incentives can be put in place to encourage companies deploying multiple fiber stands to sell the secondary strand(s) to third parties.

We recommend the following structure for the Competitive Fiber Tax Incentive Program:

- Any investment deploying new fiber-optic cable from a central office co-location facility, public peering exchange or private peering exchange facility directly to or passing by a residential or small business end-user premise that deploys more than a single strand of fiber may be depreciated fully (100%) in the year of investment.
- Any investment deploying new fiber-optic cable from a central office co-location facility, public peering exchange, or private peering exchange facility, directly to or passing by a residential or small business end-user premise that deploys two strands of fiber will also qualify for a 60 percent *refundable* tax credit, if the second fiber is sold to a new entrant within one year of deployment. If the second strand of fiber is not sold to a new entrant within one year of deployment, the tax credit will be considered nonrefundable.
- Deployment of three or more strands of fiber to a residential or small business end-user premise will qualify for an 80 percent *refundable* tax credit, if the additional strands of fiber are sold to new entrants (one entrant per strand) within one year of deployment. If the additional strands of fiber are not sold to new entrants within one year of deployment, the tax credit will be considered nonrefundable.
- Taxes on sales of additional strands of fiber to qualifying new entrants may be deferred for five years. The NTIA will certify the eligibility of a new entrant. A new entrant will be considered any network provider that does not currently offer service to the end-user premise in question. This could include the premise owner.
- If the additional strand(s) of fiber remain unsold for three years after construction, any party may petition the NTIA to determine, in arbitration, a fair market value for the asset. The network owner is then obligated to sell the cable at the determined fair market value within 90 days of the completion of arbitration; if they refuse, they must pay back the full value of the initial tax credit.
- Congress should appropriate \$5 billion for this program, to be allocated over a three-year period. Because of this constraint, we recommend that a process be established within the Treasury Department where companies obtain pre-approval for the tax credit, and a process within the NTIA for pre-approval as an eligible new entrant for purposes of the tax deferral. Credits for deployment in years two and three will be based on audits of the previous year's deployment.

5. BONDS FOR BROADBAND PROGRAM

Corporations periodically raise capital by issuing corporate tax bonds. These bonds are usually short- to medium-term maturity bonds (one to 10 years) and pay interest rates relative to the risk of the investment, determined by the companies' bond rating. Government bonds are similarly structured but usually have longer maturity periods and pay lower levels of interest due to the lower risk of default.

Congress can authorize a program that pays the interest costs for corporate bonds, effectively enabling a company to borrow money interest-free. This approach offers the advantage of spurring substantial investment at a low cost to the government. Such programs are particularly attractive to companies with less-than-stellar bond ratings, as they reap substantial savings from interest payments made by the government.

We recommend the Bonds for Broadband Program be administered as follows:

- The program will make interest payments on bonds issued to finance qualified broadband investments. Congress should appropriate \$10 billion for this purpose. NTIA will administer the funds after pre-approval of each project. Bonds will be issued for a maximum of three-years, or until the \$10 billion limit is reached.
- Qualifying investments include investments in end-user broadband networks that are capable of offering a minimum of 50 Mbps in the downstream direction and a minimum of 20 Mbps in the upstream direction.
- Speeds will not be defined on an “up to” basis, but as a guaranteed minimum speed that can be delivered (between the customer premise and first point of aggregation within the network) a minimum of 90 percent of the time.
- Qualifying investments also include investments made by non-dominant carriers to deploy new “special-access” or “middle-mile” network infrastructure (i.e. that which connects a retail network provider’s local point of presence and a public or private network peering exchange) which is not a part of a last-mile deployment project, and is of a minimum of an OC-12 service level.

6. INTEROPERABLE BROADBAND PUBLIC SAFETY PROGRAM

First responders and law enforcement officials need reliable and interoperable communication networks in times of crisis. This lesson was made painfully clear during the 9/11 terrorist attacks — and again four years later during Hurricane Katrina. Congress recognized this need and set aside several channels of valuable 700MHz spectrum specifically for public safety broadband systems. Congress also ordered the construction of a nationwide interoperable broadband public safety network that utilized this spectrum. But they failed to establish a mechanism to pay for it.

The FCC attempted to implement a public-private partnership plan aimed at getting the national public safety broadband network constructed with private funds. The FCC’s plan involved the auctioning 10MHz of spectrum in the 700MHz band (the “D-Block”) to a winner that would fund the network’s construction. In return, during non-emergency times, the private entity would have access to this spectrum and secondary access to the other public safety spectrum in the 700 MHz band. During times of emergency, public safety agencies would have primary access to the D-Block spectrum and other public safety spectrum in the 700MHz band. But at auction, no bidder met the FCC’s reserve price, and the agency went back to the drawing board.

Congress can successfully resurrect this idea by providing a one-time, \$200 million grant for assistance in construction of this network. Alternatively, Congress could abandon the auction idea and award the additional spectrum directly to public safety agencies, using the \$200 million to fund public safety network equipment purchases. We recommend Congress quickly bring this issue to a resolution, and ensure that this critical public safety network is built and operation by the end of 2009. Doing so will ensure the integrity of our first-responder system, and will provide immediate economic stimulus.

Figure 3: Summary of Broadband Investment Stimulus Policies

Policy	Program Cost	Incentive Amount	Deployment Geography & Type		
			All Areas	Unserved Areas	Special Access or Middle Mile Only by Non-Dominant Carrier
Accelerated Depreciation	\$1.5 billion	50% year 1; 25% year 2; 25% year 3	20Mbps/5Mbps	5Mbps/1Mbps	OC-12 & Higher
		100% year 1	100Mbps/100Mbps	5Mbps/5Mbps	
Investment Tax Credit	\$1.5 billion	15% non-refundable tax credit	20Mbps/5Mbps	5Mbps/1Mbps 5Mbps/5Mbps 100Mbps/100Mbps	OC-12 & Higher
		50% non-refundable tax credit	100Mbps/100Mbps		
		75% non-refundable tax credit			
		90% non-refundable tax credit			
USF Broadband Fund	\$15 billion	Grants Awarded via RFP		5Mbps/5Mbps (scalable to 50Mbps/20Mbps) 10Mbps/2Mbps (for 90th to 98th percentile unserved homes) 1Mbps satellite (for 98th to 100th percentile unserved homes)	
USF Mobility Fund	\$5 billion	Grants Awarded via RFP		Priority for Voice-grade mobility service in populated unserved areas; secondary priority for 4G-level mobility data services	
Competitive Fiber Tax Incentive Program	\$5 billion	100% Accelerated Depreciation; 60 percent refundable tax credit; 5-year deferral of tax on sale of second fiber strand	Fiber-to-the-premise (residential or small business); 5-yr deferral if 2nd strand of fiber deployed and sold w/in 1 year		
		100% Accelerated Depreciation; 80 percent refundable tax credit; 5-year deferral of tax on sale of additional fiber strands	Fiber-to-the-premise (residential or small business); 5-yr deferral if additional strands of fiber deployed and sold w/in 1 year		
Bonds for Broadband Investment	\$10 billion	Interest on Bond Paid by Federal Government	50Mbps/20Mbps		OC-12 & Higher
Interoperable Broadband Public Safety Program	\$200 million	Spectrum Auction Bidding Credit; or Funding for Local Public Safety Agencies to Construct Network	TBD		

POLICIES TO STIMULATE BROADBAND DEMAND

1. LIFELINE/LINKUP BROADBAND PILOT PROGRAM

It has long been a national policy priority to ensure that basic and affordable telecommunications services are available to all Americans. Universal adoption is perceived as so important for the national well-being that federal and state governments have for years subsidized basic local telephone service for millions of low-income Americans.

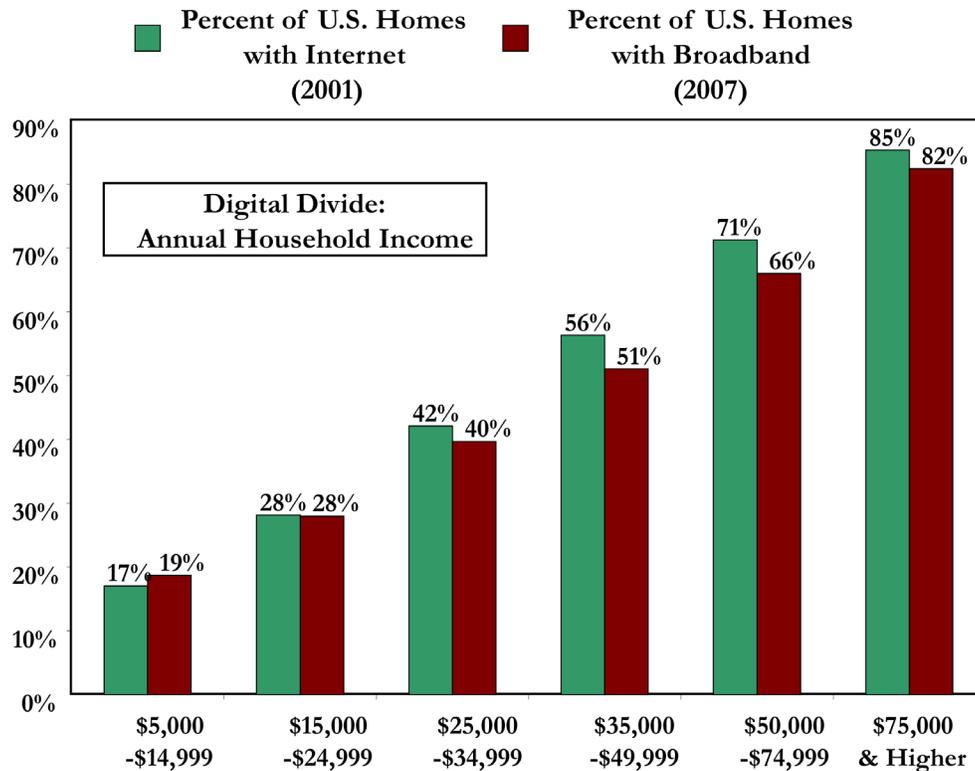
In 1984, the FCC established the “Lifeline” program,¹⁶ which provides discounts on the monthly cost of telephone service for low-income individuals.¹⁷ Three years later, the FCC created the “Link Up America” program to enhance the impact of the Lifeline program by subsidizing the initial costs of establishing telephone service in low-income households.¹⁸ These two programs (collective known as the Universal Service Low-Income Fund) currently provide about \$800 million dollars in annual support to nearly 7 million low-income customers, paid for by consumers of interstate long-distance services. Eligibility for the programs depends on criteria established by individual states, or in the absence of such criteria, the default federal criteria.¹⁹

If basic telephone service was considered a vital lifeline in the late 20th century, then the same is true for broadband service in the 21st century. If universal service policies are justified in part based on equity concerns and network effects (or “inverse network effects,” i.e., the costs of not being on the network)²⁰, then policymakers have a duty to foster adoption of broadband technology by all segments of American society. The long-term economic benefits of universal broadband adoption are numerous.

Unfortunately, while Internet access — and more recently broadband Internet access — has for the majority of Americans become viewed as a basic necessity, most low-income households remain unable to participate in this technological and social revolution. This “economic digital divide” is of deep concern, because it denies millions of Americans access to the most promising path out of poverty this country has ever seen.

The transition from a competitive, inexpensive dial-up market to a much less competitive and more costly broadband market has only exacerbated the economic digital divide. Only 35 percent of homes with annual household incomes under \$50,000 (approximately half of the country) have broadband — while 76 percent of homes above this level are connected.

Figure 4: The Economic Digital Divide (2001 & 2007)



Source: U.S. Census Bureau, 2007.

With this in mind, the FCC recently sought comment on a proposal to expand the Lifeline and Linkup programs, in a pilot fashion, to support broadband service. Specifically, the FCC proposed a \$300 million annual fund that would subsidize 50 percent of the cost of broadband Internet access installation, including a broadband Internet access device, up to a total amount of \$100. The pilot program would also provide a monthly subsidy to offset the cost of broadband Internet access service, up to \$10 per month.²¹ The FCC has yet to vote on this proposal.

We recommend Congress establish the Broadband Lifeline/Linkup pilot program, administered as follows:

- Congress should appropriate \$1.2 billion over a three-year period for the pilot program.
- Eligibility will be identical to eligibility for the current USF Low Income program (if a state does not have its own low-income program). If a state has its own program, eligibility will be based on the requirements of that program.
- The fund will subsidize up to 50 percent of the cost of broadband Internet access installation, up to \$100. This amount may also be used to subsidize the cost of an Internet access device, including subsidizing the interest payments on a qualifying loan for such device.
- The fund will also provide a monthly subsidy to offset the cost of broadband Internet access service, up to \$10 per month. Unlike the FCC's plan, we suggest that the household not be required

to also receive a monthly telephone service subsidy to qualify for this benefit. This recognizes the potential for broadband to supplant traditional telephone service, a marketplace choice that low-income households may be inclined to make.

- For the purposes of the Broadband Lifeline/Linkup pilot program, we recommend that only services that offer a minimum of 1 Mbps in the downstream direction and 384 kbps in the upstream direction may qualify as “broadband.” Speeds will not be defined on an “up to” basis, but as a guaranteed minimum speed that can be delivered (between the customer premise and first point of aggregation within the network) a minimum of 90 percent of the time.

2. E-RATE@HOME PROGRAM

In the Telecommunications Act of 1996, Congress directed the FCC to use the Universal Service Fund to provide discounted telecommunications, Internet access, and internal wiring to eligible schools and libraries.²² The Schools and Libraries program has been particularly effective at ensuring universal Internet access in all American schools. According to the FCC, more than 99 percent of public schools were connected to the Internet by the end of 2002, up from 65 percent in 1996. This improvement is due in large part to the aid provided by the fund.

The current universal service Schools and Libraries program (also known as “e-Rate”) allocates over \$2 billion annually with much of the funding going to provide broadband Internet access. Like all other components of the USF, e-Rate is paid for by consumers of interstate long-distance services. Though the program has attracted headlines for a few isolated cases of waste, fraud and abuse, stakeholders largely recognize it as an indispensable tool for ensuring that America’s youth gain the technical skills they will need to effectively participate in the digital economy.

When a teacher assigns homework, they can be confident that their students have the resources to complete the task once they leave the schoolhouse. Students are allowed to take home textbooks that are owned by the school. But if a teacher wishes to adopt a 21st-century approach to teaching, they can’t just send the student home with the school-owned Internet connection. For many American students, the benefits of the digital age are left in the classroom; when these children go home, they have no computers or broadband access. This unfortunate fact will have lasting consequences if not addressed. America’s long-term global competitiveness is directly dependent upon our work force being ready to compete in the digital economy.

We recommend Congress address this problem by creating the “e-Rate@home” program, administered as follows:

- Congress should appropriate \$3 billion to be allocated over a three-year period to the e-Rate@home program, which will be administered by the NTIA in conjunction with the USAC.
- Eligibility for the program will be structured identically to the current Schools and Libraries program (which for schools, directs funds to those populated more heavily by students from low-income households). The USAC will determine which projects are eligible for e-Rate@home support.
- The e-Rate@home program will primarily be focused on subsidizing the purchase of laptop computers by qualifying schools or school districts. We do not propose a specific subsidy amount, as we expect schools to submit proposals for approval by the USAC. However, we do suggest that the maximum per laptop subsidy be capped at \$150.

- The program should also support the construction of Wi-Fi networks that extend a school or library's e-Rate-supported broadband Internet connection to the surrounding neighborhoods. The Wi-Fi service will be offered for free to households with students.
- We encourage schools that operate particularly long bus routes to propose plans that equip school buses for mobile Internet access. This approach has been successfully deployed in Grapevine, Ark.²³
- Each school or library participating in the program will be subject to mandatory audits for one year of the three-year pilot program.

3. EVERY CHILD ONLINE TAX DEDUCTION PROGRAM

Because schools participating in the e-Rate@home will face constraints in extending their broadband Internet connections (not every student will be able to receive the e-Rate@home Wi-Fi service due to geographic and financial limitations), there is a need for a separate program to ensure that all students are able to utilize broadband at home.

We therefore recommend Congress establish the Every Child Online Tax Deduction Program, administered as follows:

- Households or families with qualifying children (under 18 years of age) earning less than \$60,000 in taxable income during 2009 will be eligible to participate in the program. There are approximately 18 million families that fit these criteria.
- Participating families or households will be allowed to deduct the cost of home Internet access up to \$180 for the year, and deduct up to \$200 in qualifying Internet access device expenditures made in 2009.
- For this program, a qualifying Internet access device must be a laptop computer or "netbook" computer. While we certainly recognize the utility of desktop computing devices, this program is designed to function in conjunction with the e-Rate@home program, which places emphasis on the portability of the Internet access device between home and school.

4. BROADBAND DATA IMPROVEMENT ACT

The process of crafting responsible public policy must begin with an assessment of basic facts. This is particularly the case when crafting policies that allocate scarce taxpayer resources for the purposes of achieving universal deployment of a particular technology. Targeted deployment requires accurate knowledge of where service gaps exist, and the likely cost of closing these gaps. Further, efficient use of scarce resources requires knowing what areas have the highest level of demand for the services.

With these concerns in mind, Congress enacted the Broadband Data Improvement Act, legislation aimed at promoting broadband deployment and adoption through local mapping and demand aggregation efforts. However, no money was appropriated to implement the programs established in the Act. Because the FCC has made substantial improvements to its broadband data collection program, the Data Improvement Act is not as critical as it once was, though it will enable a more detailed understanding of broadband deployment than the FCC's data. Nevertheless, the public-private demand stimulation programs established in the legislation are just as important as the data collection provisions.

These demand stimulation efforts will be critical to ensuring that all broadband stimulus funding is directed to the areas where it is needed the most. We recommend Congress appropriate \$300 million over three years to implement the Broadband Data Improvement Act.

5. RURAL DEVELOPMENT COMMUNITY CONNECT GRANT PROGRAM

The USDA, under the Rural Utility Service agency, operates a grant program that helps bring broadband to rural areas and funds community centers that offer technology training. The program made nearly \$15 million in grants this year, for projects such as WV WISP in Reedy W.Va. This project is providing wireless broadband service to the local volunteer fire department, elementary school and community center (which offers free technology training services) in addition to local residents.

We recommend that Congress appropriate \$50 million per year for three years to this USDA-led program for the explicit purpose of constructing and/or funding community centers (including libraries) that will offer free broadband services and technology training, with an emphasis on training for families with children and senior citizens.

6. HEALTH CARE AND PUBLIC SERVICE DIGITAL MODERNIZATION PROGRAM

In his Dec. 6 address to the nation, heard on the radio and watch via YouTube, President-elect Obama discussed how he planned to stimulate our economy by funding infrastructure projects in a way that would eclipse even the building of the transcontinental highway system. The President-elect specifically suggested using broadband technology to increase efficiency in our nation's health care system by bringing record-keeping and other health care services into the modern digital age. These efforts will reduce error and lower administrative costs, in addition to making virtual "house calls" a routine service.

Such modernization is vastly overdue in many other sectors, including numerous local and state governmental agencies that provide services to the public. Many routine record searches or permit applications require a trip to a local agency and a wait in a long line. Such activities could be done more efficiently via online Web portals. Modernizing our health care and public service sectors would vastly improve productivity in the general economy and increase the overall value of being connected, which in turn will increase demand for Internet access.

We recommend that Congress establish within the NTIA the "Health Care and Public Service Digital Modernization Program." This program will support modernization at health care facilities and local and state governmental agencies. NTIA will solicit grant proposals and will make awards based on a project's likely practical impact. We recommend a \$50 million annual appropriation allocated over a three-year period. NTIA will report annually on the progress of this program.

Figure 5: Summary of Broadband Demand Stimulus Policies

Program	Program Cost	Supporting
LifeLine/LinkUp Broadband Pilot Program	\$1.2 billion (over 3 years)	Subsidizes 50% of the cost of broadband installation (including access device) up to \$100, plus interest payment offsets. Also provides a \$10/month subsidy on broadband access
e-Rate@home Program	\$3 billion (over 3 years)	Provides participating e-Rate schools with support for laptop computers, and support for constructing a Wi-Fi network serving a school's surrounding neighborhood
Every Child Online Tax Deduction Program	\$1 billion (in 2009)	Allows households with qualifying children earning less than \$60,000 in taxable income during 2009 to deduct the cost of home Internet access up to \$180 and deduct up to \$200 in Internet access device costs
Broadband Data Improvement Act	\$300 million (over 3 years)	Funds this law, which supports public-private, state-level broadband demand aggregation and mapping programs
Rural Development Community Connect Grant Program	\$150 million (over 3 years)	Funds community centers (including libraries) that offer free broadband services and technology training, with an emphasis on training for families with children and senior citizens
Health Care and Public Service Digital Modernization Program	\$150 million (over 3 years)	Creates a program at NTIA that supports projects aimed at modernizing health care centers and state and local public service agencies

OVERSIGHT AND ACCOUNTABILITY

The amount of money that will be appropriated in the stimulus legislation will be truly staggering. This is a testament to the severity of the current economic crisis. Getting our economy growing again will be hard work — both for every day Americans and for the policymakers who are responsible for leading us out of this mess. But while the severity of the economic crisis necessitates a quick response from policymakers, it does not mean that Congress should write blank checks to industry with little to no oversight.

The telecom industry is not in dire financial straits. This stimulus is not about keeping their sector healthy; it is about creating millions of new jobs and building infrastructure that will be the backbone of the American economy for many future generations. Therefore, it is essential that oversight and accountability measures be built into the DNA of each stimulus program. If the public is to become a major investor in broadband networks, then the private owners of those networks must be held accountable.

First and foremost, Congress must establish mechanisms to ensure that any tax incentives or grant monies are used to fund new broadband deployment projects. Without this mechanism, we have no way of ensuring that the stimulus funds are being used to create new jobs.

Second, this level of public investment should return a network that is world-class — not simply an incremental improvement over the status quo. Therefore Congress must make sure that the service quality guidelines of each stimulus program are strictly enforced. Congress should first require the submission of detailed proposals prior to the awarding of any grants or tax benefits. Congress should then require the completion of audits and progress reports prior to the release of any further funds during the second and third years of each three-year program.

Third, stimulus money must not be used to build networks no one can afford. Congress should establish mechanisms that ensure funds are only awarded to projects that will offer services that are reasonably priced. Further, Congress should affirm that the Internet service these subsidies are designed to support must be an open, freely competitive platform for ideas and commerce.

Requiring oversight and accountability does not mean achieving oversight and accountability. To help Congress, we suggest that the oversight process be conducted with help from the public. Congress should require NTIA to establish a modern, user-friendly Web portal that provides constant updates on broadband stimulus programs, makes all audits and progress reports freely available, and provides a forum for users to report their own assessment of how their tax dollars are being spent. We believe this openness model will make the benefits of this massive program more tangible to everyday Americans.

ENDNOTES

- 1 See § 706(c) of the 1996 Act.
- 2 The MPEG-4 codec, version h.264 (used notably by IP video service provider Apple) transmits HD video with an approximate average bit rate of 4.5 Mbps. DBS providers also use MPEG-4 with a similar bit rate. The older MPEG-2 codec still in use by cable operators requires between 12 and 20 Mbps. In general, the more “action” or motion in the video, the higher the bit rate needed to maintain a constant level of quality.
- 3 This requirement should be loosened in the case of the most extreme high-cost rural areas.
- 4 H. Res. 1292, introduced June 20, 2008, 110th Congress, 2nd Session. S. Res. 191, introduced May 8, 2007, 110th Congress, 1st Session
- 5 “Broadband Deployment is Extensive throughout the United States, but it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas,” Government Accountability Office, Report to Congressional Committees, GAO-06-426, May 2006.
- 6 *In the Matter of Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, MB Docket No. 05-255, Twelfth Annual Report, (released March 3, 2006), paragraph 30.
- 7 *High-Speed Services for Internet Access: Status as of June 30, 2007*, Industry Analysis and Technology Division, Wireline Competition Bureau, Table 14.
- 8 The figure for the total number of U.S. households varies depending on the particular U.S. Census Bureau source used. The October 2007 Current Population Survey puts the total number of U.S. households at 117,840,000. The 2006 American Community Survey estimated 111,617,402 U.S. households, while the 2005 ACS estimated 111,090,617 U.S. households. Thus it is unclear if the 2007 CPS number is accurate, as it seems high based on the 2005 and 2006 data.
- 9 *Supra* note 5.
- 10 For the purposes of broadband deployment policy, the definition of an “underserved area” is somewhat different than the definition of “underserved home” given above. While the definition of “underserved home” is based on the quality level of service available to that home, the definition of “underserved area” is based on the number of homes that have access to any non-dial-up Internet services in a given geographic territory, such as a Census Block Group.
- 11 This estimate is arrived at by synthesizing several sources and then making a good-faith guess. A 2001 study estimated an average cost of \$1,000 per home to wire every U.S. home with fiber (see “Broadband: Bringing Home the Bits,” U.S. Computer Science and Telecommunications Board, November 2001). The Fiber to The Home Council now puts this at \$800 per home (see www.ftthcouncil.org/UserFiles/File/ftthprimer_feb.pdf). Telecom consultant John Widhausen Jr. puts the figure at \$1,000 per home (see net.educause.edu/ir/library/pdf/EPO0801.pdf). These estimates of course included the 21 percent of U.S. homes that are rural, as well as the 79 percent that are urban and suburban. The latter is where the country’s largest provider of FTTH service, Verizon, has focused their deployment efforts. According to Verizon, their FTTH deployment costs continue to decline. In 2006, it cost Verizon \$850 per home to deploy FTTH, down from \$1,400 in 2004. By 2010 Verizon expects the FTTH deployment costs to decline to \$700 per home (see <http://newscenter.verizon.com/kit/nxtcomm/Product-sheet-FIOS-1Q07.pdf>). Certainly the costs per home will be higher in rural areas because of the lower densities. A recent estimate by a rural Vermont FTTH company put the cost per rural home for FTTH at \$2,900 (\$1,100 to pass each rural home and \$1,800 for the actual “hook up” of the home; see “Rural FTTP ‘perfectly economical,’ says Muni Fiber Veteran,” *Telephony Online*, April 29, 2008). Of course, some rural homes are more “rural” than others, while some unserved homes lie in urbanized clusters inside rural areas. It is possible that some of the most extreme rural homes will not see FTTH, instead being served by a high-capacity wireless solution such as LTE. Considering all of these factors, we feel that a cost estimate range of \$2,000-\$5,000 per unserved home is a reasonable and conservative value.
- 12 Congress, in the Telecommunications Act of 1996, directed the FCC to implement and oversee policies that ensure universal access to telecommunications and advanced information services, and to base these policies on the recommendations of a Federal-State Joint Board on Universal Service.
- 13 “Non-dial-up Internet service” is defined as any Internet access service that is capable of delivering downstream speeds in excess of 200 kilobits per second (kbps).
- 14 “Non-dial-up Internet service” is defined as any Internet access service that is capable of delivering downstream speeds in excess of 200 kilobits per second (kbps).
- 15 “Optical-carrier 12,” generally capable of transmission speeds exceeding 622 Mbps.

- 16 Pursuant to its general authority under sections 1, 4(i), 201, and 205 of the Act. Nowhere in the Act is the FCC directed to establish a specific subsidy for low-income consumers (in the same manner as they are directed ensure reasonably comparable services are available to rural consumers at reasonable comparable rates). However, the Act does discuss “just and reasonable rates,” and the FCC has relied on these sections for statutory authority to establish and administer the Lifeline and Linkup programs.
- 17 *MTS and WATS Market Structure, and Amendment of Part 67 of the Commission’s Rules and Establishment of a Joint Board*, CC Docket Nos. 78-72 and 80-286, Recommended Decision, 49 Fed. Reg. 48325, Nov. 23, 1984. Also, *MTS and WATS Market Structure, and Amendment of Part 67 of the Commission’s Rules and Establishment of a Joint Board*, CC Docket Nos. 78-72 and 80-286, Decision and Order, FCC 84-637, 50 Fed. Reg. 939, Dec. 28, 1984.
- 18 *MTS and WATS Market Structure, and Amendment of Part 67 of the Commission’s Rules and Establishment of a Joint Board*, CC Docket Nos. 78-72 and 80-286, Report and Order, 2 FCC Rcd 2953 (1987), Memorandum Opinion and Order on Reconsideration, 3 FCC Rcd 4543, 1988.
- 19 To qualify for Low Income Program support in those state without their own separate criteria, consumers must certify that their household income is at or below 135 percent of the Federal Poverty Guidelines, or that they participate in at least one of the following seven federal programs: Medicaid, Food Stamps, Supplemental Security Income (SSI), Federal Public Housing Assistance (Section 8), the Low-Income Home Energy Assistance Program (LIHEAP), the National School Lunch Program’s free lunch program, or Temporary Assistance for Needy Families (TANF).
- 20 For an interesting discussion of the substantial exponential social costs resulting from consumers remaining off network See Rahul Tongia and Ernest J. Wilson, III, “Turning Metcalfe on His Head: The Multiple Costs of Network Exclusion,” (paper presented to the Telecommunications Policy Research Conference, Arlington, VA) Sept. 2007.
- 21 See Order on Remand and Report and Order and Further Notice of Proposed Rulemaking, High-Cost Universal Service Support, WC Docket No. 05-337 (and related proceedings), FCC No. 08-262, Nov. 5, 2008 (Appendix A and Appendix C).
- 22 47 U.S.C. §§ 254(b)(6), 254(h).
- 23 Paul Tough, “The One-Room School Bus,” New York Times, The 8th Annual Year in Ideas Issue, Dec. 14, 2008, available at http://www.nytimes.com/interactive/2008/12/14/magazine/2008_IDEAS.html.