America at a Crossroad

Understanding the Challenge of Broadband in Rural America

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America is at a crossroad. A new President is pursuing the reconstruction of our government and much of the critical infrastructure of this country. An economic crisis unlike any since the Great Depression is precipitating monetary and fiscal economic stimuli that are unprecedented. In the midst of this upheaval, rapid technological innovation continues, with advances in broadband-based knowledge and systems that are challenging our policymakers and corporate executives to commit to new advanced communications infrastructure.

The decisions we make at this crossroad will have long-lasting import for our country's ability to prosper in an increasingly connected and efficient world. We must be courageous, thoughtful, honest, knowledgeable, and creative, as we attempt to make near-term decisions with critical long-term impacts.

The incoming Obama Administration and the new Congress have proposed a plan that intersects all of these "roads." They propose the immediate enactment of an unprecedented infrastructure-based fiscal stimulus package. Among the most important proposed policy goals is the Administration's and Congress' commitment to implement meaningful incentives designed to spur economic growth through expanded and improved high-capacity networks across the United States.

This paper is focused on a subset of that initiative—how best to accomplish the policy goal of extending advanced broadband-based communication services to unserved rural areas. We identify three key points that should be considered in crafting effective incentives for expanding high-capacity networks in those regions:

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- Unserved rural regions, where broadband currently is not available, represent approximately 10%-15% of households in America. These unserved regions will require a more coordinated stimulus package than that proposed for regions where deployment is economically viable. While low-interest loans, loan guarantees and other incentives may work in many parts of the country, broadband-focused stimulus mechanisms for high-cost areas—both unserved and underserved—will require more significant levels of support, including deployment grants.
- Broadband investment, without meaningful support, is not economically possible in many unserved rural areas. The initial infrastructure construction costs (labor, electronics, cabling, etc.) are often prohibitive due to low population densities and long distances between end-users and service-

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provider facilities. The incentive mechanisms contemplated in the proposed economic stimulus package, to a certain degree, may be able to address this hurdle of high initial investment costs, as has occurred with universal service programs for voice service over the last century. However, it is possible—and even likely—that the proposed incentive mechanisms could be insufficient in certain high-cost areas.

In addition, ongoing network operating obligations and maintenance investment requirements remain very costly in more remote rural regions, challenging the ability of service providers to generate a profitable business case even when network deployment is fully funded.

- There are solutions to achieve greater availability of broadband services in high-cost rural areas, but they can only be accomplished through the mutual efforts of policymakers and local carriers. First, "high-cost" broadband support should be targeted to specifically-identified regions to meet the incremental return needed to make the investment economic. Second, the support levels should be calculated to match the financial need. The defined level of support then may be derived from multiple funding sources, which could include combinations of grants, tax incentives, increased expensing / accelerated depreciation, and tax-advantaged low-interest rate long-term bonds. It is our belief that the most effective incentive for stimulating broadband deployment in rural areas will prove to be some form of grant program. In addition, we believe that, for low-income customers, policymakers should consider allocating general funds to specific advanced-services programs, such as government subsidies for purchasing broadband.

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RURAL AND UNSERVED REGIONS

Across the United States, there is generally 95%+ "broadband" availability in urban and suburban regions. Cable operators and telephone companies, as well as other entrepreneurial competitive carriers, are providing wired high-speed services that range from about one megabit per second downstream to as much as 50 megabits per second. In addition, wireless carriers offer lower-speed broadband alternatives in more populous regions. Throughput speeds have been improving over time as wireless and wireline infrastructure is upgraded, competition increases, and applications have moved consumers to demand greater capacity. It is anticipated that, in the more economically attractive regions, broadband speeds will continue to increase incrementally over time as the business case warrants.

The new Administration and Congress currently are attempting to accelerate the broadband build-out process—both to expand availability and increase speeds. The thinking is that more attractive financial incentives will drive the construction of higher-speed networks, the development of more Internet applications, and the creation of more affordable services that lead to widespread adoption. Obviously, the current economic crisis has added urgency to the deliberations, and prompted policymakers to

support infrastructure programs that have the potential to stimulate today's weak economy through more job-formation (the Communications Workers of America estimate that 100,000 jobs are created for every $5 billion of new broadband infrastructure investment).

One of the often-cited purposes for including broadband-advancement bills in the overall economic stimulus package is the need for ubiquity ("broadband for all") in the advanced networks of the future. This paper is focused on that specific goal, and highlights a key insight related to policy-sponsored "ubiquity." If pervasive broadband is to be achieved, there is a *fundamentally different approach* that must be taken to stimulate higher-speed broadband growth in high-cost, uneconomic regions compared with the approach that will be needed in economically-viable regions. To stimulate growth in most regions may require relatively minor financial incentives but in many rural high-cost areas there is a profound need to provide relatively greater investment support.

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An investment distinction is also important regarding urban regions where advanced services are under-subscribed. The problems in *underserved* city areas relate not so much to infrastructure costs as to potentially low returns on investment if few subscribers use the available services. The challenge regarding "ubiquity" in those cases is usually due more fundamentally to the lack of computers in homes, inability of some subscribers to pay the going rates, and other social factors, rather than the cost of deploying a broadband-capable network. To spur broadband growth for this underserved portion of the population, demand-side incentives, computer literacy programs, and consumer financial support may be most appropriate.

In rural America, the problem is more complicated. In addition to the demand-side issues faced in urban areas, private companies report that there are further significant financial hurdles in deploying *any* broadband-capable network to customers in the highest-cost areas that account for approximately 10%-15% of their rural voice customers. It is important to recall that financial support mechanisms (USF and access charges paid by other carriers) are required to ensure that significant portions of the rural population receive even *voice* service. Rural broadband networks will also require support beyond deployment, at least in the highest-cost regions, possibly through an updated USF program that better targets funds to high-cost areas.

UNDERSTANDING THE RURAL CHALLENGES

Some observers focus on the lack of broadband availability in rural regions and suggest that the problem relates to high infrastructure investment costs. This answer is correct, but only captures one element of the high costs.

Networks are expensive to build and operate in many rural regions. In sparsely-populated areas, the length of the loop (copper or coax or fiber lines) from the carrier's switch to the customer's premise often contributes to investment costs substantially higher than in regions where the loops are short. Further, the low-density of households results in even higher per-customer investment costs as the number of

homes is frequently less than 10 per square mile. Finally, service across difficult terrains raises a carrier's costs in terms of initial investment and maintenance. The network investment to achieve 1.5 megabits per second broadband services provided over already-installed telephone plant in unserved rural regions is estimated to be $2,000 to $3,000 for each unserved home. The incremental investment is required to upgrade the existing infrastructure by reducing loop lengths and installing broadband-enabling electronics into the network. As compared to deployment at 1.5 megabits per second, a network commitment to increase the downstream speeds to 6 megabits appears to approximately double the per-home investment costs, while increasing downstream speeds to 12 megabits might raise the investment costs per potential subscriber by a factor of four. Making the problem worse, the infrastructure deployment costs for higher bandwidth networks (i.e., FTTH, FTTN, etc.) are not falling dramatically on an annual basis because the majority of the initial investment / construction costs arise from labor, which has not been a declining input.

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This paper, however, highlights another not-widely-recognized challenge, which is that ongoing operating costs can exceed reasonable subscriber rates in rural regions. In some high-cost areas, the problem is that advanced services require expensive higher-capacity transport "pipes" that are not needed for voice services. As a result, even if the network build is funded through low-interest or no-interest loans, it remains possible that the business case may still fall well short due to the combination of high capital costs for deployment and ongoing operating expenses. For these reasons, we believe a grant-based incentive program, possibly aided by other supports, will be most effective and appropriate for stimulating broadband deployment in unserved rural areas. Additionally, policymakers will want to evaluate operating costs that may be so high in these areas that the infrastructure-stimulus program will require supplementary aid to achieve the full benefits of the proposed programs.

POTENTIAL SOLUTIONS IN RURAL AMERICA

The solutions to the challenge of providing broadband service in rural, high-cost regions in America generally involve four determinations.

- A thoughtful rural broadband policy approach involves ***identifying and understanding the real-world financial challenges in the specific "high-cost" regions where infrastructure investment, operating costs, or both make services uneconomic***. At the same time, the current deliberations of policymakers regarding incentives (i.e., grants, tax credits, expensing) or favorable funding (i.e., low-interest bonds) are important and welcomed commitments for stimulating broadband deployment in unserved rural areas.
- ***The costs in uneconomic areas should be approximated*** so policymakers and potential service providers can understand the ranges of support that might be required. Most of the analyses of high-cost rural areas indicate that the avoidance of interest costs, as in a low-interest or no-interest bonds, will not offset the very substantial expense associated with deploying and operating

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rural networks, making this a less productive policy solution for rural broadband investment.

- ***Funding mechanisms must be evaluated.*** Grants, tax-incentives (e.g., investment or other credits), subsidies, low-interest or no-interest bonds, etc., should be assessed thoughtfully and properly matched with the investment requirements and costs of operations.

  In addition to stimulating broadband infrastructure build-outs and supporting customers through reducing extraordinarily high operating carrier costs, policymakers should consider more targeted aid for low-income rural customers in the form of "USF-like" Lifeline and Link-Up programs, where general funds would be allocated to subsidies to individual customers that wish to purchase advanced broadband services. These programs, coupled with other new demand-side programs, would aid low-income families by decreasing monthly fees and any installation charges, and would spur adoption once broadband services are available.

- ***Eligibility should be rationally defined.*** The more refined stimulus mechanisms we describe above—particularly grants to fund uneconomic deployment—should provide a strong incentive for broadband companies to begin to serve higher-cost geographies. We believe that the most efficient approach is to stimulate private-sector investment, as we have written in previous studies. We believe that the stimulus programs make sense in directing and spurring incremental private investment, which achieves public goals and reduces public risk.

In summary, the proposed initiatives to spur deployment of advanced broadband networks / services and to provide an economic stimulus have significant promise for many parts of the United States. We caution, however, that, in high-cost locales, the size of the per-subscriber financial support needed by service providers will almost certainly be higher than in more urban / suburban areas simply because the costs are substantially greater. Broadband deployment grants likely will be needed in unserved rural areas to meet the challenge of very high investment costs. In addition, policymakers should consider supplemental mechanisms to ensure that, in the most costly-to-serve regions, ongoing operating support is also available to broadband service providers.

We are encouraged that the Obama Administration and the Congress are committed to work in concert to advance these initiatives that are important for the economic strength and future of the United States. We are confident that government, working closely with broadband network providers, can craft constructive solutions that both encourage ubiquitous deployment of high-speed communications networks and address the unique challenges we have described above for supporting unserved high-cost rural regions.