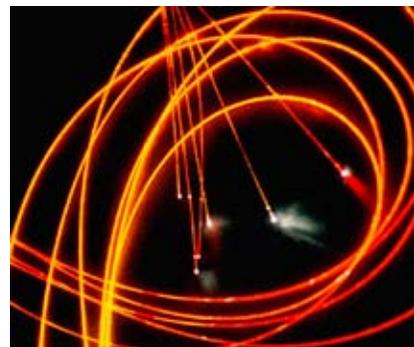
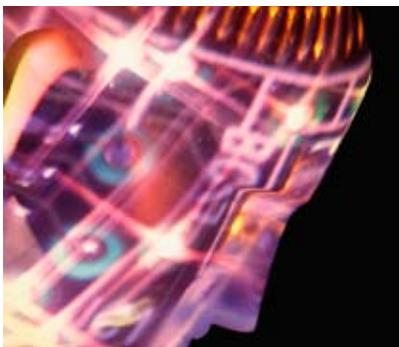
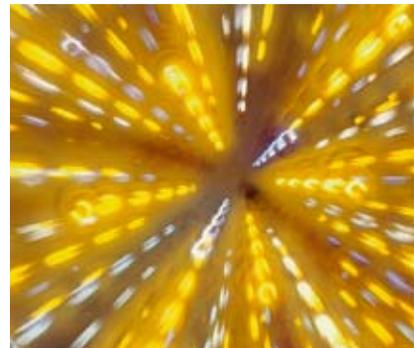
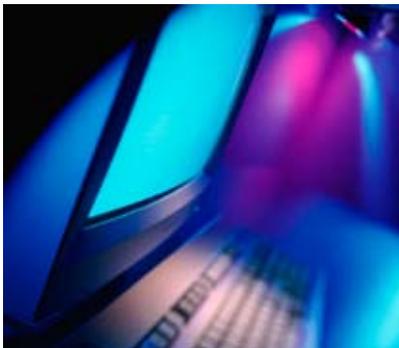




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# INCLUSION, NOT INFRASTRUCTURE: RETHINKING UNIVERSAL-SERVICE POLICY IN A BROADBAND ERA

By Steven Titch



POLICY  
STUDY

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# Inclusion, Not Infrastructure: Rethinking Universal-Service Policy in a Broadband Era

**By Steven Titch**

## **Executive Summary**

The very nature of broadband telecommunications service requires new thinking when it comes to achieving universal service. In terms of closing the digital divide or fostering greater digital inclusion, mechanisms designed to fund or cross-subsidize infrastructure cannot be counted on to work. Unfortunately, just about all current government universal-service policy—from the Federal Universal Service Fund, to U.S. Department of Agriculture (USDA) loans, to local municipal broadband projects, to the \$7.2 billion allocated to broadband expansion in the 2009 economic stimulus bill—centers on funding infrastructure.

The impulse to direct government funds into infrastructure is somewhat understandable. Historically, government initiative was behind the great water and power infrastructure projects undertaken during the Progressive Era. Many see parallels between the need for electricity and running water in the past and the need for broadband today, and are calling for even more federal and state government involvement in the construction and deployment of broadband. The general belief is that broadband, like water, power and one-time narrowband phone service, is a utility.

Broadband, in truth, has little in common with classic utilities. The only real similarity is that the underlying infrastructure is expensive to build. Utilities require high investment up front, which can be amortized over several decades. Broadband requires not only high investment up front but continued high investment thereafter. Technology cycles are short. Entire network platforms change every five to ten years.

Broadband is also competitive across multiple facilities platforms—telephone, cable and wireless—each with relative advantages and disadvantages. Competition in broadband is a critical dimension and is why government funding and subsidy programs carry a much greater risk of failure, or mere ineffectiveness, wasting public capital and resources.

At heart, government subsidies represent capital purposefully redirected into unprofitable enterprises. The rationale for a subsidy comes when the government decides that a necessary

product or service cannot be delivered by free-market mechanisms. It is an intentional diversion of capital to fill a gap between what a service costs to provide and what an average citizen can afford to pay.

In doing so, the government takes, either in the form of a tax or a loan at below-market interest rates, available capital away from investments that, in a totally free market, would yield more productive return in the long term. That's the societal trade off. The loss in productivity and profitability is offset by what is perceived as a larger good—the faster expansion of a product or service deemed essential to the entire population.

Universal narrowband telephone service was achieved this way. In the years since divestiture, narrowband networks have given way to broadband. But broadband deployment in rural areas lags behind urban areas. And in both rural and urban areas, broadband service has higher penetration in high- and middle-income households than in low-income households.

Today's telecom policymaker gets the subsidy message from both sides. Progressives look at these trends and say free-market mechanisms have failed and more government subsidies are required. Rural telephone companies say the only way they can provide affordable broadband is if current universal service and cross-subsidy mechanisms continue.

But other facts challenge this conventional wisdom. While rural penetration lags, it's still increasing. From 2001 to early 2008, according to Pew Internet & American Life Project, rural broadband penetration rose from 5 percent to 38 percent. If we break that down, we see that rural penetration grew from 1 in 20 households to almost 8 in 20. This compares to an overall national penetration of 55 percent, according to Pew. Again, there are more users in cities and suburbs, but there is plenty of real growth in rural areas, too.

Yet despite this growth, a reasonable person might say rural broadband penetration could be better. On-line information, commerce and entertainment have become a significant part of people's lives, and even small suburban towns have interactive Web pages, but 38 percent penetration is too low.

Is penetration low because of market failure, or because of government programs themselves? In fact, when considering the number of government programs that address rural universal service, and the amount of money the government allocates to the problem, the same reasonable person might also ask, why are we still only at 38 percent?

Numerous government programs, run by several cabinet-level agencies, are geared for the funding of telecommunications infrastructure and applications in high-cost areas. The Federal Universal Service Fund (FUSF), which in 2005 paid out \$6.8 billion,<sup>1</sup> may be the best-known. There is also the Department of Agriculture's Rural Broadband program, which lent \$1.22 billion in its first five years of existence, and the USDA's umbrella Rural Utilities Services program, which in 2007 had \$500 million banked for broadband grants and loans.<sup>2</sup>

Then there are programs run by the Departments of Commerce, Health and Human Services, Homeland Security and even some federal-state partnerships. There's no dearth of programs or funding, either in the form of grants or low-interest loans. The real issue, then, is how well they are being administered.

There are conflicts of interest. For example, the FUSF, although nominally under the supervision of the Federal Communications Commission (FCC), is steered by the board of directors of the Universal Service Administration Company (USAC), an insular group of 19 individuals who represent the very organizations that benefit most from FUSF disbursements.

The other major universal-service subsidy mechanism is a labyrinth of arbitrarily set network-access fees that urban and rural phone companies exchange for the completion of calls originating on each other's networks. Since Voice over Internet Protocol (VoIP), now used to route most calling traffic, can mask the originating point of the call, the current network-access scheme has become a playground for arbitrage.

When the annual reports of the major rural telephone companies are examined, the dependency of these companies on universal-service fund (USF) subsidies and network-access fees becomes alarmingly clear. Sprint spinoff Embarq had \$6.3 billion in revenue in 2006. Of that, \$228 million came from state and federal USFs. The company reported net profit that year of \$784 million. Do the math and it turns out 29 percent of its profit came from government USF receipts. At Windstream, the Alltel spinoff, state and federal USFs accounted for \$240 million in revenue. Access-charge payments accounted for an additional \$860 million. Windstream receives \$1.1 billion, more than one-third of its \$3 billion in revenue, from government subsidy programs. And that \$1.1 billion is twice its net profit of \$545 million.

The policy danger is that Embarq, Windstream, CenturyTel and their peers have begun to rely on subsidies to make their business model acceptable to investors. Income from USF and access charges are part of the way rural holding companies market their stock on Wall Street. Are subsidies actually offsetting the cost of providing rural service, or are they simply contributing to shareowner equity? As more funds, especially from institutional investors, flow into these companies, there will be greater resistance to change.

In the meantime, and perhaps in spite of all this, private capital for broadband is flowing into rural areas. Zayo Bandwidth, based in Louisville, Colorado and launched in November 2006, has begun offering high-bandwidth connections to second- and third-tier cities through its acquisition of a series of regional fiber networks. Founders Dan Caruso and John Scarano, veterans of Level 3 Communications, have lined up \$225 million in funding from major venture capital firms, including Battery Ventures, Centennial Ventures, Columbia Capital, M/C Venture Partners and Oak Investment Partners. They are strategically positioning their company to cover areas they believe are not well-served today.

States also are rethinking their approach to broadband by shifting their focus to development of services and applications while reaching out to the private sector for funding and partnerships.

Herein lie the seeds of a new universal-service policy built around the unique nature of broadband to offer various degrees of value to different individuals. While the goal remains to bring inexpensive broadband connectivity to as many people as possible, a more enlightened approach shifts away from large infrastructure projects to making the benefits of broadband relevant to all classes of potential users.

The best way to accomplish this is to promote universal-service policies that:

- Engage all segments of the broadband industry,
- Create climates conducive to investment,
- Reduce or eliminate central infrastructure planning at the federal level, and
- Energize leadership and expertise at the state and local levels.

For example, the USAC board mainly consists of representatives from rural companies, education and state utility agencies. Its governance reflects but one part of what has become a very broad telecommunications industry with diverse segments, all with a stake in universal service and with different ideas as to how the requirement can be met. The USAC board needs representatives from wireless carriers, Internet service providers (ISPs), cable companies, Internet software and applications developers, and venture capital firms that do a predominant amount of investment in telecom-related start-ups. It is imperative that the federal government's largest organization devoted to universal service reflect the diversity of stakeholders in the U.S. telecommunications industry.

From there, FUSF reform could get away from its regime of corporation-to-corporation transfers and examine new concepts that can reduce costs yet address needs more effectively. These include reverse auctions and vouchers.

The industry itself is taking steps to reform the current intercarrier compensation. The Missoula Plan, while flawed, represents an acknowledgement among service providers that the current system can no longer be sustained and a consensus toward a simpler, more transparent system.

The broadband stimulus sets aside funds specifically to measure rural service penetration in a better way. The plan is for a more precise state-by-state study to locate rural areas where broadband is not available, where it is, and where there is more than one provider. This information will replace the broader yet misleading measurements of broadband availability by zip code.

The stimulus rules also update the FCC's ridiculously low broadband specification of 200 kilobits per second (kb/s) to 768 kb/s, although that speed arguably is not much better. It will however, open the door to the use of wireless broadband in many unserved areas. Although it is questionable whether the government needs to spend an additional \$7.2 billion on a broadband stimulus—over and above USF funds—one outcome could be a better definition of “rural” when it comes to broadband policy.

While the federal government can provide a degree of general direction, broadband planning and development may best be driven by focused efforts at the state and local levels. There, it already has been learned that large-scale infrastructure initiatives rarely work and that the key to creating digital inclusiveness is a willingness to work in concert with communities to develop broadband applications that appeal to low-income users who might otherwise believe the Internet offers little value to their lifestyle.

The e-NC Authority and ConnectKentucky, state authorities in North Carolina and Kentucky, are trailblazers in creating broadband-development strategies that leverage the commercial sector, nonprofits, enterprise users, and state and federal funding mechanisms to engineer broadband growth.

Both authorities drilled down to the county level to assess infrastructure requirements. DSL and cable modems are calculated into broadband-service percentages, but not lower-speed wireless. Information about telecommunications infrastructure penetration is tracked through data solicited directly from service providers. The authorities also use geographic information systems to correlate information about socioeconomic status, educational systems and health-care facilities with geographic availability of high-speed Internet access. This information can be used to develop more effective programs and recommendations suited to specific county and community needs. One encouraging fact is that the federal agencies administering the broadband stimulus—the National Telecommunications and Information Agency and the Rural Utilities Service—say they intend to follow the North Carolina and Kentucky models when it comes to measuring rural broadband penetration throughout the country.

Both states saw industry as a partner, not a competitor. Both authorities get money from state and federal sources, but they also were wise enough to understand that there was more to broadband infrastructure than fiber-optic cables. They reached out to companies, enterprises and associations across the industry supply chain.

The problem of universal broadband service will not be solved by redirecting subsidies into greater quantities of infrastructure. The divide also represents the gap between those who appreciate the benefits of broadband and those who don't. That gap can be closed through education, applications development and targeted community programs that provide everything from wireless hot spots to PCs and computer training for low-income people.

Reliance on market mechanisms poses nowhere near the risk to rural consumers that regulators and rural telcos believe. On the contrary, today it's only the transport portion of the network, especially in rural areas, that's regulated and subsidized. Considering what this industry, when left unregulated and driven only by its need to attract willing investors, has accomplished in delivering the benefits of personal technology and networking to a wide range of Americans of all means, it is time to extend the same freedom to the service-provider sector.

# Table of Contents

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The Unintended Consequences of Legacy Subsidy Programs .....	1
A. Broadband Does Not Follow Classic Utility Models.....	2
B. Current Programs .....	3
C. FUSF.....	6
D. The Broadband Stimulus.....	8
E. Intercarrier Network-Access Charges.....	9
Making a Transition .....	13
A. Steps Toward Federal Reform.....	16
B. Defining ‘Rural’ .....	17
C. Reforming the FUSF .....	18
D. Apply Stimulus Funds Wisely .....	21
D. Reform Network-Access Charges.....	23
E. Continue To Develop State And Local Initiatives And Partnerships .....	24
Summary and Conclusions: Toward More Principled Policy.....	25
About the Author.....	27
Related Reason Studies.....	28
Endnotes .....	29

## Part 1

# The Unintended Consequences of Legacy Subsidy Programs

Government subsidies represent capital purposefully redirected into unprofitable enterprises. The rationale for a subsidy comes when the government decides that a necessary product or service cannot be delivered by free-market mechanisms. It is an intentional diversion of capital to fill a gap between what a service costs to provide and what an average citizen can afford to pay.

In doing so, the government takes, either in the form of a tax or a loan at below-market interest rates, available capital away from investments that, in a totally free market, would yield more-productive return in the long term. That's the societal trade-off. The loss in productivity and profitability is offset by what is perceived as a larger good: the faster expansion of a product or service deemed essential to the entire population.

Traditionally in the United States, federal and state governments have been selective about what they choose to subsidize. Roads, electricity, water and narrowband telephone service, because they are infrastructure-intensive *and* have been deemed essential for modern quality of life, have been subsidized as a matter of course, particularly in rural areas, where the cost-per-household can indeed be prohibitively high.

At the same time, the government chooses not to fund many other things that may be considered desirable but not essential. For example, while rural electricity networks are subsidized, the manufacturing of air conditioners, heaters, televisions and major household appliances is not.

Furthermore, although roads, electricity, water and telephone require expansive networks and expensive infrastructure, the scale of a project does not by itself make a case for government assistance. Modern freight-rail networks are essential to the timely movement of goods around the country, yet they are vibrantly competitive and function without government assistance.

## A. Broadband Does Not Follow Classic Utility Models

The risk of unintended consequences is inherent in any subsidy scheme. That is why it is always wiser to evaluate the conditions of a market sector before introducing or expanding a subsidy program. The argument for broadband subsidies equates broadband infrastructure to municipal and rural water, power and narrowband telephone, services that many localities set up during the mid-20<sup>th</sup> century.

Broadband, in truth, is not a utility. The only real similarity between broadband and classic utilities is that the underlying infrastructure is expensive to build. Utilities require high investment up front, low investment thereafter combined with lengthy amortization of infrastructure. Broadband requires not only high investment up front, but continued high investment thereafter (see Table 1).

Unlike with water and power, broadband technology cycles are rapid and require wholesale network upgrades and changeouts. To be sure, water and power systems are repaired and upgraded regularly, but they are not replaced by entirely new technology platforms every five to 10 years. This makes for a more capital-intensive industry. For example, since 1970, the U.S. telecommunications networks have gone through several major technology phases: first, from automatic electronic switching to digital switching, then from digital switching to an early broadband switching technology called asynchronous transfer mode (ATM), then from ATM to packet switching. Each stage required multimillion-dollar investments. At the same time, in the national long-distance network, copper network and microwave radio was replaced with fiber optics. Since the introduction of cellular radio in 1984, networks have gone from analog to digital to broadband. Each time, old network technology had to be replaced.

The telecommunications industry, through its constant investment and development in new technology, has reached the point where it can support a range of broadband delivery mechanisms that possess a number of qualitative differences. This fact alone negates the central argument that broadband is akin to a natural monopoly. This level of facilities-based competition does not exist in any other utility. What's more, different platforms are constantly leapfrogging each other. Cellular service is superior to yesterday's wireline, copper-based dial tone. WiFi data is superior to cellular data, at least today. Tomorrow that might not be true. Then, new technologies like WiMax, might mean more improvement.

Competition, combined with rapid technology cycles, presents problems to any subsidy scheme. A subsidy program usually requires government commitment to endorsing and supporting a single platform for an extended period. (If the platform offered fast return on investment or near-term profitability, subsidies would be unnecessary.) Given the technology cycles in broadband, and the level of intermodal competition, a subsidy policy could easily end up locking consumers into outmoded technology. Once the government begins using its financial clout to encourage or protect the investment choices of one group of companies, any competitive alternative, even one that can be offered to consumers at equal or less cost without subsidies, gets economically straight-armed out of the picture.

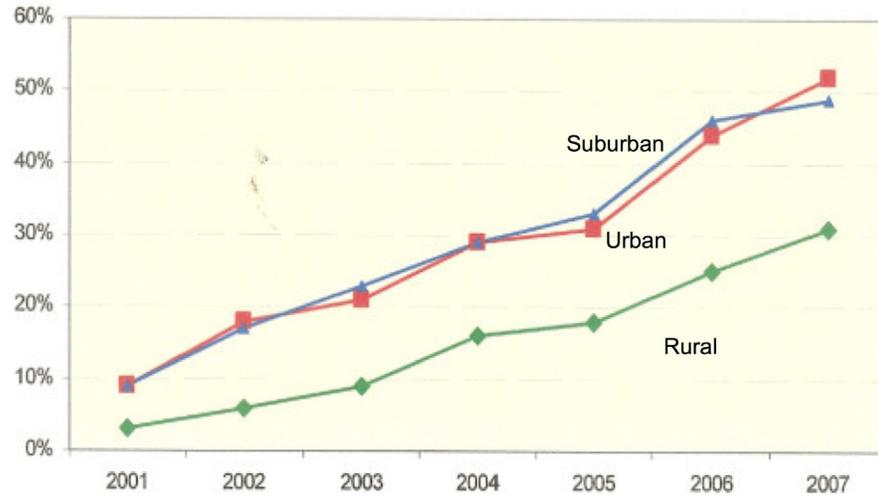
<b>Table 1: Not The Same Beast: Characteristics of Conventional Public Utilities vs. Broadband</b>		
Characteristic	Water, Power and Landline/Dial-Tone	Broadband Services
Upfront Investment	High	High
Ongoing Investment	Low	High
Incremental Cost of Additional Users	Low	High
Marketing Costs	Low	High
Business Model	Stable, predictable from year to year	Unstable, prone to disruption
Value Proposition Necessary For Sustained Market Share	No	Yes
Allows Long-term (>20 years) plant amortization	Yes	No
Predictable Costs and Revenues	Yes	No
Barriers to Competitive Entry	High	Low
Consumer Price Elasticity	Low	High
Speed of Technology Cycles	Slow	Fast
Nature of Competition	Regulated and price-controlled, where permitted	Unregulated, no price controls

The essential question, then, is whether a competitive broadband environment, driven by private investment, can (1) extend to the rural level and (2) deliver affordable services to low-income households, whether rural or inner city. Despite the evolution of the telecom sector as outlined above, in policy circles, the default answer seems to be “no.” Therefore, goes the reasoning, broadband service, in order to be truly universal, must require subsidies.

## **B. Current Programs**

But in the environment that broadband telecommunications has become, subsidies, because they divert capital that can be used more efficiently, may do more harm than good. Let’s go back to the goal: universal service, i.e., a broadband network that reaches every home and business in the country. What is the current situation, and how well are current policies serving that end?

It is true penetration is higher in urban and suburban areas than rural areas. But while rural penetration lags, it’s not declining. It’s not even flatlining. From 2001 to 2007, according to the Pew Internet & American Life Project, rural broadband penetration rose from 5 percent to 38 percent. If we break that down, we see that rural penetration grew from 1 in 20 households to almost 8 in 20. This compares to an overall national penetration of 55 percent, according to Pew. Again, there are more users in cities and suburbs, but plenty of real growth in the rural areas, too.<sup>3</sup>

**Figure 1: Home Broadband Penetration by Community Type, 2001-2007**

Source: Pew Internet and American Life Project

Yet despite this growth, a reasonable person might say rural broadband penetration could be better. On-line information, commerce and entertainment has become a significant part of people's lives and even small suburban towns have interactive Web pages, but 38 percent penetration is too low.

Is penetration low because of market failure, or because of government programs themselves? In fact, when considering the number of government programs that address rural universal service, and the amount of money the government allocates to the problem, the same reasonable person might also ask, why are we still only at 38 percent?

If you listen to the calls of some activists, at least before the stimulus package passed, you'd believe the federal government was doing nothing about the gap between urban and rural penetration. That was not true. As the text box below shows, numerous government programs, run by several cabinet-level agencies, are geared for the funding of telecommunications infrastructure and applications in high-cost areas. The Federal Universal Service Fund (FUSF), which in 2005 paid out \$6.8 billion,<sup>4</sup> may be the best-known. There is also the Department of Agriculture's Rural Broadband program, which lent \$1.22 billion in its first five years of existence, and the USDA's umbrella Rural Utilities Services program, which in 2007 has \$500 million banked for broadband grants and loans.<sup>5</sup>

## **Federal Funding Programs for Rural Telecom and Broadband Infrastructure and Applications**

### Federal Communications Commission

- USF High Cost
- USF Low Income
- USF Schools and Libraries
- USF Rural Health Care

### Department of Agriculture

- Rural Broadband Development Loans and Loan Guarantees
- Rural Broadband Development Community Connect Broadband Grants
- Rural Utilities Service Distance Learning and Telemedicine Program

### Department of Housing and Urban Development

- Community Development Block Grants
- Indian Community Development Block Grants

### Department of Commerce

- Grants for Public Works and Economic Development Facilities
- Public Telecommunications Facilities Program

### Department of Health and Human Services

- Telehealth Network Grants

### Department of Education

- Education Technology Programs

### Department of Homeland Security

- Interoperable Communications Equipment Grants

### Federal-State Partnerships

- Appalachian Regional Commission
- Delta Regional Authority
- Denali Commission

### Other Sources

- Institute of Museum and Library Services
- National Institutes of Health/National Library of Medicine

Source: Congressional Research Service

Then there are programs run by the Departments of Commerce, Health and Human Services, Homeland Security, and even some federal-state partnerships. There's no dearth of programs or funding, either in the form of grants or low-interest loans.

The real issue, then, is how well they are being administered. For example, economist Thomas Hazlett calculated that you could take the \$7 billion FUSF spends in one year and buy a satellite phone for every household without a phone and have plenty left over.<sup>6</sup>

### C. FUSF

The FUSF was created by the Telecommunications Act of 1996 to fund rural telecommunication, low-income users, and service to schools and libraries. It authorizes the levy of a per-line FUSF fee on wireline, wireless and, increasingly, Voice over Internet Protocol (VoIP) phone bills. The FUSF charge is adjusted each quarter based on collection and disbursement formulas.

The FUSF operates under a complicated mechanism of cost-plus subsidies to rural phone companies, much of it geared to the construction and maintenance of narrowband facilities, most of them wireline. But wireline narrowband usage has peaked and is in decline. Hazlett notes that 95 percent of the U.S. population had at least one phone line as of 2004. Of that group, 89 percent used a wireline connection only, the balance were wireless-only users. More recently, The Heartland Institute's *Info Tech & Telecom News* reported on a Mediamark Research survey that found that households with wireline phones dropped to 84.4 percent. The same survey found that wireless-only households had moved ahead of wireline-only households, 14 percent to 12.25 percent.<sup>7</sup> So here we have a \$7-billion program dedicated to expanding a service people find less and less desirable.

Both Hazlett and Vince Vasquez of the San Diego Institute for Policy Research published comprehensive reports in 2006 critiquing the FUSF. While the intention is not to reproduce their findings here, the authors make several important observations that contribute to the inefficiency of the High Cost portion of the FUSF, which goes to rural carriers and makes up 64 percent of total FUSF distributions.<sup>8</sup>

First, the FUSF makes payments based on a "cost-plus" formula: rural phone companies are compensated at 110 percent of the cost of providing service to rural areas. However, the FUSF demands little in terms of accountability to offset the cost side of the ledger, and because the USF payment comes as a percentage of the overall cost, the incentive for the USF recipient is to choose high-cost technologies and high-cost business models to deliver service. After all, 10 percent of \$500,000 is \$50,000; 10 percent of \$1 million is \$100,000.

*The average RLEC [rural local exchange company] corporate overhead expense is almost \$99, or a third more than the non-rural ILEC level. Moreover, over one-third of rural telcos (301 of 892 total) have corporate expenses greater than \$250 per line per year. To put the dollar magnitude into perspective, the average residential telecommunications subscriber spends less than \$250 per year on local access. Thus, more than one-third of the rural telcos*

*eat up as much in corporate overhead expense, per line, as the average household spends for service. And this is prior to accounting for the costs of actually connecting customers to the network. Given the prevalence of extraordinarily high cost operations, there appears to be no mechanism in place to assure a wise use of taxpayer resources or to rein in even the most egregious inefficiencies. These data suggest that HCF subsidies reward high-cost carriers in rural markets.<sup>9</sup>*

Ironically, the cost-plus payment creates a vicious circle for inefficiency of the FUSF fund. Proponents of the status quo say the high cost of rural service demands mechanisms such as the FUSF. But the very mechanisms of the USF keep the cost of rural service high.

Another problem is that FUSF oversight is highly insular. Although the FCC has titular authority over the FUSF, it has delegated management to the Universal Service Administration Company (USAC), a non-profit corporation. And the USAC's 19-member board is made up mostly of "individuals representing groups eager for a piece of the USF pie—education advocates, telecom industry executives, and state regulators."<sup>10</sup> Vasquez is referring to the USAC board as of 2005; little has changed, although the 2009 list shows members from AT&T (which pays more into the USF fund than it gets back in subsidy for its services in rural areas), and the U.S. Internet Industry Association, which could be counted as a party with an interest in promoting 21<sup>st</sup> century networking technology and applications.<sup>11</sup>

Both studies touch on another core question: whether FUSF subsidies are getting development to the rural areas and residents that truly need them.

*The High Cost funding mechanism also deters prudent corporate consolidation and cost-cutting, as it awards the smallest rural telephone companies quadruple the subsidy rate received by larger carriers. Underscoring this figure, the state of California, which is home to nearly twice as many telephone landlines than any other state (22 million) actually received less High Cost funding in 2005 than the island of Puerto Rico, which has one million lines.<sup>12</sup>*

Hazlett points out that a high proportion of universal-service subsidies goes to a relatively small group of rural telephone carriers, that a large fraction of money dispensed to rural phone carriers does not increase affordability for low-income consumers, and that companies receiving subsidies often serve "rural" but high-income communities such as Jackson Hole, Wyoming, where there is no shortage of broadband nor residential means to pay for it.<sup>13</sup>

Hazlett and Vasquez stop short, however, of fully exploring the unevenness of rural broadband development. Most studies, such as the Pew research cited above, take a macro approach. Viewed across all 50 states, rural broadband penetration might be 30 percent. Drill down, as some new state initiatives are doing, and a new picture emerges, one where rural broadband deployment can vary within rural communities that lie within miles of each other. Or where a community in one state may have three or four competitive broadband providers while, in a neighboring state, a community of similar size and population density has no broadband provider at all.

This is because of an FUSF funding formula that relies heavily on statewide cost averaging, which turns the subsidy mechanism into a near-surreal exercise in urban-rural relativity. Part of the FUSF distribution is governed by the average cost of serving customers in the state where the recipient company does business. Texas, which has large swaths of rural areas, also contains Dallas-Fort Worth, Houston and San Antonio, where population densities drive down the average statewide cost of providing service and, therefore, the amount of USF subsidies that companies serving rural Texas can receive. At the same time, the lack of major conurbations in states like Mississippi, Alabama and Louisiana raises the average statewide cost of providing service. The result is that 10 to 15 wireless companies, all supported by FUSF subsidies, compete in small towns in Mississippi, while only one wireless company serves all of west Texas.<sup>14</sup>

In addition to the FUSF, other government programs address broadband, either through loans or grants. The U.S. Department of Agriculture manages the largest of these, the Rural Utilities Service (RUS), of which the Rural Broadband Development program is a part. RUS is a direct descendant of the Rural Electrification Administration, a New Deal-era program set up to provide low-interest government loans to build electric, water and telephone infrastructure.

The Rural Broadband Development program was created by the 2002 farm bill. Compared with the FUSF, the program is relatively small. Since its inception through 2006, it has approved 70 loans totaling \$1.22 billion. The broadband loans serve 1,263 communities with a total of 582,000 household subscribers. Approximately 40 percent of these communities were unserved at the time of the loan approval, and an additional 15 percent had only one provider.<sup>15</sup>

But Rural Utilities Service funds are notoriously difficult to get. According to the program's own report, more than 100 of the nearly 200 applications the agency received were turned down. A number of rural state agencies privately complain they can't get broadband-development funds because the federal process is overly bureaucratic. While taxpayers may be well-served when the government creates a high bar for assistance, it is difficult to tell whether the USDA is rewarding solid business plans or a talent for filling out forms.

#### **D. The Broadband Stimulus**

The 2009 stimulus bill directly allocates \$7.2 billion for broadband expansion. The disposition of these funds was being debated in joint hearings of the Commerce Department's National Telecommunications and Information Administration, and the USDA's RUS in March and April 2009. Further, the stimulus package is likely to inject an additional \$30 billion into U.S. broadband infrastructure through programs designed to boost current Internet speeds, according to a January 2009 research note issued by UBS.<sup>16</sup>

The critical question, then, is, if the federal government is going to kick in \$40 billion, where can the money do the most good? With so much talk of infrastructure, the temptation, both from bureaucrats and even the private sector, is to view the program as an opportunity to spend heavily on network construction, especially fiber-optic lines. But fiber networks are not

roads, bridges or dams. Other than employing workers to dig holes and trenches in the ground for a few months, there is little guarantee that a massive investment in fiber networks by themselves will create enough long-term economic gain to justify their cost to taxpayers.

### E. Intercarrier Network-Access Charges

FUSF and federal loan programs constitute direct subsidies of loans below commercial interest rates. Another regulatory scheme aimed at offsetting the cost of providing universal service governs payments telecommunications companies make to each other for the completion of calls. These network-access charges are set and administered by the FCC. In general, rural telephone companies are permitted to charge large telephone companies a higher rate to terminate inbound calls on their networks. For example, when Clark Kent calls home to Smallville, Kansas, Metropolis Telephone Co. might pay a half-cent a minute to Smallville Telephone Co. to complete the call. But when Ma Kent calls Clark, Smallville Telephone might pay the Metropolis company just one-tenth of a cent per minute for the same service, even though the underlying network costs are the same for both companies. Further complicating matters is that the network-access charges rural phone companies pay each other generally are far lower than fees paid by the major companies for call completion. And these rates may vary all over the map.

Trouble is, the intercarrier network-access charge regime assumes phone calls are still set up and routed through the network by a direct and definable end-to-end circuit, that is, between switches controlled by franchised monopoly landline companies connecting through a single long-distance network. That model, from both business and technology standpoints, began to break down more than 25 years ago and has all but disappeared today. The advent of multiple competing carriers combined with the use of the Internet Protocol (IP) to route long-distance calls, which do not use direct and physically identifiable end-to-end connections, has turned the intercarrier network-access charge regime into a huge playing field for arbitrage (See box, “Phantom Traffic”).

### **Phantom Traffic**

The integrity of the FCC's intercarrier network-access charge regime hinges on a terminating phone company knowing which company to bill. But the Internet Protocol literally scrambles this information.

Long-distance calls were once routed point-to-point through AT&T, MCI (now owned by Verizon), Sprint or another long-distance network. The information regarding the origin of the call and the networks it traveled was conveyed and documented along the switched circuit. Today, more and more calls leave the circuit-switched telephone network and travel as information packets across the Internet. True, while AT&T, Verizon and Sprint own these backbones, the calls no longer travel an identifiable end-to-end circuit. As they move across the Internet as packets, they lose the information identifying their origin.

So when these calls re-enter the circuit-switched network, the terminating carrier has no information as to where they came from and therefore no way to determine a carrier to bill for call completion. Hence the term "phantom traffic."

The final element contributing to the distortion of legacy universal-service policy models is the consolidation trend among rural phone companies. The rural telephone cooperatives and the independent, small-town, mom-and-pop phone companies of the past, built and sustained largely through subsidy mechanisms, are being bought up and consolidated into large holding companies. Although they are barely more than two years old, the two biggest are CenturyLink (created from the merger of Embarq and CenturyTel completed July 1, 2009) and Windstream. Embarq was spun off Sprint; Windstream from Alltel (See box, "From Co-op to Consolidated").

These companies and others face competition for broadband from wireless and cable. What's troubling is the amount of revenue they garner from universal-service subsidies and network-access charges because, sizable as they have become, they are still considered rural service providers. And given changing population trends, the degree to which the areas they serve can be classified as rural is now questionable. Windstream inherited Sugar Land Telephone Co., which once served a community of sugar farms built around a large prison. Today Sugar Land is one of the fastest growing cities in the United States. Consolidated Communications Holdings is the wireline provider in Katy, Texas, which at one time was mostly ranches and farms but today is a growing suburb of Houston and home to one of the largest planned developments in the country, Cinco Ranch. Both Sugar Land and Katy also have competitive broadband providers. Yet the telephone companies that serve them receive subsidies that were originally intended to remedy "market failure."

### **From Co-op to Consolidated: The Big Shift in Rural Ownership**

Prior to its divestiture in the 1970s AT&T owned 22 telephone operating companies (e.g., Illinois Bell, New York Telephone, Southern Bell) serving the top metropolitan areas in the country. This organization itself stemmed from a consolidation of the major markets in the 1920s. Most of the remaining markets were served by smaller, yet sizable, independents such as GTE, Central Telephone Co., United Telephone Co. and Allied Telephone Co. Their holding-company structures mirrored AT&T's, although their decentralized operating companies served mostly rural markets. (Ironically, GTE held properties in Tampa, Florida and Orange County, California, areas dismissed as too small by AT&T in the 1920s that would see population booms during the Sunbelt migration in the second half of the century.) Finally, there was a lower tier of truly small companies and cooperatives, such as Telephone & Data Systems, serving rural Wisconsin; Century Telephone Co., serving rural Louisiana; Consolidated Communications, serving southern Illinois; and Sugar Land Telephone Co., serving parts of southeast Texas.

An initial round of consolidation followed AT&T's divestiture. Verizon acquired GTE. United Telephone became Sprint and later acquired Central Telephone, which by then had shortened its name to Centel. Allied Telephone began buying other smaller companies and changed its name to Alltel. Throughout the 1990s, regional swapping occurred. Verizon traded some of its GTE properties outside its region for Sprint properties within its region. Century Telephone, now CenturyTel, and Consolidated, now Consolidated Communications Holdings, bought other small phone companies in rural areas.

The past two-and-a-half years have seen a second restructuring. Eying greater growth in their wireless operations, Sprint and Alltel have divested their rural landline holdings, spawning Embarq and Windstream, respectively, which though barely more than two years old are the two largest rural telephone holding companies in the country. The latest consolidation occurred when CenturyTel acquired Embarq in an \$11.6 billion stock transaction, creating CenturyLink.

A look through the annual reports of some of these companies offers a veritable picture of corporate welfare. Table 2 shows some of the top telephone holding companies that serve rural areas. Embarq had \$6.3 billion in revenue in 2006. Of that, \$228 million came from state and federal USFs. Embarq did not disclose income from intercarrier access charges. Looking at the profit column, we see Embarq had net earnings of \$784 million. Do the math and it turns out 29 percent of its profit came from government USF receipts. Embarq is not the worst. At Windstream, state and federal USFs accounted for \$240 million in revenue. Access-charge payments accounted for an additional \$860 million. Windstream receives \$1.1 billion, more than one-third of its \$3 billion in revenue, from government subsidy programs. And that \$1.1 billion is twice as much as its net profit of \$545 million. Given these financials, an

investor is apt to ask whether Windstream is in the telecommunications business or the regulatory rent-seeking business.

Table 2: Rural Telephone Holding Companies and Subsidies						
Company	2006 Revenues	Revenue From Fed And State USF	Revenue From Access	Net Income	USF As Percentage Of Profit	Access Lines
Embarq	\$6.3b	\$228m	Not disclosed	\$784m	29%	6.9m
Windstream	\$3b	\$240m <sup>1</sup>	\$860m <sup>2</sup>	\$545m	44%	3.2m
CenturyTel	\$2.4b	\$163.1m	\$879m	\$370m	44%	2.1m
Citizens Communications	\$2b	\$165m	\$263m	\$345m	48%	2.5m
Consolidated Communications Holdings	\$320.8m	\$47.6m	\$68.1m	\$13.3m	358%	233,689
FairPoint Communications	\$270m	\$20m (FUSF only)	\$110m	\$31m	65%	311,150
Iowa Telecommunications Services	\$228.1m	\$3.3m	\$95m	\$14.2m	23%	252,000
Qwest	\$13.9b	\$80m <sup>3</sup>	\$550m	\$593m	14%	13.8m

1 Based on statement that 8 percent of revenue comes from federal and state USFs (p. 18)

2. Based on statements on p. F-12 of 2006 10K

3. FUSF only

Sources: 2006 10K Annual Reports for Respective Companies

The policy danger is that Embarq, Windstream, CenturyTel and their peers have begun to rely on subsidies to make their business model acceptable to investors. Worse, these companies are becoming addicted to these subsidies. Income from USF and access charges are part of the way rural holding companies push their stock on Wall Street. Are subsidies actually offsetting the cost of providing rural service, or are they simply contributing to shareowner equity? As more funds, especially from institutional investors, flow into these companies, there will be greater resistance to change.

However, with the exception of one company in the table, Consolidated Communications Holdings, take away the subsidies and they still will be profitable. Maybe not *as* profitable, but profitable. And then, maybe, they will start looking for ways to organically grow revenue in line with proper market mechanisms.

## Part 2

# Making a Transition

As discussed, broadband differs from the classic utility model because it presents a value proposition to consumers. That's why discussion in policy circles about "closing the digital divide" often ends up at cross-purposes. What do we mean by universal service? Is the goal to place a high-speed connection within reach of every household? Or is it to raise the number of households that buy high-speed Internet services? The first is purely a physical problem. The second is a social problem. The trouble is, policymakers on all sides tend to muddle both together.

There is no doubt that the higher costs of providing infrastructure to rural areas affect penetration in these areas. At the same time, whether in rural or urban settings, higher adoption of broadband services tracks in parallel with higher education and income levels.

Municipal broadband largely failed because, in the end, local governments misperceived it as a solution for low Internet penetration rates among lower-income households. Municipal broadband had its origins in rural communities and was largely about expanding infrastructure. As larger towns and cities became attracted to the idea, municipal broadband morphed into a policy means to increase adoption of service, usually by promising that municipal service could be delivered free or for substantially less than commercial providers charge. All a town supposedly needed was a publicly financed fiber-optic or wireless network and *all* its citizens would immediately be empowered with the tools to be part of the 21<sup>st</sup> century global economy. By the time the idea reached the bigger cities, infrastructure build-out had become a secondary issue. In cities such as Los Angeles, San Francisco, Philadelphia and Houston, multiple broadband networks already were in place. Municipal broadband had become a social program.

Cities that spent millions to build networks, however, soon found out that the addition of infrastructure did not lead to an automatic increase in household penetration. Provo, Utah, for example, runs a fiber-optic line to every residence and business in the city, yet is still well short of its customer and revenue targets. Like many other cities and towns, Provo built it, but few came. Either residents were happy with the services they received from their current phone, cable or satellite provider, or they did not see immediate value in signing up. Pretty much across the board, revenue from municipal systems was far lower than expected. In the

end, it was this reality that forced most of the major cities that announced municipal broadband plans in 2006 to choose not to follow through in 2007.

Lack of infrastructure is a physical problem. It can be solved by research and development, planning, investment and construction, activities that the private sector has always done more efficiently and effectively than government. Low adoption, on the other hand, is a social problem. And that's where there is more room for government action, especially at the state and local levels, ideally working in partnership with nonprofits and private industry. But effective policy depends on lawmakers understanding that while infrastructure is important, by itself it will not lead to increased penetration of broadband services or job growth.

An illustration to this effect is offered by two neighboring towns, Lebanon and Rose Hill, in rural southern Virginia, both of which were wired with high-speed fiber lines using public grants. In Lebanon, two companies moved in, creating 700 new jobs. In Rose Hill, broadband resulted in just a "handful" of new jobs. Furthermore, in Rose Hill, just one in three households signed up for broadband service.<sup>17</sup>

The disparity in broadband uptake between the towns points to complex factors, including relative education levels of the area population. Studies looking to find a causal relationship between broadband development and economic growth, such as a 2005 study by the state of West Virginia, have shown that while broadband and economic development sometimes correlate, a causal relationship is difficult to pin down. Numerous other factors are at work in the economic growth that is observed, such as geographic location, local high-school graduation rates and perceived benefits among area households.<sup>18</sup>

Universal-service policy is better focused on developing applications and communicating their value to individuals and households who do not yet see broadband as a desirable product. The message behind many digital divide programs, however well-intended, is a paternalistic "use broadband because it's good for you." Indeed, from a college-educated, middle-class perspective, it's easy to see the benefits of home broadband. But households of even moderate means, where wage earners might still hold jobs that require traveling to work each day with limited time to use broadband at home, may not be convinced the expense of high-end broadband services is worthwhile. Note that these same individuals might need to be computer- and Internet-literate to do their jobs; they just see little value in having broadband at home.

Rather than attempting to nag households into adopting broadband, some states and cities are trying to create value for different population segments by thinking outside the middle-class-user box. For example, the system in Corpus Christi, Texas, is routinely held up as one of the best implementations of municipal wireless. Indeed, the citywide Wi-Fi network is being used by the city electric and gas utility to read meters, by the police department to find stolen vehicles and by emergency medical services to relay patient information to medical professionals en route to the emergency room.<sup>19</sup>

But for Corpus Christi, creating a municipal network was a secondary goal. Although it initially financed and built the system, it sold the infrastructure to EarthLink in early 2007.

The city instead concentrates on applications and education—not as glamorous as a costly infrastructure, but effective in achieving the goal of greater digital inclusion.

In line with this, the city has established the Corpus Christi Digital Community Development Corporation, a nonprofit group that primarily looks to develop e-government applications that give the WiFi network and Internet connectivity broader appeal across larger portions of the population. While this may include free connectivity and training, it also addresses ways city government agencies can use the Internet to make it easier for, say, single-parent households and infirm or disabled people to do business with the city, from filling out forms online that would otherwise require a trip downtown, to filing theft reports, paying taxes and fees, and performing other transactions.

Services such as these, which require creativity on the part of city government, provide reasons for individuals who might at first see little value in the Internet to go online, said Susan Cable, Corpus Christi's former director of e-government services, who has continued working with the city as a consultant for e.Services. Overall, she added, such services might work better at achieving inclusiveness rather than simply subsidizing network infrastructure.<sup>20</sup>

Although Corpus Christi is a mid-sized city, the same policy logic is applicable to universal-service programs in unserved or underserved rural areas. Some of the more innovative state programs are taking this approach.

The e-NC Authority and ConnectKentucky, state authorities in North Carolina and Kentucky, are trailblazers in terms of creating broadband-development strategies that leverage the commercial sector, nonprofits, enterprise users, and state and federal funding mechanisms to engineer broadband growth.

For both agencies, infrastructure deployment is the means. The end is a state with a computer-literate population familiar with information networking, as well as a modern telecommunications network that can attract knowledge-based, globally oriented businesses that will likely thrive in the 21<sup>st</sup> century economy.

Both states saw industry as a partner, not a competitor. Both authorities get money from state and federal sources, but they also were wise enough to understand that there was more to broadband infrastructure than fiber optics. They reached out to companies, enterprises and associations across the industry supply chain.

The e-NC Authority, which dates from 2000, has received funding from most of the broadband service providers serving the state: BellSouth (since acquired by AT&T), Alltel, Sprint, Verizon, the state's cable providers, its rural electric cooperatives and its rural telephone cooperatives. It has also received support from Cisco Systems, Hewlett-Packard, IBM, Microsoft, DukeNet, Sprint, Capital Broadcasting and Curtiss Media Group.<sup>21</sup> Likewise, ConnectKentucky, which was launched in 2004, has drawn participation from Apple, AT&T, CA (formerly Computer Associates), Humana, Intel and Nortel.<sup>22</sup>

Both authorities drilled down to the county level to assess infrastructure requirements. DSL and cable modems are calculated into broadband-percentages service, but not lower-speed wireless. Information about telecommunications infrastructure penetration is tracked through data solicited directly from service providers. The authorities also use geographic information systems to correlate information about socioeconomic status, educational systems and health-care facilities with geographic availability of high-speed Internet access. This information can be used to develop more effective programs and recommendations suited to specific county and community needs. The authorities then work with local “e-communities” to further match broadband levels to actual applications needs. In this way, e-NC and ConnectKentucky create a climate for commercial broadband deployment by developing applications interest among an unserved rural user base, particularly local government and employers. This immediately aids a private-sector business case by raising the demand for services, yet allows for technology-agnostic approaches. Both states are reporting progress in infrastructure and penetration ahead of general U.S. averages cited by Pew.

*Since Governor Ernie Fletcher launched the Prescription for Innovation in late 2004, the availability and use of broadband across Kentucky has increased 50 percent. Approximately 500,000 previously unserved Kentucky households can now access broadband as private investment in telecommunications infrastructure has reached an unprecedented level. This represents an increase of more than 1.2 million additional Kentucky residents gaining broadband service since January 2004. Currently, more than 90 percent of Kentucky homes can access broadband, and ConnectKentucky expects every household to be capable of accessing high-speed Internet by the end of 2007.<sup>23</sup>*

In North Carolina, 83.5 percent of all households have access to high-speed Internet services, according to e-NC’s 2006 *100 County Report*.<sup>24</sup> Twenty-one counties have less than 70 percent access to high-speed Internet service; four of these counties have less than 50 percent access, but none is below 45 percent.

## A. Steps Toward Federal Reform

It remains to be seen how well state-level universal-service programs that consider applications identification and development over straight infrastructure subsidy can be transposed to the federal level, or whether such attempts are desirable or can produce the results that state agencies can. Washington by definition is that much farther removed from the local scene. Even so, federal policymakers understand that reform is necessary.

In late November 2007, the FCC outlined the first phase of a universal-service reform plan.

*The plan, when turned into new regulations, will also reform to [sic] the way subsidies are paid out to telecommunication providers and put a cap on the rapidly growing USF, which is funded by taxes on consumer’s phone bills.*

*The commission’s Recommended Decision on High-Cost Universal Service Support comes amid mounting pressure from consumer advocates to cap the amount of subsidies paid out of the USF for infrastructure and more effectively use the fund to provide services.*

*The decision, which is a framework for the creation of more specific FCC regulations, adopts a detailed recommendation by the Federal-State Joint Board on Universal Service and recommends the creation of separate funds for broadband and mobility within the high-cost subsidy fund. The FCC is also seeking to place a cap on the high-cost funding provided by the USF at \$4.5 billion—the estimated amount of subsidies the fund will pay out in 2007.*

*The Broadband fund would be limited to \$300 million per year and disbursed to the states to administer. The FCC is exploring ways of reassigning existing funds from other programs within the USF for broadband and is considering a matching-fund requirement from the states that receive the subsidy.<sup>25</sup>*

These steps alone, which have the support of rural phone companies, may stop the annual growth of FUSF collections and distributions. Still, the plan maintains the current regime of infrastructure subsidies to companies and does not take apparent steps to induce economic alternatives.

## **B. Defining ‘Rural’**

As part of the broadband stimulus package, the federal government is reviewing how it defines broadband and measures rural service penetration. To its credit, it is doing away with its ridiculously low broadband specification of 200 kilobits per second (kb/s), replacing it with 768 kb/s. This still is a relatively low connection speed, but it opens the door to broadband wireless platforms, which are now reaching 1.5 Mb/s, twice as fast as 768 kb/s. The stimulus also calls for a far more precise state-by-state study to locate rural areas where broadband is not available, where it is, and if there is more than one provider. This information will replace the broader yet misleading measurements of broadband availability by zip code.

The stimulus study, if it achieves its aims, will help provide a better understanding of “rural” when it comes to broadband policy. As noted earlier, many of the holding companies that have consolidated rural holdings have seen the character of their “rural” franchises change greatly.

As we approach the second decade of the 21<sup>st</sup> century, understanding what regions of the country are indeed rural will be important in formulating universal-service policy. Unfortunately, there are still examples where government is investing in nominally rural programs that actually fund service in areas where there is ample infrastructure and choice.

The Utah Telecommunication Open Infrastructure Agency (UTOPIA), for example, was set up in 2004 as a joint project of 14 member cities to build a statewide fiber-optic backbone. The goal of the network, funded by loans guaranteed by local sales tax revenues from member cities, was to spread high-speed broadband connectivity to areas of Utah that UTOPIA members claimed were not, nor would ever be, served by commercial providers such as Qwest and Comcast.

But at a September 2007 hearing of the Interim Subcommittee on Government Competition and Privatization, consisting of members from the Utah Senate and House of Representatives, UTOPIA officials were questioned on their recent pursuit of bids to build fiber networks in new housing developments in so-called “non-pledging” member cities, often in competition with commercial service providers.<sup>26</sup>

Whether intended or not, UTOPIA became entwined with the current exurban boom that is seeing a spurt of population growth extending out in a radius 25 to 100 miles from urban hubs, particularly in the South and West. Utah by and large is a rural state, but UTOPIA doesn't extend to those parts. Instead, the network runs the length of the Wasatch Valley, from the state's northern border south through Salt Lake City, south to Spanish Fork and Payson. This is where most Utah residents live and where much of the state's future growth is expected to take place. Utah's population growth ranks third in the United States, according to the U.S. Census Bureau.<sup>27</sup>

UTOPIA is not a rural infrastructure program by any stretch of the imagination. A review of service provider marketing information shows that competitive broadband service is available in most cities in Utah's Wasatch Valley. This puts these areas on a par with the broadband choices available in other parts of the country that are being transformed from rural to exurban, including Fort Bend County, Texas (Houston); Clark County, Nevada (Las Vegas); and El Paso County, Colorado (Denver).

### C. Reforming the FUSF

The FCC's examination of the Federal Universal Service Fund will, it is hoped, yield substantial reforms. However problematical the current structure, the FUSF, unfortunately, cannot be overhauled without disrupting the rural local exchange companies, their shareowners and their customers. Nonetheless, a desirable outcome would be a reformed agency more effective and accountable in delivering broadband funding, while at the same time substantially reducing the billions of dollars in surcharges on consumer phone bills.

While the FUSF may never be able to fully move away from the redistributive model, it can change the way it formulates and disburses funds. It must look at methods beyond the company-to-company transfers it uses today and move toward reduced but better-targeted funding of state bureaus, non-profits and companies that demonstrate true high-cost issues.

This cannot be accomplished in a vacuum. Any FUSF overhaul must come in conjunction with a more expansive universal-service policy, preferably built along the lines outlined in this paper, where the government seeks to work in concert with market forces, allowing private investment to take the lead. FUSF reform, therefore, must start at the strategic level.

### *1. Diversify The Board*

The best way to initiate reform would be for the FCC to change the composition of the USAC board of directors to more accurately reflect the diversity and scope of the 21<sup>st</sup> century broadband industry. It may be a cliché, but change comes from within. And as critical as recent reports and observations have been, the FUSF problem is not going to be solved by external forces.

The addition of representatives from AT&T, a net FUSF payer, and the U.S. Internet Industry Association, amount to good first steps. The USAC board, however, is highly insular. Its governance reflects but one part of what has become a very broad telecommunications industry with diverse segments, all with a stake in universal service and with different ideas as to how the requirement can be met.

Board positions for representatives from rural companies, and from education and state utility agencies should remain, but their number should be reduced. Representatives from wireless carriers, ISPs, cable companies, Internet software and applications development, and venture capital firms that do a predominant amount of investment in telecom-related start-ups must be added to the governing board. Companies such as Apple, Cisco, Intel and Microsoft, all of which have an interest in the spread of the knowledge economy, have shown willingness to participate in state-level universal-service initiatives, such as ConnectKentucky. Their presence brings a knowledge and perspective about broadband platforms, costs and applications that organizations steeped for years in narrowband service simply don't have. It is imperative that the federal government's largest organization devoted to universal service reflect the diversity of stakeholders in the U.S. telecommunications industry.

### *2. Phase Out Cost-Plus Allocation*

Cost-plus allocation merely protects recipient companies from the consequences of overspending. In his report, Hazlett concludes that the cost-plus subsidies in the long run do not even save consumers money.

The default policy position regarding all broadband infrastructure should be to encourage competition for private investment to the greatest degree possible. Instead of assuming market failure, the assumption should be that everyone will benefit when there is a would-be seller willing to meet a would-be buyer's terms, even in broadband.

Moreover, there is every sign that private capital is available for rural projects. Zayo Bandwidth, based in Louisville, Colorado and launched in November 2006, has begun offering high-bandwidth connections to second- and third-tier cities through its acquisition of a series of regional fiber networks. Founders Dan Caruso and John Scarano, veterans of Level 3 Communications, have lined up \$225 million in funding from major venture capital firms, including Battery Ventures, Centennial Ventures, Columbia Capital, M/C Venture Partners and Oak Investment Partners. They are strategically positioning their company to cover areas they believe are not well-served today.

According to Telephony Online: “The initial two acquisitions are PPL Telcom, an Allentown, Penn., company that serves the Northeast via a 4600-route-mile fiber network and Memphis Network, a 200-route-mile fiber network serving that metro area. In addition, Zayo has definitive agreements in place to buy Indianapolis, Ind.-based Indiana Fiber Works (IFW) and Minneapolis, Minn.-based Onvoy.”<sup>28</sup> Elsewhere, Bend Broadband is a cable company serving 60,000 homes in areas of rural Oregon, and competes with Qwest and Clearwire to boot.

As of July 2009, Sprint had launched its WiMax network in Chicago and Baltimore, and was readying launch in Atlanta, Las Vegas and Portland, Ore.<sup>29</sup> WiMax, which spreads a high-speed broadband radio network over a large area, is capable of delivering 2- to 4-Mb/s broadband service economically to rural areas. All that’s needed is a policy climate where investors do not have to fear competing against companies and technologies that will receive subsidies from the government.

### *3. Give Budgeting Power to Congress*

While the current FUSF mechanism was created by Congress, the USAC has the authority to create its own disbursement budget. It then sets the USF collection rate in accordance with its pre-determined allocations. As Hazlett and Vasquez have pointed out, it is one of the few federal agencies that can commit funds in advance of their collection. The USAC can (and does) raise and lower the USF collection rate at its discretion. Moreover, the FCC has done a poor job in reviewing USAC’s allocation budgets, amounts or the basis for their decisions.

While it is nominally a government “fee,” the USF charge is, for all intents and purposes, a tax. Legally and constitutionally, it is arguable that Congress should be the governing body to set the USF rate and approve an annual disbursement. That the proceeds are earmarked solely for telecommunications development is immaterial. There are other cases where Congress funds government programs out of special taxes. For example, gasoline taxes fund road building and maintenance. The Department of Transportation oversees spending projects to be sure, but it remains accountable to Congress.

The downside is that there are always risks that Congress might divert USF monies into general revenues, as has been done by some states that maintain USF funds of their own. And there’s no guarantee the tax would go down. Those risks are less compared to the way the USF payouts have grown because of lack of accountability. Legislative oversight at least puts spending decisions in the hands of representatives elected by voters.

### *4. Reverse Auctions*

A more cost-effective alternative to cost-plus allocation is the use of reverse auctions. Reverse auctions also tap the growing competition in broadband technologies and platforms and serve to spark investment in innovative approaches suited particularly to rural challenges. In a reverse auction, the FUSF would provide funding to the service provider who could meet a rural broadband goal at the lowest cost. Fund administrators could still set parameters in terms

of network performance, speed and quality of service, but a more diverse board would ensure the benefits and trade-offs of different platforms are understood.

### *5. Vouchers*

Payments made directly to qualifying consumers allow them to choose the type of broadband service or platform they believe best suits their needs. Like reserve auctions, this approach encourages and stimulates competition and investment but adds an element of consumer empowerment.

### *6. Don't Subsidize Competition*

Competition is desirable and, even in rural areas, stands to be more widespread if market forces are given more leeway. Still, broadband competition is not the policy end, universal service is. Some rural markets will only be able to support one provider. If that provider is meeting local broadband demand cost-effectively, market mechanisms will dissuade alternate investment. It is just as harmful to subsidize alternative companies just for the sake of creating “choice,” as it is to subsidize a high-cost monopoly.

## **D. Apply Stimulus Funds Wisely**

Frustration will only grow if broadband expansion discussions continue to focus on the shape of the solution rather than the precise scope of the problem. Too often, debate devolves into discussing the relative merits of fiber versus wireless, whether market failure means there are no broadband providers—or simply one or two—in a single town, or if stimulus-funded networks should be “neutral.” This debate distracts from what should be an easily measurable goal: how to use government funds wisely to bring broadband connectivity to areas without it.

### *1. Determine Where The Need Is*

In the same way FUSF funds need to be redirected, the trick will be to find places where there actually is no terrestrial broadband (fiber or wireless) and a reasonable likelihood that there will be no commercial construction in the next 12 to 18 months. The federal stimulus allocates \$350 million to determine areas where broadband is needed. Using methods pioneered in Kentucky and North Carolina, there's no reason Washington can't put this cash to good use.

### *2. Address The Differences In Broadband Requirements For Businesses And Consumers*

Fiber advocates often muddle the benefits broadband offers residential consumers with the benefits it offers businesses and institutions. There's no question that fiber delivers critical applications in health care, manufacturing, education and other such sectors. Connections of 100-megabits per second (Mb/s) are necessary for telemedicine, distance learning and data-

center operation, and thus can be extremely valuable to a hospital, school or office park. But does funding fiber to a rural hospital mean funding fiber to every rural home?

One hundred Mb/s is a high-end choice for high-volume residential users. Even most tasks required for home-based businesses or telecommuters—e-mail, document transfer and Web-based teleconferencing—can be accomplished by the 6-to-15-Mb/s connection delivered by most wired broadband systems today.

Stimulus dollars can be applied to the expansion of wireless systems because they stand to offer a far greater return than fiber. Wireless is not second-class broadband. Although not as fast as fiber, wireless broadband, which approaches three Mb/s today, offers the added benefit of mobility. The popularity of iPhones and BlackBerry Smartphones among consumers attests to this. These pocket-size devices integrate phone, e-mail, texting, GPS and Web access. Meanwhile, employers are finding more and more applications that rely on mobile computing. Perhaps, then, the scope of wireless connectivity will be more critical than that of conventional wired Internet.

### *3. Respect The Private Sector*

Stimulus policies that respect the private sector's investment, diversity and expertise will go farther toward achieving ubiquitous broadband than attempts to create competing government broadband operations or to subsidize competition through tax dollars. To date, no government-run municipal broadband operation has made good on its triple promise to offer lower rates, universal connectivity and better quality service than commercial competitors. The stimulus is about delivering broadband, not bailing out municipalities that have shown they can't.

### *4. Don't Get Hung Up On Numbers*

While it makes good press, the United States' place in worldwide broadband rankings does not tell us how broadband is creating value, both for individual users and the general economy. An elderly retiree may not have broadband, but she benefits if she has an up-to-date health-data record that can be accessed by any health-care provider she needs. Likewise, low-income households without broadband still benefit from a local supermarket that uses fiber optics, satellite and radio frequency identification (RFID) networking to manage inventory and keep prices low. Ultimately, the success of a broadband stimulus will be measured by the number of lives improved by the extension of the digital economy. That means looking at jobs created or retained in rural areas. It means watching how grades improve at connected schools. It means tracking the growth of telecommuting and the reduction of congestion. It means measuring how well quality health care is reaching remote areas.

## E. Reform Network-Access Charges

In July 2006, the large incumbent companies and more than 300 rural companies signed off on the Missoula Plan, a sweeping proposal to change the structure of network-access fees. The plan was the product of a two-year effort by the National Association of Regulatory Utility Commissioners (NARUC) to develop a consensus on the intercarrier compensation issue. It specifically aims to address the complexities created by the introduction of IP technology into the network and reduce artificial cost disparities and the arbitrage opportunities they facilitate.

The Missoula Plan attempts to even out pricing for the majority of connections. For the purposes of setting rates, the plan places each phone company in one of three tracks, based on the company's size and regulatory classification.

Track 1 includes the former Bell companies and other non-rural carriers, including competitive local exchange carriers, long-distance companies and wireless companies. It covers 146.2 million local loops.

Track 2 includes most mid-sized rural carriers and covers 12.5 million local loops.

Track 3 includes the smallest, rate-of-return-regulated rural carriers and covers 7.3 million local loops.

Designed to be phased in over four years, the plan reduces the highest rates yet will not require rural carriers to reduce intrastate access charges below their current rates for interstate access charges, which rural carriers maintain are cost-based.<sup>30</sup> At the same time, however, the plan permits telephone companies to introduce a subscriber line charge to replace some access-charge revenue lost in the shift to the new model, as well as the creation of a Restructure Mechanism, essentially an FCC-administered fund.

Little has progressed in the three years since the plan was filed with the FCC. The wireless industry has been cool toward it, and its trade association, CTIA, has criticized the plan as not doing enough to curtail arbitrage.<sup>31</sup>

One other drawback is that it sets up yet another FCC fund for infrastructure subsidization. And because the plan takes in compensation terms for inter- and intrastate connections, it may run into state and federal jurisdictional issues, although regulatory conflicts might be tempered given that NARUC, an organization that represents state public utility commissioners, spearheaded development of the plan.

Finally, the formulas outlined in the 108-page plan are complex, although far less so than the virtually impenetrable matrix of agreements it is designed to replace.

On the plus side, the plan could reduce consumer costs by simplifying the payment system, although there's no guarantee. There is no doubt that the three-tiered system would create more

transparency in the compensation transactions between and among carriers and would be an important and necessary step in the direction of cost-based fees. This would serve to push rural carrier business models away from dependency on regulatory structure. The Missoula Plan would also reduce, but probably not eliminate, arbitrage.

The Missoula Plan must be seen for what it is, a compromise document. The plan does not give free-market advocates everything they might want, but it does acknowledge that the current intercarrier compensation system is untenable in the long term. Given the diverse and often conflicting interests that rural, urban and wireless carriers have, the fact that it has broad industry support speaks well for it.

## **F. Continue To Develop State And Local Initiatives And Partnerships**

The most innovative developments are occurring at the state and local level. As discussed, Kentucky and North Carolina are among those finding success through partnership and cooperation with the private sector.

Although some policy analysts talk about ways to translate programs like ConnectKentucky and e-NC to the national level, the best policy might be to explore ways that federal programs can be used to support more state-level initiatives such as these. The best federal universal-service program might be a *federalist* universal-service program.

For one thing, states are more attuned to their needs. State agencies have more up-to-date information on areas where broadband deployment is either marginal or non-existent. State agencies are also aware of immediate priorities, such as when a large manufacturer is assessing an area of the state for factory development. Thus, they are in a position to marshal and direct resources to address projects that will yield an immediate payoff for residents, employers and industry partners.

## Part 3

## Summary and Conclusions: Toward More Principled Policy

The digital divide is not a failure of the market. Broadband universal service cannot be guaranteed by pervasive infrastructure. Government subsidy programs, in fact, might be doing more to hold back infrastructure development than to encourage it. The market already has demonstrated that private capital exists for infrastructure development. Enlightened policy seeks to create a climate where investment is welcome. That is best accomplished by avoiding attempts at government-funded, centralized infrastructure planning, and by engaging all segments of the broadband industry and energizing leadership at the state and local levels.

The digital divide represents the gap between those who appreciate the benefits of broadband and those who don't. That gap can be closed through education, applications development and targeted community programs that provide everything from wireless hot spots to PCs and computer training.

Reliance on market mechanisms poses nowhere near the risk to rural consumers that regulators and rural telcos believe. On the contrary, market mechanisms have done well in sparking investment and innovation. As Hazlett writes, today it's only the transport portion of the network, especially in rural areas, that's regulated and subsidized.

*The obsolescence of traditional phone service is becoming apparent in rural areas, where wireless technologies—including terrestrial and satellite, fixed and mobile—are displacing wireline systems. With lower costs in low density markets, greater utility for users who prefer untethered phones, and national calling plans that price long distance minutes cheaply, this is a consumer pleasing, economy enhancing transition. However, the current Universal Service system resists this tide of efficiency, levying taxes on productive networks to reward those threatened with obsolescence.<sup>32</sup>*

All other segments of the IT, telecom and Internet industry are unregulated and unsubsidized. In each one you find the leader is a U.S. company—software: Microsoft; search engines: Google, IP infrastructure: Cisco; e-commerce: eBay, Web-based media: Apple, PCs: Dell, Internet servers: HP, Sun, Akamai and IBM. Considering what this industry, when left unregulated and driven only by its need to attract willing investors, has accomplished, isn't it time to extend the same freedom to the service-provider sector?

Remember, subsidies are the intentional redirection of capital into inefficient business models. Telecom subsidies, in particular, are based on the outmoded idea that service and infrastructure are inseparable. Policymakers should think about it, especially in telecommunications, where the pace of technological change makes every business model prone to disruption. One must ask if, three to five years down the line, the market stands to deliver much greater value from the investor dollars regulators leave in people's hands versus what a government program can deliver from the tax dollars it takes.

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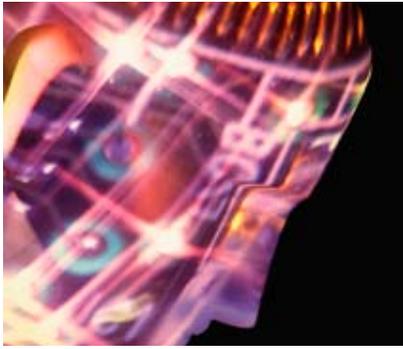
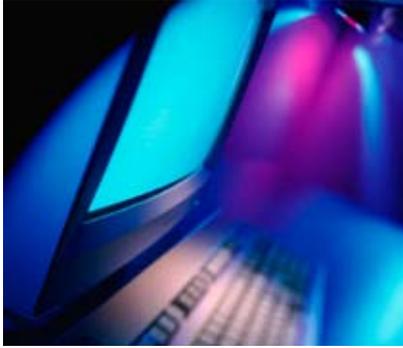
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