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# Encouraging Broadband Deployment from the Bottom Up

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## Recommendation

State governments that have elected to make investments to increase the availability of affordable broadband service in rural areas and low income urban neighborhoods should organize their efforts around a strategy that encourages and leverages locally-driven initiatives, rather than follow a top-down approach that seeks to identify and close all broadband service gaps in a comprehensive fashion. A bottom-up approach to state broadband policy has three major advantages. First, it is a conservative policy response in an economic arena in which the appropriate role of the public sector is highly contested and in which private sector deployment is proceeding rapidly, even as gaps in service in rural and poorer communities remain. Second, it acknowledges the extraordinary practical difficulty of identifying and addressing all broadband infrastructure and service gaps at any point in time, given data limitations and the rapid pace at which technologies, services and the telecommunications industry itself are evolving. Third, it facilitates the design of solutions that are unique to the local conditions in places where gaps exist and where local commitment to policy action is clearly demonstrated.

## Broadband as a State Policy Issue

Today a growing number of states are debating whether to develop programs or enact legislation designed to encourage faster deployment of broadband infrastructure to rural areas and lower income urban neighborhoods (Brennan Center 2006). With the Internet becoming the means of delivery of an ever broader array of information products and services in education, health, entertainment and government, the need for faster broadband is increasing. Broadband, a

term often used to refer to high-speed, always-on connectivity to the Internet, may be defined generally as a transmission channel of sufficient capacity to effectively deliver advanced information services. Although the Federal Communications Commission (FCC) defines "high speed" broadband as facilitating the transfer of data at a rate of 200 kilobits per second in either the downstream (provider to customer) or upstream (customer to provider) direction, a growing slate of applications require the size of the information "pipe" to be much larger than 200 kbps to function optimally. Some technology specialists argue that true broadband is between 30 and 100 megabits per second (Mbps). The most common current forms of consumer broadband provisioning in the U.S. – digital subscriber line (DSL) and cable – typically offer speeds of between 1.0 and 6.0 Mbps (Gillett and Lehr 1999).

Debates around broadband deployment as a sub-national policy issue generally center on two related questions. The first is whether broadband is an increasingly critical infrastructure for economic development at the state and local levels. While careful empirical studies of the link between broadband and local and/or rural development are few, a recent study commissioned by the U.S. Economic Development Administration finds higher rates of economic growth in zip codes served by broadband, versus a matched sample of zip codes unserved by broadband (Gillett et al, 2006). Other studies have focused on the substantial economic impact of broadband (Crandall and Jackson 2001), potential U.S. productivity losses from a failure to improve broadband networks and performance (Ferguson 2002), and case studies of positive impacts from deployment efforts in specific communities (e.g., DTI 2003). Such evidence, together with the fact that a number of countries in Europe and Asia have implemented significant broadband deployment strategies in recent years, has convinced

some state leaders that U.S. telecommunications policy is too passive and that state governments should step in to ensure their own infrastructures are globally competitive (Bleha 2005). May 2005 statistics compiled by the International Telecommunications Union (ITU) show the U.S. ranking 16<sup>th</sup> in broadband subscribers per 100 inhabitants (often referred to as “broadband penetration”). Leading the U.S. are countries such as South Korea (1<sup>st</sup>), the Netherlands (3<sup>rd</sup>), Canada (5<sup>th</sup>) and Japan (13<sup>th</sup>). Of more concern to observers is the precipitous decline of the U.S. ranking. The U.S. ranked fourth in ITU’s survey in 2001.

The second subnational policy question is whether states should take action to ensure that all citizens and geographic areas have the opportunity to purchase some type of broadband service, preferably at an affordable rate. The existence and potential consequences of differing rates of utilization of computer and Internet technology among different population segments—rich and poor, rural and urban—were publicized widely in a series of reports prepared by the National Telecommunications and Information Administration during the 1990s (NTIA 1995; 1998; 1999; 2000). The reports, titled *Falling through the Net*, tracked the information disadvantaged—“those who are not connected to the National Information Infrastructure”—finding that they are disproportionately located in rural areas and poorer central cities. The series fed concerns that a “digital divide” is emerging in the United States, such that those who cannot access, afford or properly use computing and Internet technologies will be left behind as the knowledge- and information-intensity of the economy increases. Another study finds that rural small businesses subscribe to broadband at lower rates than their urban counterparts, and that rural businesses typically face higher prices for service (Pociask 2005).

## Do Something or Do Nothing?

When state officials take up the broadband policy question, they quickly find that the environment in which they might design and implement any response is characterized by extraordinary debate, complexity and flux, including:

- The absence of a consensus of the appropriate role of government in broadband provisioning, with proponents of government action citing public goods and imperfect competition rationales and opponents pointing to high rates of private sector deployment as evidence the market should be left alone;
- Rapid, ongoing changes in broadband technologies and related standards, such as the emergence of

various wireless protocols/systems and continuing development of satellite, broadband over power line, and fiber to the curb/premise solutions;

- Shifting definitions of broadband as bandwidth demands evolve, and widespread disagreement among experts about what speeds to target;
- The absence of a single optimal technological approach appropriate for all provider situations and geographic cases;
- Broadband provisioning business models whose viability is not generic, but is rather dependent on specific local or regional conditions;
- Multiple potential provider types to address specific broadband needs, including traditional telephone companies, cable companies, for-profit and non-profit wireless providers, municipalities, electricity companies and cooperatives, and existing state-owned networks;
- Diverse sources of potential federal funding to accelerate deployment, including programs operated by the Small Business Administration, U.S. Dept. of Agriculture, and U.S. Dept. of Commerce;
- Continuing strong rates of market-driven deployment in many areas;
- A continuously evolving federal regulatory environment and very little state control over the thorniest regulatory issues governing competition in the broadband marketplace.

In this environment, it is no surprise that some states have opted to take a wait-and-see attitude with respect to broadband deployment. They are encouraged in that approach by telephone companies, cable companies, and other private sector interests that are wary of any government involvement that might result in additional competition in the markets they serve. Moreover, surveys show that broadband penetration is increasing fairly rapidly in the U.S. and differences in availability in take-up rates by race, income and location are narrowing (Horrihan et al., 2003; Bell et al., 2004). If the complexity of the problem is high—implying that government’s effectiveness is likely to be low—and market forces are moving in the right direction, why do anything at all? It is possible there is no significant role for state government to play.

Advocates of public sector action cite several reasons why some government intervention is justified. First, despite overall upward trends in broadband penetration, there is ample evidence that some areas—particularly geographically remote ones and low income urban communities—are unserved and probably will remain so for some time given the absence of sufficient current demand to motivate purely private sector investment (Pociask 2005). To the degree that

states place value on broadband access for all citizens, targeted efforts to remove persistent gaps is both justified and necessary. Market forces alone are not likely to close such gaps, a clear market failure if access to information is regarded as a merit good. Second, while at least low-end (e.g., DSL, cable) broadband is becoming more ubiquitous, affordability is still a problem. Competition is limited in many rural areas and consequently prices remain high (Brennan Center 2006). In many places, the local telecommunications market is very clearly not a competitive one. Third, as broadband infrastructure improves, demand-side challenges in rural and low-income areas persist, namely the need to provide adequate training for users, to encourage the development of products and applications tailored for the specific needs of rural or disadvantaged populations, and to address the absence of terminal equipment (home and school computers to connect to the Internet). Here again, the policy rationale rests on a public goods case for access to digital information and technologies.

It is not clear that the highly contested broadband policy debate can be settled definitively, given legitimate arguments on both sides. In that context, what advice might be offered those states that have already sought to intervene in the broadband provisioning market to improve deployment in underserved rural and urban communities?

What states *should not do*, given the challenging broadband technology, market and regulatory environment described above, is attempt a large-scale strategy that seeks to address all broadband concerns in a comprehensive fashion. On the one hand, it has proven very difficult for states to get an accurate picture of where infrastructure gaps exist, given poor data and unwillingness of providers to supply information on their facilities and networks. On the other hand, appropriate solutions are often so locally-specific and dependent on the cooperative efforts of local private and public sector players, that state efforts to push solutions from the top down are too likely to fail. Instead, states that are seeking to boost broadband deployment and utilization should adopt a policy framework that explicitly encourages innovative *locally-based* solutions to broadband provisioning. A bottom-up approach sees state government as a catalyst, facilitator, and occasionally co-investor to local initiatives. And, while it is difficult to make a blanket case for or against government intervention in broadband deployment as a general matter, it is much easier to make competent policy decisions when specific initiatives in specific places are in play.

## Finding Gaps and Targeting Solutions

A bottom-up strategy is not necessarily an easy strategy. It means undertaking multiple simultaneous activities, including provision of consumer and business information, technical support for local planning and deployment, brokering of local partnerships, ongoing study and development of policy to reduce obstacles to local deployment, and monitoring of deployment and utilization trends. To do those things well, states need the administrative capability to maintain maximum flexibility in the delivery of support. Flexible bottom-up approaches are often harder to implement than top-down grants and spending programs constrained by arbitrary parameters (technology type, eligibility of provider type, eligibility of area, grant size, etc.).

The state role as catalyst is probably most effectively coordinated by a single small but flexible organization that has the expertise, resources and authority to maintain sustained leadership on broadband and digital divide issues. While such an organization must serve as an information clearinghouse, technical resource, and policy advisor, it would not act as a major program administrator, since deployment initiatives would be driven by agencies and organizations at the local level. The state organization would provide a “one stop shop” to assist service providers, consumers, and local governments undertaking broadband initiatives; help facilitate leveraging of federal, corporate and foundation funding sources; maintain a catalog of best practices; provide training as necessary to help build local capacity to address broadband needs; and ensure that broadband issues receive sustained state-level policy attention.

One might argue that states should first document all infrastructure needs, evaluate the costs and benefits of closing various gaps, and direct investments accordingly. The problem with that rational-comprehensive approach is that the creation of an up-to-date map or catalog of a state’s information technology infrastructure is extraordinarily difficult, both because providers are loath to release information on their networks and because the infrastructure is evolving rapidly; maps are out-of-date shortly after they are created. The rational-comprehensive approach also implies that the state could successfully direct the closure of gaps even when no local initiatives are driving the intervention. By letting local efforts push solutions, the state can leverage the efforts it believes will be most successful, conducting due diligence accordingly, while also building a catalog of infrastructure gaps and needs. The organization can also maintain a degree of neutrality toward technologies- and provider-types.

While private sector provisioning is preferred as a default, public (e.g., municipal) and public-private provisioning options can be encouraged where needs dictate and local citizen and business interest is present. When local projects and needs dictate solutions, state programs are less likely to inadvertently encourage a particular technology or provisioning model as a "magic bullet."

The bottom-up strategy is being implemented successfully in some states. The leader is probably North Carolina, which describes its broadband policy explicitly as a "grassroots" effort with a state-designated "e-champion" organization acting as a catalyst and resource for locally driven initiatives (E-NC 2003). North Carolina's broadband authority is a lean organization, operating with a permanent staff of six people and an annual operating budget of \$1.8 million. It reports leveraging over \$206 million in federal, community and business support for local projects between its founding in 2000 and the end of 2005 (E-NC 2005). While North Carolina has developed perhaps the most complete infrastructure mapping system to aid its decision making, many of its efforts could have been implemented without a detailed statewide infrastructure catalog. Kentucky has also established an initiative designed to encourage decentralized solutions, patterned closely after the North Carolina model, though Kentucky's is more limited in its scope.

## Summary

Whether and how states should encourage the deployment and utilization of broadband technology are challenging questions. Given the complexity of the technological, regulatory and market environment in which broadband is developing, states should avoid attempts to design and implement high cost, top-down, comprehensive strategies aimed at closing all infrastructure gaps. Instead, they should look to design and implement flexible programs to incentivize and assist locally-driven efforts to improve provisioning and encourage demand. While that will require building a capability to truly catalyze local efforts, preferably housed in a single small organization or authority with the necessary expertise, it need not require massive expansion in government programs or the creation of a large bureaucracy.

## References

- Bell, Peter, Pavani Reddy and Lee Rainie. 2004. *Rural Areas and the Internet*. Washington, DC: Pew Internet and American Life Project.
- Bleha, Thomas. 2005. Down to the wire. *Foreign Affairs*, 84: 111-24.
- Center, Brennan. 2006. The Need to Permit Broadband from Public Entities. New York, Brennan Center for Justice, NYU School of Law: 63.
- Crandall, R and C Jackson. 2001. *The \$500 Billion Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access*. Washington, DC: Criterion Economics.
- DTI. 2003. Economic Impact Study of the South Dundas Township Fibre Network. London, UK, Department of Trade and Industry.
- E-NC. 2003. *2003 Annual Report*. Raleigh, NC: E-NC Authority.
- E-NC. 2005. *E-NC Background Brief*. Raleigh, NC: E-NC Authority.
- Ferguson, C. 2002. *The United States Broadband Problem: Analysis and Recommendations*. Washington, DC: Brookings Institution.
- Gillett, Sharon E, William H Lehr and Carlos A Osorio. 2006. *Measuring the Economic Impact of Broadband Deployment*. Washington, DC: U.S. Economic Development Administration.
- Gillett, Sharon Eisner and William Lehr. 1999. Availability of Broadband Internet Access: Empirical Evidence. Boston, MA, MIT Internet & Telecoms Convergence Consortium.
- Horrigan, John, Lee Rainie, Katherine Allen, Angie Boyce, Mary Madden and Erin O'Grady. 2003. *The Ever-Shifting Internet Population: A New Look at Internet Access and the Digital Divide*. Washington, DC: Pew Internet and American Life Project.
- NTIA. 1995. *Falling Through the Net: A Survey of the "Have Nots" in Rural and Urban America*. Washington, DC: National Telecommunications and Information Administration, U.S. Department of Commerce.
- NTIA. 1998. *Falling Through the Net II: New Data on the Digital Divide*. Washington, DC: National Telecommunications and Information Administration, U.S. Department of Commerce.
- NTIA. 1999. *Falling Through the Net: Defining the Digital Divide*. Washington, DC: National Telecommunications and Information Administration, U.S. Department of Commerce.
- NTIA. 2000. *Falling Through The Net: Toward Digital Inclusion*. Washington, DC: National Telecommunications and Information Administration, U.S. Department of Commerce.
- Pociask, Stephen B. 2005. *Broadband Use by Rural Small Businesses*. Washington, DC: Small Business Administration.