

Facilitating Broadband in Hard-to-Serve Areas

Executive Order: Accelerating Broadband Infrastructure Deployment

On June 14, 2012, President Obama signed an Executive Order to facilitate the deployment of broadband technology on Federal lands, buildings, rights of way, federally-assisted highways and tribal lands, particularly in underserved areas. The Order required the USDOT-FHWA to work with state and local governments on implementing best practices related to accommodating broadband in highway and roadway rights-of-way (ROW).

What is *Broadband*?

Broadband refers to the information-carrying capacity of a computer network or other telecommunication system, relative to its bandwidth. The wider (or broader) the bandwidth of a channel (path through which signals flow), the greater the amount of information can be transmitted. Broadband is also used to describe Internet speed. The Federal Communications Commission (FCC) defines it as Internet service providing a minimum of 200 kilobits per second.

Wire line vs. Wireless Service

There are different ways to provide the bandwidth required to deliver broadband. Two major project types are wire line and wireless services.

Broadband Defined

The speed and/or capacity of a computer network or other telecommunication system to transmit information, relative to its bandwidth.

Wire line projects involve the construction of a physical network that provides services through a direct “wired” connection, in most cases using fiber optic cable. When in the highway ROW, the cable is either installed above ground, attached to poles, or run through a tube, called conduit and plowed into the ground.



Wireless projects use radio or microwave frequencies to provide a connection between the customer and the operator’s network, such as mobile phone connectivity. Security and service reliability issues caused by interference are drawbacks of wireless services, but they are often preferred over wire line installations in rural areas or in areas with difficult terrain because they are easier and less costly

to install. Tower installations most often occur outside of the highway ROW for safety reasons.

Application to Transportation

Many features of today’s Intelligent Transportation System (ITS) depend on a broadband connection. Traffic signals, which were once connected to an operations center through standard phone lines, now rely on broadband. Other examples include video cameras, variable message signs, and computer applications used to provide traveler information, track freight and assist in vehicle routing.

In this day and age, broadband is also needed to accommodate large amounts of data being transmitted through Global Positioning System (GPS) and sensors used to monitor infrastructure condition, system performance and support technologies related to highway automation.



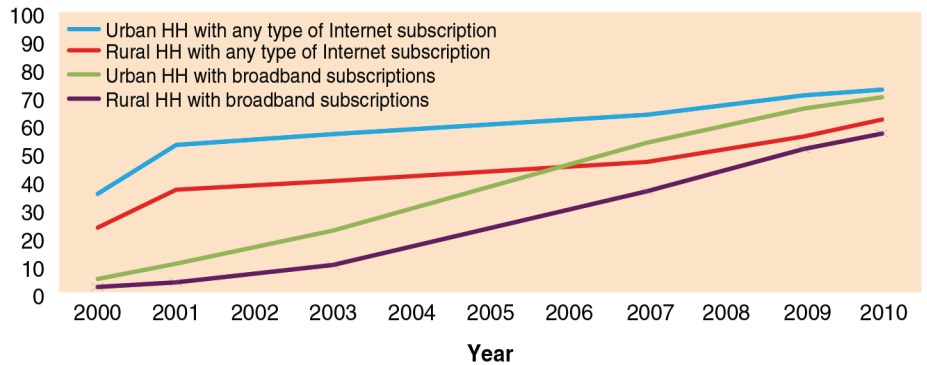
In addition to supporting ITS initiatives, connectivity along the Nation’s roadways is an essential part of developing local and regional economies in proximity to the road system. High-speed Internet service offers businesses and institutions the capabilities they need to expand their services and provides households with virtual access to education and training.

AN OVERVIEW OF BROADBAND ACCESS

Since the early 1990s, subscriptions to the Internet have more than doubled, however, not everyone who has the Internet has broadband. The graph on the right shows households with Internet subscriptions from 2000-2010, that include both dial-up and broadband. As shown, a higher percentage of urban households have an Internet subscription as well as broadband; however, the gap between all households that have Internet as well as broadband is diminishing.

Household Internet subscribers, 2000-10

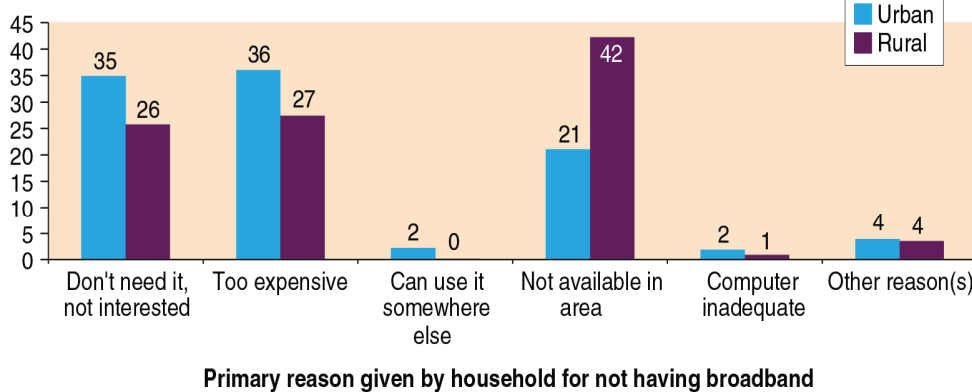
Percent of all households



Note: HH means households. As used here, urban and rural areas are synonymous with the Office of Management and Budget's definitions of metropolitan and nonmetropolitan areas, respectively.
Source: USDA, Economic Research Service calculations based on U.S. Census Bureau Current Population Survey data.

Primary reasons given by online households for not having broadband, 2010

Percent of non-broadband households



The chart on the left shows primary reasons for not having broadband among urban and rural households with Internet subscriptions. As shown, not having access to broadband technology for households that already have the Internet is primarily a rural issue.

Note: As used here, urban and rural areas are synonymous with the Office of Management and Budget's definitions of metropolitan and nonmetropolitan areas, respectively.
Source: USDA, Economic Research Service calculations based on U.S. Census Bureau Current Population Survey data.

Access to broadband is essential to the Nation's global competitiveness in the 21st century. The United States has made great strides in past decade to increase access to broadband services as the result of initiatives from both the public and private sectors. According to the US Telecom Association, more than 95 percent of the U.S. population has access to robust and diverse wired broadband infrastructure, including fiber to the home, cable and DSL, capable of supporting average download speeds (4Mbps).—GN Docket No., 12-228, iii, September 20, 2012

Although there has been much progress in the expansion of broadband, there are still areas of the country that remain underserved. A recent survey from the Pew Internet and American Life Project stated that only sixty two percent of rural adults have access to broadband in their home.—*Spring Tracking Survey*, April 17—May 19, 2013. In addition to access issues, barriers to broadband adoption include households that can not afford an Internet connection, or are headed by older adults who adopt new technologies at a slower rate than younger generations.

In most cases, drawing telecoms to hard-to-serve areas is difficult because of the lack of a market for services and resources needed to build infrastructure that supports broadband. States and local areas that have been successful in bringing broadband to these areas have engaged in substantial partnering, and have set aside funds to expand broadband or have received Federal grants.

What are States doing to expand broadband into hard-to-serve areas?

Within the past decade, there have been many efforts made across the country to expand broadband. An important step in expanding any system is establishing a *backbone*. The backbone is a central conduit which connects every main server and device on the network. It is designed to carry the heaviest data traffic at high speeds over long distances.

Locating the regional backbone in Interstate ROW has been viewed favorably by States that have goals for expanding broadband. Interstate roadways are often in proximity to or connect with major hubs of activity that can provide connectivity for rural fiber architectures. Connecting to major hubs of activity can also increase the value of the network by attracting customers. In Maryland, the SHA installed backbone infrastructure in ROW of Interstate I-70, I-270 and then worked with additional State and Federal funding to expand the network.

Maryland State Highway Administration (MSHA)

In 2007, Maryland introduced rural broadband legislation. Within the same year the MSHA entered into an agreement with the Maryland Broadband Cooperative (MDBC), a private entity made up of 73 members from local businesses and agencies, to install rural broadband fiber. In 2010, a \$115 million (Federal) Broadband Technology Opportunities Program (BTOP) grant was awarded to Maryland's Dept. of Information and Technology, which has been used to expand build-out initiatives in rural areas of Maryland. In place today, a broadband network stretches across the state of Maryland, including 1,100 miles of fiber and 140 towers that are shared with the police, emergency management and the Department of Natural Resources.

Resource Sharing

Resource sharing is an agreement between a State DOT and a telecommunications service provider that involves an exchange of fiber optic services for the use of ROW or existing infrastructure. The services in exchange provide State DOTs with connections for operations facilities, cameras and message signs along the roadway.

The Utah Department of Transportation (UDOT) installs empty conduit during highway construction, and then leverages this infrastructure by trading it for fiber that is used to connect state-operated ITS facilities, cameras and weather stations. The State found that if it installs small sections of conduit along roadways in hard-to-serve areas, telecoms have cooperated in helping to extend the infrastructure and provide services to rural communities. By using this approach, Utah has been able to provide regions throughout the State with a connection.

In addition, UDOT meets regularly with telecommunication companies to coordinate road projects with telecommunication projects. The agency also helps communities understand how to attract telecoms by working with them to learn how to install their own conduit.

Utah DOT

Background: *The Utah DOT (UDOT) has been successful in facilitating the expansion of broadband infrastructure in remote areas of the State. For the past five years, UDOT has facilitated cooperative fiber and conduit trades with broadband service providers to expand its communications network across the state without major capital investment. UDOT's approach to deploying broadband has also advanced ITS initiatives in the state, as well as promoted economic growth by enabling access to broadband in both urban and rural areas.*

Incentives for Attracting Telecoms (Utah DOT)

—“If you build it, they will come.”

—Help communities understand how to attract fiber telecom providers.

Facilitating Broadband in Hard-to-Serve Areas

Making Access to ROW Easier

Some states have passed laws that allow for the installation of telecommunication facilities on Interstate ROW, which do not apply to other utilities. These states have recognized that telecommunication facilities may be provided without compromising interstate system safety, maintenance and operations and can contribute to the deployment and efficient operation of intelligent transportation systems. In addition, some states have policies that make access to ROW easier for telecoms, such allowing the ROW to be open at all times (not just during advertised periods), which gives companies easy access to complete continuous build outs and ensures that no single company has exclusive access.

Reducing Deployment Time

A coordinated and consistent sharing of information on policies and practices between public and private entities is essential to developing good working relationships with service providers and helps to facilitate the deployment process. In addition, the availability of online mapping tools that provide detailed information to the general public on state routes and conduit locations, and the ability of agencies to process contracts and payments electronically help to bring efficiencies to the deployment process.

What can States do to advance broadband?

- States may consider updating Utility Accommodation Policies (or in some cases, the development of such policies) to include accommodation of broadband utilities.
- State DOTs may consider practices that can further broadband deployment initiatives in hard-to-serve areas, such as resource sharing.
- State DOTs may consider practices that minimize repeated excavation of the roadway, such as coordinating with broadband utilities during highway construction and integrating trenchless technologies into construction practices, as appropriate.

Over the past year, the FHWA Working Group on Broadband has reached out to States and local agencies with a series of workshops and webinars to gain stakeholder input and better insight on how to best facilitate the deployment of broadband in hard-to-serve areas. The following is a list of considerations for States that was developed as a result of that process.

State Considerations for Accommodating Broadband

1. Develop a statewide policy on broadband with input from stakeholders.
2. Develop a statewide plan to facilitate the provision of broadband services to all citizens in the State by identifying corridors where broadband infrastructure is most needed.
3. If applicable, review, update, and/or modify State utility accommodation policies.
4. If applicable, review and propose modifications to State legislation to facilitate accommodating broadband facilities in highway and public ROW.
5. If applicable, publish broadband plans and/or State utility accommodation policies on the State Web site and provide links to these materials.
6. Include broadband stakeholders and service providers in the transportation planning and project development process.
7. If applicable, coordinate transportation and highway construction plans with other statewide telecommunication plans, such as Statewide Interoperability Communication Plans, Fusion Center Plans and State Next Generation 911 Plans.
8. Make information on the location of conduits, fiber lines and planned highway projects available electronically.
9. Consider new technology and construction practices, such as micro-trenching and horizontal directional drilling that would allow for the safe and efficient accommodation of broadband infrastructure in the public ROW.
10. Coordinate with utilities to minimize the number and scale of repeated excavations that involve the installation of broadband in the public ROW.
11. Consider developing or updating a State DOTs Asset Management System to collect pertinent broadband data, such as size, type, location of spare ducts, and live and dark fibers.