

## FirstMile.US Comments FCC GN Docket No. 09-51 A National Broadband Plan for Our Future

### About FirstMile.US

FirstMile.US<sup>1</sup> is 501c3 nonprofit organization headquartered in California. Since 2005, our mission has been to educate and advocate regarding the promise of big broadband in the United States. Our vision is that every member of the American public has access to big broadband, the 21<sup>st</sup> century pathway to a better overall quality of life.

### Executive Summary

The legislated goal of the national broadband plan is to “ensure that all people of the United States have access to broadband capability.” We have reframed the goal of the broadband plan as this: universal adoption and usage of broadband. Merely having access to broadband is not enough to meet the desired outcomes: meeting the government policy goals and create the nation’s 21<sup>st</sup> century innovation engine.

Rather than trying to adapt our current communications policies and regulations to “fit” this new communications infrastructure, a clean slate approach is needed. The barriers to broadband access and adoption must be dissolved, in both the public and private sectors. Trying to retrofit the myriad of existing policies and regulations is a disservice to broadband users and a potential obstacle to the ongoing economic leadership of this country.

To simplify discussion, we use the following definitions:

*Broadband = pipe*

*Broadband usage = pipe + devices + applications*

*Internet = primary set of broadband applications to meet government policy goals*

The pipe should support a government-mandated minimum level of applications/services based on an experiential metric, focused on advancing government public policy goals. Any technology that will support the mandated minimum can be provisioned as the pipe.

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<sup>1</sup> FirstMile.US. <<http://www.firstmile.us>>

We propose a user-centric definition of access<sup>2</sup> in the context of the FirstMile.US Big Broadband Bill of Rights:

Access to broadband is adequate if a consumer can attach any consumer devices, computers and appliances to a broadband pipe that meets the mandated minimum federal standard. Through the pipe, devices will work effectively with any and all applications that support them, without restriction, within the scope of the law. The user experience should conform to generally accepted, scientifically-based usability criterion.

The important role that the national broadband plan should play is one of defining and finding ways to lower barriers to adoption – barriers that prevent building broadband pipes; barriers that prevent broadband value propositions that work for the underserved; barriers to application development that create broadband usage; barriers to accessibility by all users, devices and applications; and barriers to providing assistance to those need additional help in gaining the skills needed to embrace a broadband future.

The United States has two differentiators that must be taken into consideration when determining useful broadband access and adoption metrics – *metrics that should be based on a principle of equity for broadband infrastructure*. These differentiators are predictors of underserved broadband communities.

- First, approximately one fifth of the US population lives in rural America.
- Second, approximately one fifth of the US population lives in poor urban centers.

The definition for underserved must be tied to measurable, empirically verifiable criteria that are known predictors of low broadband adoption. These include but are not limited to:

- No access to broadband pipes
- Median income
- Head of household education level
- Whether English is second language
- Concrete measures of the level of ICT literacy (homes with low adoption of technology)
- Median age of residents

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<sup>2</sup> FirstMile.US has developed a process and data structure to help develop a strategic methodology for thinking about how to demand bigger and better broadband services in rural areas. The process helps develop deep regional understanding on what is right and what is necessary. "A Comprehensive Determination of Broadband Deployment to Designate Unserved and Underserved Communities Using Fact-based Measurement Criteria". FirstMile.US.  
<<http://www.firstmile.us/pubs/unserved/index.php>>..

- Mean, median, and modal education level within the household

Access to broadband services of first and last resort is imperative. A national broadband plan should emphasize and provide for publicly available resources while building on its goal of universal adoption.<sup>3</sup>

Education level is a predictor of broadband usage. Particular emphasis should be made in the broadband plan to provide for full inclusion of every classroom and educational institution in this country, both public and private.

## A. Approach to Developing the National Broadband Plan

The legislated goal of the national broadband plan is to “ensure that all people of the United States have access to broadband capability.” We have reframed the goal of the broadband plan as this: universal adoption and usage of broadband. Merely having access to broadband is not enough to meet the desired outcomes: meeting the government policy goals and create the nation’s 21<sup>st</sup> century innovation engine.

Rather than trying to adapt our current communications policies and regulations to “fit” this new communications infrastructure, a clean slate approach is needed. The barriers to broadband access and adoption must be dissolved, in both the public and private sectors. Trying to retrofit the myriad of existing policies and regulations is a disservice to broadband users.

A simple but elegant plan, one that is focused on the broadband user and the applications they want/need to use on their broadband connection, provides the foundation needed for both the private and public sectors to discover innovative solutions to meet the goal and achieve the outcomes.

### Guiding Principles for a User-Centric National Broadband Plan

The FirstMile.US *Big Broadband Bill of Rights*<sup>4</sup> contains the guiding principles for a user-centric national broadband plan – a plan that could ensure that the broadband communications medium is the national innovation infrastructure for the 21<sup>st</sup>

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<sup>3</sup> *The Gates Foundation Towards the Equality of Access Guide* evaluates the importance of library-based computers in addressing the digital divide. Drawing from government statistics and independent research, the report finds widespread acceptance of library-based computer and Internet access from patrons and librarians. However, report also notes urgent—but manageable—challenges facing libraries as they seek to maintain and further develop their role in providing access to digital information. This valued public service can only be sustained by the continued support of policymakers, librarians, and community advocates.

<http://www.firstmile.us/kit/EqualityOfAccess.pdf>

<sup>4</sup> “Big Broadband Bill of Rights.” FirstMile.US. <<http://www.firstmile.us/rights/index.php>>.

century. The *Big Broadband Bill of Rights* was published in 2005 and is included below.

### *FirstMile.US Big Broadband Bill of Rights Preamble*

During the last 20 years, the main tenets of Internet development included building and sustaining an open, interoperable, scalable network of networks that robustly supports a variety of applications and devices. As we look forward to a ubiquitous big broadband environment, these basic philosophies still hold true.

To understand how big broadband should evolve, it is essential to understand the three distinct portions of a big broadband connection.

The first is the pipe -- essentially the path, street or highway connecting you to the rest of the broadband network. These can be wireless or wired or a combination of the two.

The second portion is the applications -- this is what you can do over the broadband pipe. These are sometimes software-based, but may be built-in to certain devices.

And, finally, there are devices and computers that you need to attach to your pipe that provide specific functions to help you more readily access applications.

These articles will best ensure the benefits of big broadband for all members of the American public.

### *Article 1. The Pipe*

1.1 You have the right to a big broadband pipe -- no matter where you live, work or play. The pipe must be fast enough to support what you want to accomplish and must provide symmetric service.

1.2 You have the right to expect that any group with a reasonable business case will be able to provide a pipe to you including municipalities, telephone companies, cable companies, electric companies, community groups and others that may want to invest in you and your community.

1.3 You have the right to an affordable level of service.

1.4 You have the right to attach consumer devices and computers to the pipe as you see fit.

1.5 You have the right to use any application that you need or want to use, without restriction from the pipe provider, within the scope of the law.

1.6 You have the right to trust that public libraries and/or other publicly supported venues in your local community are available to serve your needs, if you do not have access to a pipe. You have the right to expect them to be funded for this activity, open during reasonable hours including nights and weekends and have up-to-date devices and applications for accessing the broadband connection.

## *Article 2. The Applications*

2.1 You have the right to use any and all applications without restriction that meet your needs and wants, within the scope of the law.

2.2 You have the right to encourage educators, medical professionals, businesses, the government and entertainment companies to provide reasonable access to their services through your big broadband connection.

2.3 You have the right to trust that others will respect your copyright ownership. In turn, you shall respect the copyright protections afforded to us and compensate copyright owners per their request<sup>5</sup>.

2.4 You have the right to widespread availability of entertainment, business, healthcare and education applications, especially if you live, work or play in an area where traditional options are limited.

2.5 You have the right to increased bandwidth that applications will require as they become more advanced, interactive and powerful.

## *Article 3. The Devices*

3.1 You have the right to connect to your big broadband connection without restriction.

3.2 You have the right to widespread availability of entertainment, business, healthcare and education devices especially if you live in areas where traditional options are limited.

3.3. You have the right to expect that industry and government will provide an ever-broadening array of devices that will utilize your big broadband connection to support your needs in healthcare, business, education and entertainment.

## *Article 4. Public Officials*

4.1 You have the right to expect your elected officials at the local, state and federal levels to be aware of the importance of big broadband and create laws that catalyze the development of big broadband pipes, applications and devices for your use. They shall not restrict any aspect of big broadband development or availability unless public safety is in question. They shall look at all aspects of your health and welfare to ensure that laws are created and modified to ensure that big broadband can drive economic development and better jobs, better healthcare and a stronger educational system for your community.

4.2 You have the right to expect your regulatory officials at the local, state and federal levels to be aware of the importance of big broadband and provide the absolute minimum regulatory rulemaking to ensure competition, to ensure ubiquity,

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<sup>5</sup> Fair use also needs to be considered.

to ensure the speed of connection that each individual requires and to ensure that solutions are developed for hard-to-reach and disadvantaged members of the public.

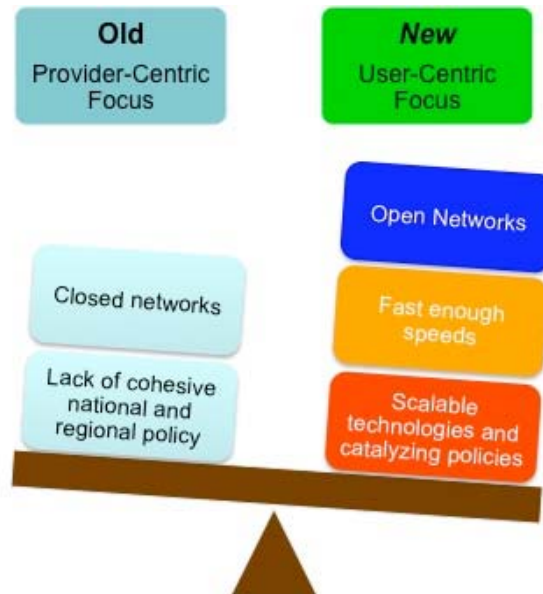


Figure 1. The FirstMile.US broadband vision shifts the priority from “last mile” provider-centric networks to “first mile” user-centric networks.

## B. Establishing Goals and Benchmarks

### 1. Defining Broadband Capability

Broadband is the pipe as described above. The pipe should be technology neutral. To simplify discussion, we will use the following definitions:

*Broadband = pipe*

*Broadband usage = pipe + devices + applications*

*Internet = primary set of broadband applications to meet government policy goals*

The pipe should support a government-mandated minimum level of applications/services based on an experiential metric, focused on advancing government public policy goals: consumer welfare, civic participation, public safety and homeland security, community development, health care delivery (also cost reduction), energy independence and efficiency, education, worker training, private sector investment, entrepreneurial activity, job creation and economic growth and

other national programs. <sup>6</sup> Any technology that will support the mandated minimum can be provisioned as the pipe.

A ten-year view of a set of dynamic experiential metrics should be developed and adjusted on an annual basis to allow for technology, user-interface and application innovations. It should provide a baseline of required performance metrics such as upload and download speed, latency, jitter, dependability, etc. that meet a minimum level of experience.

Any available technology that can meet the minimum metrics should be considered, while making note of the lifespan of the technology and the expected increasing experiential levels (and mandated minimums over time.) The FCC should work directly with unbiased network and applications subject matter experts to craft the ten-year view of a set of dynamic experiential metrics through an open and transparent process.

It is just downright silly and horribly confusing to users to create individual metrics based on individual technologies.

As to where and how to measure the performance of the broadband pipe, the performance metrics should begin by measuring the local access link. Beyond that, the FCC should work with our nation's network scientists to find valid and useful measurement schema that provides the data needed to ensure a beneficial shared innovation infrastructure.

## 2. Defining Access to Broadband

We propose a user-centric definition of access<sup>7</sup> in the context of the FirstMile.US Big Broadband Bill of Rights:

Access to broadband is adequate if a consumer can attach any consumer devices, computers and appliances to a broadband pipe that meets the mandated minimum federal standard. Through the pipe, devices will work effectively with any and all applications that support them, without restriction, within the scope of the law. The

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<sup>6</sup> Government public policy goals from Section F of Notice of Inquiry. GN Docket No. 09-51. Washington: Federal Communications Commission, 2009.

<sup>7</sup> FirstMile.US has developed a process and data structure to help develop a strategic methodology for thinking about how to demand bigger and better broadband services in rural areas. The process helps develop deep regional understanding on what is right and what is necessary. "A Comprehensive Determination of Broadband Deployment to Designate Unserved and Underserved Communities Using Fact-based Measurement Criteria.". FirstMile.US.  
<<http://www.firstmile.us/pubs/unserved/index.php>>..

user experience should conform to generally accepted, scientifically-based usability criterion.

*The real goal of the national broadband strategy is bigger than access; it should be the universal adoption of broadband.* The California Emerging Technology Fund<sup>8</sup> created an equation called the five A's of adoption. FirstMile.US believes the five A's are a thoughtful way to address the issues surrounding broadband adoption.



Figure 2. Broadband adoption can be characterized using the five A's of Adoption model.

**ADOPTION = Access + Applications + Affordability + Accessibility + Assistance**

- **Access.** Can the user attach to a broadband pipe that meets the government mandated minimum criterion – at their residence and at their business or nomadically, as needed?
- **Applications.** Can the user access the applications and connect the devices, without restriction, that allow the government public policy goals to be met?
- **Affordability.** Can the user afford to purchase broadband and the associated devices and applications needed to allow government public policy goals to be met?<sup>9</sup>

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<sup>8</sup> California Emerging Technology Fund. <<http://cetfund.org/>>.

<sup>9</sup> The national plan should focus specifically on sectors where socio-economic equity needs to be achieved and broadband adoption is less than the national norm and create policies that develop current and new pipes, applications and devices to make residential broadband a necessary, useful purchase.



- **Accessibility.** Are all potential users considered and are universally designed devices and applications enabled that allow the government public policy goals to be met?
- **Assistance.** Does the user already have or have access to the information and communication technologies (ICT) skills required to be an effective online user of government public policy goal applications?

The United States has two differentiators that must be taken into consideration when determining useful broadband access and adoption metrics – *metrics that should be based on a principle of equity for broadband infrastructure.*

- First, approximately one fifth of the US population lives in rural America.
- Second, approximately one fifth of the US population lives in poor urban centers.

Both of these demographics deserve special attention to ensure equity in a national broadband plan.

Rural America is woefully underserved with broadband access and should be considered an example of market failure – where the market is not big enough for large companies, there is a failure to deploy reasonable broadband services. When discussing the lack of deployment in rural or expensive-to-serve urban areas, providers cite<sup>10</sup> realistic business reasons such as long distances between population centers, expensive and hard-to-get environmental permits and right-of-way, density of the subscriber base, limited and/or expensive backhaul, the return on investment required by stockholders, and a long return on investment horizon. Note also that many suburban areas are also considered to be too expensive to serve and have woefully inadequate broadband services.<sup>11</sup>

America's urban poor are also woefully underserved with today's broadband. While they have access to broadband services, they may not be equipped with the financial or social resources to take advantage of a connection. According to the OECD study *Growing Unequal? Income Distribution and Poverty in OECD Countries*<sup>12</sup>, the income gap between rich and poor is also well above the OECD average in the United States.

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<sup>10</sup> "YouTube - The Rural Broadband Dilemma: Lack of Return on Investment."

<<http://www.youtube.com/watch?v=7kdh8uBhXVQ>>. "YouTube - The Rural Broadband Dilemma: Right of Way and Environmental Permits." <[http://www.youtube.com/watch?v=-1r\\_0z3h72Y](http://www.youtube.com/watch?v=-1r_0z3h72Y)>.

<sup>11</sup> The FirstMile.US president lives in suburban San Diego County in an unincorporated area and pays approximately \$600 monthly for symmetric 768 Kbps private line Internet access. The local zoning requires 2.5 acres or more per residence. Using the "Home Depot" factor as an example of "ruralness", one finds, five Home Depot locations within seven miles of her home indicating that the location is surely not rural. The area has simply been deemed too-expensive-to-serve by providers.

<sup>12</sup> "Growing Unequal? Income Distribution and Poverty in OECD Countries." Organisation for Economic Co-operation and Development. <<http://www.oecd.org/els/social/inequality>>.

The United States is the country with the highest inequality level and poverty rate across the OECD, Mexico and Turkey excepted. Since 2000, income inequality has increased rapidly, continuing a long-term trend that goes back to the 1970s. For example, the poorest 10% in Sweden have incomes 1.5 times the level of the poorest 10% in the United States even though average incomes are higher there.

Noting these and other similar statistics means, that in order to provide equitable broadband connectivity for all, we need to develop a holistic broadband plan that includes specific metrics that fully defines and provides valid measurements that focus on these broadband inequalities and their underlying causes.

### 3. Measuring Progress

Population density is not necessarily correlated with the rate at which broadband technologies are adopted. Moreover, theoretical broadband access does not necessarily lead to widespread adoption. These facts quickly become apparent when one visits certain neighborhoods of any of this country's major cities. In what we believe to be a hasty rush to judgment, too many have concluded that the words "unserved" and/or "underserved" refer primarily to rural areas of the country. We do not concur.

In urban communities, two neighborhoods may be merely blocks away from one another, but may be as different as are two entire states in a less populated area. For example, as of the end of 2008, San Diego County had a population greater than that of Alaska, North Dakota, Vermont, the District of Columbia, and Wyoming combined.

The reasons why households and businesses are not adopting broadband, particularly when there is ready access to services, may be different from the than the lack of access to service found in rural areas, but they are just as powerful. Because of this, it is imperative that when we are measuring progress in broadband adoption, a holistic definition be used for underserved communities whether they be urban, suburban or rural. The definition for underserved must be tied to measurable, empirically verifiable criteria that are known predictors of low broadband adoption. These include but are not limited to:

- No access to broadband pipes
- Median income
- Head of household education level
- Whether English is second language
- Concrete measures of the level of ICT literacy (homes with low adoption of technology)
- Median age of residents
- Mean, median, and modal education level within the household

These should be tabulated at the smallest unit of geography feasible within the U.S. Census system: the block group. The simple reason for this is that more people are likely to live in some San Diego County zip codes than live in entire counties in more sparsely populated states.

Items that should be included in any assessment of “level of service” include:

- Whether the service was accessible—physically and financially—to the entire population or just a subset,
- Whether people had the equipment they needed to use it, and
- A very precise, granular and behavioral series of measures of adoption.

We also believe that the Department of Commerce has a rare opportunity to undertake a nationwide measurement of these criteria during the upcoming 2010 Census. The Census Bureau is unique in having both competence in and experience at designing and implementing research on such a massive scale, as well in the vital, technically demanding arena of data analysis.

The American Community Survey (ACS) adheres to the highest professional standards in sample selection (e.g., random selection within each subgroup to be measured and ensuring adequate numbers of responses in each “cell”<sup>13</sup> sufficient to produce measurable, statistically significant<sup>14</sup> differences, controlling for Type I and Type II errors<sup>15</sup>).

The “short” form of the Census is an effort to count literally every man, woman, and child living in the United States, along a number of key criteria such as age, gender, and race or ethnic background. The American Community Survey (ACS, formerly known as the “long form” of the Census, gathers more detailed information about a sample of US residents and rests on the same ‘common denominator,’ in terms of categories, definitions of terms, etc. and does the Decennial census, data from the Bureau of Labor Statistics, NAICS, and other critically important datasets produced by the Federal Government. The sample is quite large (between 1,437,969 and 2,142,964 at last count) and is designed to be generalizable to the population as a whole.<sup>16</sup> Because Census data can be analyzed along with these other datasets

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<sup>13</sup> A “cell” represents a population subgroup, such as white men over 50 living in rural settings, or Americans of Puerto Rican descent living in the suburbs of Seattle.

<sup>14</sup> “Statistically significant” refers to the case where the result of a particular analysis of a data set is unlikely to be an artifact of random chance. The standard for an acceptable level of statistical significance is 95%, expressed as  $p < .05$  (in other words, the likelihood of the result being a fluke is less than 5 percent).

<sup>15</sup> Type I and type II errors are measures of precision. Type I error describes the case where there is a high likelihood of finding no statistically significant difference when such differences actually exist (a.k.a. a false negative). Type II error describes the case where there is excessive likelihood that statistically significant differences will be found when they do not exist (a.k.a. a false positive).

<sup>16</sup> This is true with one caveat: the ACS only measures populations larger than 65,000. However, the geographic scope of the measurement is flexible, so that in the case of a sparsely populated location,

without losing accuracy, as would occur if all each dataset different measurement schemes, the value of a rigorous, thorough, high-quality U.S. Census can be multiplied many times over, as innovators devise new ways of finding patterns in the numbers.

Thus, when it comes time to generalize from the sample to the population as a whole, we will have solid numbers, which will be accurate within a known band of random error. Among other things, each and every question (e.g., access to broadband) should be both valid (measures what it intends to measure) and reliable (measures it consistently and accurately across time, place, and population group). Any results that are reported must meet all the standards described above.

Adherence to the clearly established, carefully codified and thoroughly tested standards for sampling methodology, appropriateness of the questions posed, and adequate levels of validity and reliability are the bedrock quality measures that must be achieved to render results generalizable from a smaller group to a larger one. These measures are quantitative, rigorous, and have been tested for effectiveness for more than fifty years.

We now have the opportunity to build a national broadband network on the basis of empirical reality, measured with accuracy and fairness. If we seize this opportunity, all will surely benefit. To bypass it, by contrast, would fly in the face of the very notion of an information economy, and of everything this initiative strives to achieve.

#### 4. Role of Market Analysis

It is a fantasy to believe that a traditional market analysis will serve any useful purpose in a national broadband strategy. We already know the objective – universal adoption of a broadband to support government public policy goals. The question becomes how do we lower the barriers to adoption and access. We shouldn't get bogged down in the infinite variety of applications and devices that can make use of a universal broadband infrastructure.

A “user” of broadband can be individuals and organizations. A “user” can be a human or a machine. More and more machines will become “users” over time. Today, we see rain sensors in the middle of agricultural areas communicating with farmers to manage irrigation, smart machines that communicate with electricity utilities to manage energy consumption, and scientific grids where computers, servers, storage farms and specialized devices routinely communicate with each other over the networks to run massive computational calculations. We expect these

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unit of (geographic) measurement would simply be expanded to the point where it reaches the threshold of 65,000 residents.

types of communications to exponentially grow and thrive in a ubiquitous broadband system.

The important role that the national broadband plan should play is one of defining and finding ways to lower barriers to adoption – barriers that prevent building broadband pipes; barriers that prevent broadband value propositions that work for the underserved; barriers to application development that create broadband usage; barriers to accessibility by all users, devices and applications; and barriers to providing assistance to those need additional help in gaining the skills needed to embrace a broadband future.

## C. Effective and Efficient Mechanisms for Ensuring Access

### 1. Market Mechanisms

As we cited in Section B.2 of this comment, the lack of rural broadband deployment are a good example of market failure. Without subsidies, especially in provisioning the very expensive middle mile, many rural areas will never become desirable markets for service providers. Subsidized middle-mile fiber combined with community connection points will catalyze first mile deployments in expensive-to-serve areas.

FirstMile.US has developed criteria for expensive-to-serve underserved areas called *A Comprehensive Determination of Broadband Deployment to Designate Unserved and Underserved Communities Using Fact-based Measurement Criteria*.<sup>17</sup> We believe these criteria can help the federal, state and local entities on two levels: 1) in determining the need for subsidized funding and 2) in helping determine how to develop regional solutions to maximize subsidized investments (i.e., middle-mile, open-infrastructure construction.) These five criteria are:

- Price
- Coverage
- Number of providers, especially the availability of open infrastructure
- Highest upload and download speeds
- Backhaul/middle-mile availability

Through funding of strategically located “open” middle mile infrastructure(s) paired with low-cost, regional “community connection points” (also known as

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<sup>17</sup> "A Comprehensive Determination of Broadband Deployment to Designate Unserved and Underserved Communities Using Fact-based Measurement Criteria." FirstMile.US.  
<<http://www.firstmile.us/pubs/unserved/index.php>>..

exchange/peering/transit points), subsidies can effectively ameliorate the enormous costs that have prevented many local broadband buildouts.

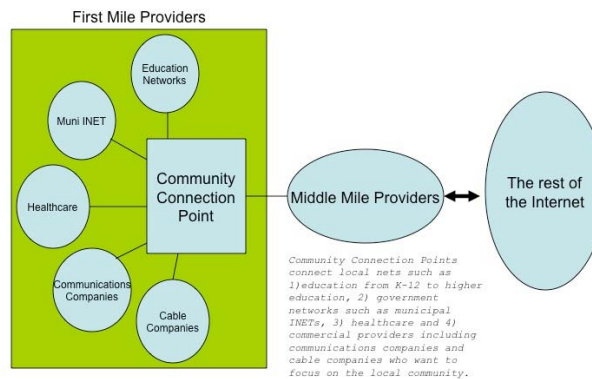


Figure 3. The Community Connection Point is a natural conduit for open infrastructure – allowing interconnection amongst providers and integration of grand challenge applications.

Funded middle mile infrastructure should:

- Be open and offer a pure transmission service with no discrimination among users or among the services, information, and applications users want to provide to each other.
- Be regional and serve multiple communities along its path.
- Provide interconnection points at reasonable intervals as needed by local service providers.
- Create an ownership structure that provides a long-term pricing advantage to the region served. Novel concepts should be encouraged such as fiber condominiums, public joint powers ownership, and cooperatives.
- Include 'huts' for community connection points and agreements among service providers on how to best interconnect the region.

Community connection points (CCP) are the building blocks of new networks. One can think of the community connection point as a very small, very cheap central office for broadband—in essence, a broadband commons. Peering among local networks, which allows providers to send and receive traffic from each other, occurs within the connection point.

Statistics show that vast majority of people who do not have broadband in the home or workplace are in areas where there is access to broadband, but for some reason have not purchased service. In many cases, the urban poor are most adversely affected.<sup>18</sup> We believe it is important to specifically target nonadopters through

<sup>18</sup> "Home Internet Access: Continuing To Grow, But Big Differences Among Demographics | Nielsen Wire." 06 Mar. 2009. Nielsen. 08 June 2009

programs that address applications, training, public awareness initiatives, and workforce development with the goal of increasing adoption rates. Many community-based organizations, educational institutions and libraries are doing remarkable work in this area.

## 2. Determining Costs

The Commission must develop an understanding of the costs of deployment of broadband pipes. Many of the underlying causes of extraordinary costs (and concomitant lack of deployment) are barriers to deployment and must be identified. In addition, the Commission must also develop an understanding of the costs of using broadband services especially the applications and the devices. These costs are also barriers to broadband adoption.

## 2. Universal Service Programs

The Universal Service social goal is essential no matter how the telecommunications landscape changes. The Communications Act of 1934 codified the goal as: “To make available, so far as possible, to all the people of the United States a rapid, efficient nationwide, and worldwide wire and radio communication service with adequate facilities at reasonable charges.” The Telecommunications Act of 1996 reaffirmed this goal by establishing policies for the “preservation and advancement of Universal Service” and expanding the reach of the Universal Service Fund to rural health care providers, schools and libraries.

Today’s Universal Service funds primarily subsidize the wireline telephone service. With technology development at light-speed, we are currently obligated to fund Universal Service programs that are not providing the communication services that Americans need and want today. Present technologies and applications afford us innovative and improved ways to communicate. It’s time to rethink Universal Service strategies with an eye towards these present and future uses. It’s time for Universal Services to provide all communications how, when and in the manner people want them.

Technology changes daily. Attempts to unnecessarily regulate technology will only hamper economic development and innovation. What we can do is rethink current regulation and modify the definition of the Universal Service Fund to reflect this new reality.

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<[http://blog.nielsen.com/nielsenwire/online\\_mobile/home-internet-access-continuing-to-grow-but-big-differences-among-demographics/](http://blog.nielsen.com/nielsenwire/online_mobile/home-internet-access-continuing-to-grow-but-big-differences-among-demographics/)>.

The regulatory policies of the last 100 years have delivered affordable, nearly ubiquitous telecommunications systems to most Americans. The legacy regulatory model of the past ensured widespread wireline service deployment and a guaranteed recovery of provider costs. However, it is the semi-deregulatory policy of the past dozen years that applied to the cellular and cable industry and led to the phenomenal growth and investment in those two sectors. Today, however, the rapid pace of the digital revolution is shaking the underpinnings of the legacy regulatory framework and the concept of Universal Service.

Today's Universal Service Is broken. Yes, it's broken. The funding collection and distribution represents an outdated model and must be changed. We must consider whether Universal Service should transition from a highly limited and unsustainable foundation to one that fits technology trends, particularly trends that use broadband pipes as the underlying foundation to most communications.

The social goals of Universal Service programs—namely, providing affordable, available accessible service for all—are still relevant, but change remains necessary. Two key questions must be dealt with:

- How funding is achieved: the mechanisms for collecting Universal Service funds
- How funds are disbursed: the mechanisms for disbursing Universal Service funds for end-user benefit

Funding must act in the public interest, be simple, easy to audit and as broad-based as possible to reduce distortions. Universal Service should continue to support end users such as:

- those with lower incomes
- those with disabilities requiring specialized communication equipment
- those in traditionally geographically expensive areas
- schools, libraries, community-based organizations and hospitals/clinics based on need

Explicit funding for Universal Service programs comes from surcharges on the customer's telephone bill, calculated as a percentage of monthly intrastate (state) and interstate (federal) charges. The higher the phone bill, the higher the contribution to the Universal Service Fund. Until this century, the model for Universal Service funding and disbursement has worked. This traditional economic telecommunications model built on subsidies, intercarrier compensation and fees on calls will not work any longer. Broadband and cell phones are changing the economic structure of telephony.



Universal Service policies need to be technology-neutral and responsive to change. This can be accomplished by:

- Stop subsidizing providers. Instead let consumers pick their own vendor.
- Stop subsidizing specific technologies (wireline.) Instead become end-user focused/empowered.

More collaboration and cooperation among government entities might include:

- Examining overlap or conflict between State and Federal programs. Can we reframe programs to compliment each other?
- Governments—city, state and federal—working together to ensure that members of the public receive the right services

With an eye toward future scalability, a framework for funding sources should be based on the following two characteristics:

- *Regulatory flexibility.* Implementation/administration to be adjusted as needed.
- *Exposure and risk protection.* Programs must be well-managed and supportable, to avoid to elimination as part of short-term crisis management

The principle: Let the customers get the funds/vouchers directly and let them buy the services that they need/want. Universal Service funds should allow customers' freedom of choice of vendors and technology, both in broadband pipes and broadband applications.

Universal Service programs need to be more end-user/customer focused—particularly in the way the funds are disbursed. Today, the structure of some programs encourages vendor involvement sometimes to the detriment of the customer. Providing the benefit directly to the end user would make the subsidy portable, allowing customers freedom of choice of vendors and technology. Disbursement methodologies should also encourage vendors to deploy new, lower-cost solutions.

Presently, Universal Service recipients can't get cell phones or broadband. They can only get a discount if they buy a dedicated telephone line from a telephone company. How 1934 is that?

#### 4. Wireless Service Policies

The Commission should assess their wireless service policies, particularly reflecting the broadband pipe not total broadband usage (pipe+applications+devices.) A national broadband plan should seek to maximize the capability and functionality of wireless spectrum. Typical wireless services today are comprehensive services and

include the broadband pipe *and* the applications and devices. Many times, the devices and applications include usage restrictions enforced by the service providers. In a user-centric wireless broadband network, the wireless broadband pipes would not include these unnecessary restrictions. Consumers would be able to choose applications and devices that would meet their needs. The wireless pipes would meet the minimum requirements to reach government public policy goals.

## 5. Open Networks

Typical U.S. broadband deployments are based on the concept of vendor-controlled networks. Vendor-controlled networks usually restrict the use of the network connection to their own provided services (voice, Internet, TV, etc.) and, thereby, control the applications and content available to subscribers. In general, open networks are not deployed in the U.S. It is becoming increasingly obvious that this lack of openness is a major barrier to universal broadband deployment.

In our proposed definition of broadband as a pipe (but not the applications and devices), it makes sense to open the pipes for as many vendors to use for as many applications and devices as possible. While there are previous federal rulings for nondiscrimination on networks, open networks and open infrastructure would benefit from a clean slate approach toward a new barrier-busting regulatory framework.

The world is moving towards a much more consumer-robust concept of open networks. A recent report from a group of international broadband experts describes the open network idea.<sup>19</sup>

“The big picture idea about communications is an open network. At a high level, everyone understands what it means for a network to be open: (1) whatever else is might do, the network offers a pure “transmission” service, so that users can freely communicate with each other; (2) users can connect any devices they want, as long as they don’t harm the network; (3) the network connects to other networks; and (2) the network doesn’t discriminate among users or among the services, information, and applications users want to provide to each other.

In this regard, we should carefully distinguish between the basic infrastructure on which communication depends, and the notion of a “service” provided using that infrastructure. Newspaper delivery is a “service” provided using roads – a physical transportation infrastructure. We do not normally think of roads themselves as a “service” being provided to anyone – even though it obviously costs money to provide and maintain roads, and even though there must be rules regarding the use of and access

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<sup>19</sup> Big Think Strategies - Open Access

[http://www.budde.com.au/presentations/content/2009\\_Big\\_Think\\_-\\_OAP\\_-\\_Public\\_Copy.pdf](http://www.budde.com.au/presentations/content/2009_Big_Think_-_OAP_-_Public_Copy.pdf)

to roads...The point of the [communications] infrastructure is not be a market-driven service itself. The point of the infrastructure is to enable and facilitate the provision of services that will be subject to the normal operation of market forces.”

## 6. Competition

To accurately establish the availability of a competitive environment in an area, it is critical to understand the role of the service provider, open versus closed networks, and the number of competitors with closed networks. With market-driven vendor-centric services, the number of providers indicates the desirability of the area in terms of profitability. With open networks deployed, only one pipe is needed to avail access from many communications service providers to homes and businesses via an installed fiber or wireless network.

In an open network, one pipe is adequate. In a vendor-controlled network, each unique pipe to the home should be counted. In closed, vendor-controlled networks, three or more service providers constitute a robust competitive environment in a rural area. Currently, the European Union has determined that it takes at least three to five carriers to provide a true competitive environment in urban settings. In vendor-controlled networks, the number of providers should include wired services, fixed wireless services, and mobile wireless that provide at least a basic broadband service.

## 7. Other Mechanisms

There are many examples of successful broadband deployment in OECD<sup>20</sup> counties, some including government subsidies.

## D. Affordability and Maximum Utilization

It is important to remember these two definitions when discussing broadband affordability and utilization.

Broadband = pipe

Broadband usage = pipe + applications + devices

### 1. Affordability

Once the government has set a minimum level of acceptable broadband performance, a targeted consumer price level should be set based on OECD global price points. This will allow essential research into and understanding of the overall

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<sup>20</sup> "OECD Broadband Portal." Organisation for Economic Co-operation and Development. 20 May 2009. <[http://www.oecd.org/document/54/0,3343,en\\_2649\\_34225\\_38690102\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/54/0,3343,en_2649_34225_38690102_1_1_1_1,00.html)>.

broadband usage costs and consumer price structures that are barriers to deployment and the barriers to usage. In the near term, broadband subsidies to the poor may have to include more than just the broadband access itself. Major barriers exist with the cost of the devices (typically computers) and the ability to maintain the device once obtained. Broadband deployment in rural areas has been discussed earlier in this paper.

## 2. Maximum Utilization

The government needs to assess utilization using its own criteria: access to and usage of applications and devices that meet governmental policy goals. In today's broadband system, the primary way to fulfill to governmental policy goals is the Internet, a broadband application. The *It's the Internet Stupid*<sup>21</sup> comment to these proceedings sums it up nicely.

“There’s risk in confusing broadband and Internet. If the National Broadband Plan starts from the premise that the U.S. needs the innovation, increased productivity, new ideas and freedoms of expression that the Internet affords, then the Plan will be shaped around the Internet. If, instead, the Plan is premised on a need for broadband, it fails to address the ARRA’s mandated objectives directly. More importantly, the premise that broadband is the primary goal entertains the remaking of the Internet in ways that could put its benefits at risk. The primary goal of the Plan should be broadband connections to the Internet.”

The Commission should include a local leadership component in the national broadband plan and use existing centralized clearinghouses such as 211<sup>22</sup> for local broadband outreach. Sustained local leadership has the biggest and most dramatic effect on creating broadband demand, creating a community broadband spirit and attracting the attention of communications providers. The adage, “All politics is local” holds true for creating broadband demand. In essence, “politics always was about values combined with instincts” and communities must take their local core values and marry them with the “broadband instinct.” FirstMile.US is leading the leaders through its *Broadband Leadership Corps*. We’re providing training, programs, and forums to assist in developing local broadband leadership.

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<sup>21</sup> It's The Internet Stupid › A Comment on Notice of Inquiry, FCC GN Docket No. 09-51. 08 June 2009 <<http://itstheinternetstupid.com/>>.

<sup>22</sup> 2-1-1 US: Home Page. <<http://211us.org/>>.

### 3. Broadband Privacy

We have no comment on this section at this time.

## E. Status of Deployment

### 1. Subscribership Data and Mapping

A national map is a smart strategy in order to help understand the magnitude of the broadband problem this nation is facing. We believe any national mapping effort needs to be focused on the ultimate mapping goal: *figuring out where the underserved are* and providing enough visual information that leads to logical deductions on how to increase broadband adoption. After all, a map is simply a visual representation of “other” data, but a visualization that is valuable to many.

In some respects, the mapping process itself – the journey—may be more important than the final map—the destination. We urge that mapping be accomplished as locally as practical. Six California rural projects have demonstrated the usefulness of local mapping by utilizing the mapping process to cement strong relationships with local providers and bringing the best broadband service to their rural areas. The previous statewide mapping effort left out all wireless ISPs and many other cable and telephone company infrastructure in these areas. One of the rural groups has identified well over 100 providers serving their area. Many of these providers will have no interest in participating in a centralized mapping process, but would have interest if it increased their local presence and netted new local business.

#### *Verifiable, Reliable Data Sources Must Be Utilized*

Mapping—a handy tool if you know what to map and you have verifiable, reliable data sources—is like any other database: garbage in leads to garbage out. Or, in the alternate view, one can make a map say anything they want. The veracity of a national mapping effort boils down to where the data is created—publicly accessible, verifiable data is the most reliable way to build the maps and the only way the government should spend our tax dollars. Our earlier discussion of utilizing the Census process and its resultant data is exactly the type of data that should be utilized to map nonadopters and low adoption regions and could be used to map underserved rural or expensive-to-serve urban regions.

One of the major problems with any mapping is the treatment of the raw data. In the some existing broadband maps, the providers’ required that the data be smoothed to blur any network “edges.” The resulting map creates the impression that many unserved areas are served. This problem was visible in both rural areas and expensive-to-serve urban areas.

All data sources must be scientifically valid and not distorted when transferred to a map.

*Institutions that Serve Government Public Policy Goals Should Be Mapped.*

The federal map should include the institutions that specifically serve country's public policy goals and indicate which are underserved or unserved. One key focus of the national broadband plan should be to enable access to public institutions, especially in areas that lack access to the "brick and mortar" locations.

*Standardized GIS Schema Must Be Created at a National Level.*

Creation of a standardized GIS mapping schema is essential. We believe that it is necessary to provide a "roll-up" methodology utilizing GIS that can be locally customized by communities and providers. Our experiences with mapping lead us to believe that the journey is as important as the destination. One incredibly positive outcome of a mapping exercise is the development and sustainment of local partnerships/understandings that lead toward big broadband deployment and adoption. The process of mapping can be leveraged into a much greater community and economic development activity.

*Mapping Must Include More Data than the Combined Upload/Download Speeds.*

When doing rigorous analysis of broadband for a region, it is imperative to understand the upload and download speeds in relation to the experiential federal goals that are essential to both the state and the federal government. These speeds are ever changing and will require a detailed knowledge of upload and download speeds per grand challenge application.

*Broadband Pipes Should Be Mapped.*

Broadband pipes can be delivered over wireline, fixed wireless, mobile wireless and other heterogeneous combinations of the above and should be mapped. Instances of open infrastructure should be given special note on the map. Obtaining this data can be controversial and difficult. We recommend that publicly available data be utilized as much as possible, including Census data if appropriate questions can be included.

We do not believe that the federal government should obtain data directly from the broadband providers, as that will have a detrimental effect on local discovery and implementations. However, it may be prudent to require FCC-obligated broadband providers to cooperate with local initiatives that need data.

*Map the Factors that Affect Adoption.*

It is important to look at the factors that affect adoption and map these outcomes using scientifically valid assumptions. Examples include:

- Whether the service was accessible—physically and financially, to the entire population or just a subset,
- Whether people had the equipment they needed to use it, and
- A very precise, granular series of measures of adoption.

One specific example is expensive-to-serve areas where the cost of the local connection is reflective of the cost of the backhaul/middle mile to get to the nearest ISP aggregation point. In unserved or very underserved areas, this cost is so prohibitive that no provider has seen a reasonable return on investment. In other areas, the providers have instituted usage caps to cover this extraordinary cost.

*The Federal Government, Tribal Governments, State Institutions, and Local Leaders Should Work Together to Determine the Variety of Geographical Areas Needed to Understand the True Nature of Broadband Deployment.*

While the federal map will most likely rely on federally designated zones such as census-blocks, the tribal, state and local entities may find that other, more locally-oriented determinations should be utilized for mapping. Any database or GIS mapping schema should be flexible enough to allow groupings for multiple purposes.

*All Federally-Owned, State-Owned and Native American-Owned Lands and Buildings Should Be Mapped.*

This mapping will help drive a better understanding of and the actions required to provide an accelerated permitting process and government-owned facilities that could be leveraged in a national broadband strategy.

## 2. Stimulus Grant and Loan Programs

Recovery Act broadband projects should be viewed as pilot demonstrations for the national broadband plan and studied. Successes and, more importantly, failures should be studied to identify barriers to deployment and adoption and to create a workable government policy strategy that overcomes the identified barriers.

## F. Specific Policy Goals of the National Broadband Plan

With respect to meeting government policy goals with broadband, two specific points are important to the nation.

First, access to broadband services of first and last resort is imperative. A national broadband plan should emphasize and provide for publicly available resources while building on its goal of universal adoption.<sup>23</sup>

Second, education level is a predictor of broadband usage. Particular emphasis should be made in the broadband plan to provide for full inclusion of every classroom and educational institution in this country, both public and private.

The *Big Think Strategies – Leading to Smart Communities* submission to this docket is an important discussion on the coordination aspects of meeting the specific policy goals. Here is an excerpt:

“All around the world there is dissatisfaction about the level of availability of healthcare, education, energy and many other essential services provided by governments. At the same time, the cost, both to the individual and to society overall, has increased just as sharply and a piecemeal approach will not suffice. These issues will be at the top of the political agenda for some time to come. We believe that the method for making that intervention needs to be based on a trans-sector approach, looking for the multiplier effect that those investments will have in relation to healthcare, education, energy independence and efficiency, environment, public safety, civic participation as well as economic growth. Any risk of analysis paralysis or stifled decision-making can be overcome by allowing initiatives to be taken by putting in place a cross-checking facility against the digital vision to guarantee the multiplier effect of the economic stimulus packages in relation to infrastructure. The outcomes of the process should lead to the development of smart interconnected and sustainable communities, cities and buildings.”

## G. Relationship between the Recovery Act and Other Statutory Provisions

A clean slate approach should be taken with the development of a national broadband plan.

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<sup>23</sup> *The Gates Foundation Towards the Equality of Access Guide* evaluates the importance of library-based computers in addressing the digital divide. Drawing from government statistics and independent research, the report finds widespread acceptance of library-based computer and Internet access from patrons and librarians. However, report also notes urgent—but manageable—challenges facing libraries as they seek to maintain and further develop their role in providing access to digital information. This valued public service can only be sustained by the continued support of policymakers, librarians, and community advocates.  
<http://www.firstmile.us/kit/EqualityOfAccess.pdf>



## H. Improving Government Performance and Coordination with Stakeholders

See the submission to these proceedings from the *Big Think Strategies – Leading to Smart Communities* for more information on this area.