Before the
FEDERAL COMMUNICATIONS COMMISSION

In the Matter of	)	
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
	)	

COMMENTS BY
EDUCAUSE, Internet2 and ACUTA.

EDUCAUSE,[1] Internet2[2] and ACUTA[3] are pleased to submit these comments concerning the development of a national broadband plan for the United States.

EDUCAUSE/Internet2/ACUTA have a deep and wide-ranging interest in the nation's broadband capabilities. The future of our country and its competitiveness depend on the quality and reach of our higher education. In an ever-changing, highly-competitive, and international economy, our educators must teach students how to prepare for professions that do not yet exist and work with technologies we cannot yet imagine or comprehend. Because of this, it is essential that campuses have access to the highest broadband speeds available to conduct the education and research our economy demands to remain in the forefront of international scientific discovery. As research becomes increasingly data-driven and increasingly international (e.g., the Large Hadron Collider), it is essential that these broadband technologies are upgraded and distributed throughout the campus to serve the needs of students in all disciplines and areas of study. [4]

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[1] EDUCAUSE is a non-profit association of over 2200 colleges and universities, representing the interests of the information technology (IT) professionals on campus – from the chief information officers (CIOs) to the technical staff who keep the network operating on a daily basis.

[2] Internet2 is an advanced networking consortium led by the research and education community. Internet2 operates an advanced optical backbone network which, together with its regional partners, brings multi-gigabit connectivity to its members, enabling advanced applications and spurring the innovations that will forge the Internet of the future.

[3] ACUTA, the Association for Information Communications Technology Professionals in Higher Education, is a non-profit association whose members include over 800 institutions of higher education within the United States. ACUTA members include both large and small institutions of higher education, ranging from institutions with several hundred students to major research and teaching institutions with greater than 25,000 students. ACUTA member representatives are responsible for managing voice, data and video communications technology services for students, faculty and staff on college and university campuses.

[4] Please refer to "Unleashing Waves of Innovation; Transformative Broadband for America's Future," (included as Attachment B to these comments) by Ed Lazowska of The University of Washington on behalf of organizations that represent all 50 states, over 2200 colleges and universities, 30 state and regional networks, 44 corporations, and international reach to networks in 90 countries. http://www.cra.org/ccc/docs/init/Unleashing.pdf.

In addition to upgrading on-campus broadband facilities, higher education increasingly depends upon the public broadband network to meet the needs of students, faculty and researchers who are off-campus. Higher education must continually strive to serve a more diverse student population. Online distance education has become an essential tool to overcome geographic barriers and extend the on-campus learning experience more broadly. The demand for online classes has nearly doubled over the past 5 years alone with over 4 million students enrolled in online classes in 2008.[5] Distance education allows students the flexibility to work full time, meet family obligations, and to reduce travel while earning their degree(s). But the quality of online education is dependent on the quality of broadband that is available to connect the instructor with the student. Many rural and underserved urban areas, where the students live, may not have the connection speed necessary to take part in the coursework. To properly extend the reach of higher education, the public must have access to high-speed broadband.

The members of EDUCAUSE/Internet2/ACUTA are concerned about the inadequate level of broadband connectivity in the United States and the impact this shortage of broadband facilities is having on education. In January 2008, EDUCAUSE released a paper called "*A Blueprint for Big Broadband,*"[6] which explained in detail the limitations of the nation's broadband policy and performance. Among its conclusions were:

1. Internet usage is growing far faster than the supply of broadband facilities. The trends indicate that homes will soon require a minimum of 100 Megabits per second (Mbps) speeds to meet the demands of applications running concurrently, such as distance learning, videoconferencing, research and student-teacher collaboration, tele-health and other applications.

2. The U.S. broadband industry has not been investing enough to meet this growth in demand. The U.S. international ranking in several measures of broadband connectivity has fallen dramatically over the past decade. There is a growing consensus that the federal government has been overly reliant on free market/private enterprise solutions to our broadband needs, while other nations have been moving forward with government sponsored efforts to promote broadband deployment and use.

EDUCAUSE/Internet2/ACUTA are extremely pleased with the enactment of the American Recovery and Reinvestment Act (ARRA) which responds in part to the information and arguments set forth in*"A Blueprint for Big Broadband"*. Though the amount of funding made available in the ARRA is less than we suggested, EDUCAUSE

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[5] http://www.sloan-c.org/publications/survey/staying_course , "Staying the Course: Online Education in the United States, 2008", I. Elaine Allen, Ph.D., Jeff Seaman, Ph.D., Sloan Consortium, November 2008.
[6] Windhausen, John, *Blueprint for Big Broadband*, EDUCAUSE, January 2008. Please see http://net.educause.edu/ir/library/pdf/EPO0801.pdf. See also, http://www.educause.edu/Resources/Browse/NationalBroadbandPolicy/30572 for other resources on broadband policy produced by EDUCAUSE members.

believes that it provides a healthy start for a national broadband plan that will truly extend the reach of broadband to all Americans.

EDUCAUSE/Internet2/ACUTA would like to focus our comments on six major areas:

- Goals and benchmarks
- The middle mile and proposed solutions
- The last mile and proposed solutions
- Evaluation of our progress
- Other policy goals
- Conclusion

1. Goals and Benchmarks:

EDUCAUSE/Internet2/ACUTA believe there are three basic questions the national broadband plan must answer:

- What level of broadband should be routinely available in the US?
- What are the networking needs of our community anchor institutions?
- What capacity is needed to facilitate the research and innovation necessary to keep the US internationally competitive?

To answer these questions, the plan must be forward-looking and willing to call for the resources necessary to restore America's role as a world leader in broadband deployment and use. To that end, rather than investing in short-term, transitional technologies, emphasis should be on technologies that can spur innovation and be scalable for decades. Within a 5-10 year timeframe, for the general purpose Internet, we suggest an initial goal of 100Mbps to every home and business; for smaller anchor institutions such as schools, community colleges, libraries and health clinics, an initial goal of 100Mbps to 1 Gbps; and for larger anchor institutions such as colleges, universities, and hospitals, and to facilitate the essential research applications in use today and in the near future, networks and equipment must provide multi-Gigabit speeds.

For benchmarking purposes, we must stay abreast of the actions to promote broadband taken by our international competitors. In order to retain our economic and innovative leadership in the world, we must learn from the progress made by other countries that, in many cases, are years ahead of us in tackling this issue. It will not matter if Rhode Island leads California in broadband deployment if neither of them can compete with what Asian and European countries have to offer.

2. The Middle Mile and Proposed Solutions.

EDUCAUSE/Internet2/ACUTA believe that there is a severe shortage of adequate broadband facilities to meet the needs of the nation. Currently, the most obvious shortages are in the "middle mile" and the "last mile". Yet to truly have access to broadband, there must be adequate facilities at all levels, last mile AND middle mile facilities must both be available and affordable.

According to the Minnesota Internet Traffic Studies, Internet traffic is growing at 50-60% per year, which means that it doubles approximately every 18-24 months.[7] Technology Futures estimates that a growing number[8] of U.S. households will need a minimum of 100 Megabits per second (Mbps) capability in only a few years (See Attachment A: Table 1). This prediction is consistent with recent research from Japan indicating that, over time, broadband subscribers increase their usage of their broadband connection. The lines represented by the empty white triangle and the empty white diamond show the total amount of information downloaded and uploaded on a per subscriber basis. The trends clearly show that people with a broadband connection are generating more traffic up and down than broadband-connected people did just a few years ago. (Table 2).

Unfortunately, there is not enough investment in broadband facilities in the U.S. to accommodate this growth. Another table from Technology Futures demonstrates that there is an insufficient amount of investment in both the access capacity (last mile) and the core switching (middle mile) in comparison to the optical switching (backbone) (Table 3). In contrast, Japan has been investing in fiber networks to such an extent that its DSL customers are declining in number as they move to fiber (Table 4). Not surprisingly, Japan has the fastest average Internet speeds in the world, with the U.S. lagging far behind (Table 5).

The FCC has correctly noted that middle mile[9] broadband facilities are "a necessary precursor to a provider's being able to deploy broadband services to its customers."[10] Unfortunately, the evidence of a shortage of middle mile, or backhaul, facilities in the U.S. is becoming stronger every day.

Many different parties have identified a shortage of middle mile facilities. The wireless carriers, competitive local exchange carriers, large business users, Voice over IP (VoIP) providers, and consumer organizations have all expressed concern about the lack of available backhaul/middle mile facilities. The FCC has received several studies that document the market power local telephone companies have over special access (the term used by the telephone companies to provide middle mile facilities). Economics and Technology, Inc. predicted that during the period of 2007 through 2009 properly regulated special access rates would have allowed the U.S. economy to grow by 234,000 new jobs and $66 billion in GDP.[11]

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[7] http://www.dtc.umn.edu/mints/home.php.

[8] Over 20% in the next five years and over 60% in the next ten years.

[9] In its Rural Broadband Report, the FCC described "middle mile" facilities as "the facilities that are commonly used to connect the "last mile" ISP with an Internet backbone service provider." (p. 48). See also, "[A]n ISP providing service to subscribers in a rural area must obtain connections to a node of an Internet backbone service provider. The facilities making this connection are among those commonly referred to as "middle-mile" facilities." FCC Rural Broadband Report, p. 67.

[10] FCC Rural Broadband Report, p. 48.

[11] Lee. L. Selwyn *et al*., Economics and Technology, Inc., Special Access Overpricing and the US Economy: How unchecked RBOC Market Power is Costing US Jobs and Impairing US Competitiveness, (Aug. 2007)

There are three steps that can be taken to enhance the deployment of middle mile/backhaul facilities:

- Most immediately, the FCC can support the prioritization of ARRA grants that focus on extending middle mile facilities into communities and connecting anchor tenants such as schools, institutions of higher education, libraries, and community centers. These strategic institutions can act as affordable interconnection points for private or municipal entities to provide service to surrounding neighborhoods and small businesses.

  As an example, the Commission can work more closely with state and regional networks to extend their backbone networks deeper into the community to provide middle mile/backhaul capabilities. Over 30 states have some form of a non-profit research and education backbone network that currently carries the telecommunications traffic of state and local governments, schools, libraries, hospitals and other anchor institutions. They have experience in providing high-quality service at lower prices than incumbent carriers. The FCC can also continue to involve these state and regional networks in the Universal Service Fund (such as the Rural Health Care Pilot Program and other programs).

- After the ARRA grant program ends, the Commission can support on-going initiatives for the private and non-profit sectors to make greater investment in middle mile facilities. For example, federal legislation has been introduced to require any new highways to provide sufficient conduit for laying fiber optic cables.[12] Tax credits for broadband deployment have also been considered by both federal and state lawmakers. The Commission can support these efforts by writing reports, sending letters, using the "bully pulpit" and otherwise actively promoting legislation that would bring about more competition and greater investment. As an example, the acting chairman of the FCC just submitted a report to Congress on rural broadband strategies. The chairman can provide similar reports on ways to encourage greater investment in middle mile facilities.[13]

- And finally, the Commission can establish greater regulatory control over the prices offered by incumbent telephone companies when they are the only provider of such middle mile/backhaul facilities. When the Commission relaxed its price controls over special access facilities, it did so under the theory that there were a sufficient number of new entrants that would build competitive facilities to act as a market-check on the special access prices of incumbent carriers. In most markets, however, such competition has failed to develop. Lowering special

[12] Rep. Anna G. Eshoo (D-Palo Alto) introduced H.R. 2428, the *Broadband Conduit Deployment Act*, which is intended to spur the deployment of broadband networks throughout the U.S. She was joined in introducing the bill by House Energy & Commerce Chairman Henry Waxman (D-California), Communications, Technology and the Internet Subcommittee Chairman Rick Boucher (D-Virginia), and Rep. Edward J. Markey (D-Massachusetts). The legislation will require all new federal highway projects to include "broadband conduit" –pipes which house fiber-optic communications cable.

[13] *Bringing Rural Broadband to Rural America* at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-291012A1.pdf.

access prices in non-competitive markets will lower the costs of providing broadband to consumers. And it will also encourage the build-out of "last mile" facilities if the last mile provider knows it will be able to obtain adequate middle mile facilities at reasonable prices.

3. The Last Mile and Proposed Solutions.

There is no question that the most costly component of building broadband networks is in the "last mile" – the connection between the home or business and the telephone company central office, the cable head-end, or a similar aggregation point. Building last mile broadband facilities faces a number of challenges, including:

- Negotiating with the owners of poles can be difficult, especially if stringing cables over the poles requires existing lines on the poles to be moved;
- Digging trenches to lay cables can cause inconvenience to property owners;
- The labor costs can be significant, especially if digging trenches is required;
- Environmental impact statements may be required;
- Gaining regulatory approval from local authorities can be time-consuming; and
- Finding sites for wireless towers and antennas can also require community involvement and local government approval.

Our national goal should be to ensure that every home and business in America has both a high-capacity landline (preferably fiber) connection and a wireless broadband connection. Wireless is an essential component because it offers the advantage of mobility. However, no technology can match the broadband capabilities of fiber.

Fiber optics offer almost unlimited bandwidth. A single wavelength of light (a color, or "lambda") over a fiber optic strand can carry data at more than ten Gigabits (10,000 Megabits) per second. A single strand of fiber can carry at least 160 different wavelengths.[14] Furthermore, a single fiber optic cable may carry several glass strands. The actual transmission speed depends upon the electronic equipment used at either end of the cable. To upgrade the speed, it is only necessary to change the electronics; no change is necessary to the transmission cable itself. For these reasons, fiber optics are often described as a "future-proof" technology.

Fiber optic cables are increasingly becoming the standard technology of choice. In the U.S., fiber optic cables long ago replaced microwave and satellites as the primary transmission medium for long distance telephone and Internet traffic, and most large businesses and universities already have fiber connections. Many municipalities are

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[14] "Lambda Networking," Steven Wallace, Indiana University, available at http://paintsquirrel.ucs.indiana.edu/pdf/Lambda_Networking.pdf. *See also*, the definition of Lambda Circuits in Linktionary.com ("Using separate lasers, each tuned to a slightly different frequency, multiple lambdas can be projected down a single fiber strand to carry multiple streams of data. . . Currently, 200 lambdas per fiber is common, but thousands are possible.")

deploying fiber to serve anchor institutions (schools, hospitals, city governments, and sometimes libraries), and many new housing developments install fiber in the ground to serve each household. Japan and South Korea have implemented national programs to install fiber to the home, and several European (Sweden, the Netherlands, and France) and Oceanic (Australia and New Zealand) countries are beginning to do so as well. Most experts now recognize that every home and business will require a fiber optic connection to handle the needs of the Internet traffic at some point in the foreseeable future.

The costs of providing adequate last-mile fiber facilities can vary significantly, depending upon the location and whether or not the calculation is only for fiber "passing the home" or includes the cost of connecting "to-the-premise". According to Verizon, the costs of deploying fiber past each of the 19 million homes it will reach with its FiOS service will be about $700-800 per home, and the cost of connecting each home will also be around $700, for a total of about $1400-1500 per connected home.[15] Verizon's FiOS coverage area, however, tends to be in high-density suburban residential areas. The costs are higher in rural areas. According to a report by the Vermont Public Service Board, the average build-out cost for fiber-to-the-premise networks in rural areas of Vermont would likely be close to $4,000 per subscriber.[16]

Except for Verizon (in half of its coverage area), no provider is making the kind of investment in last-mile infrastructure that America needs for the 21st Century.[17] Rather than deploy FiOS in its other regions, Verizon is choosing to sell many of its operations in less densely populated areas.[18] AT&T has chosen a more conservative strategy to deploy a fiber to the node, called Project Lightspeed or "U-verse", which is designed only to provide about 35 Mbps.[19] AT&T has recently announced that it will slow down its roll-out of Lightspeed, postponing its goal of passing 30 million homes from 2010 to 2011.[20] Some cable providers are beginning to deploy DOCSIS 3.0 cable modems, a software solution that aims to provide over 100 Mbps of service. However, since the cable architecture is shared, the actual speed delivered to consumers is still quite uncertain.[21]

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[15] This cost consists of an average of $817 per home to lay the fiber down the street (to "pass" the home) and an additional $172 per home in "video infrastructure". See, Analysis of Craig Moffett of Sanford C. Bernstein, reported at http://bits.blogs.nytimes.com/2008/08/19/a-bear-speaks-why-verizons-pricey-fios-bet-wont-pay-off/?pagemode=print. In its response, Verizon notes that the cost to pass each home will decline to $700 per home passed by 2010.

[16] Vermont Department of Public Service, "Understanding Broadband Deployment in Vermont (2007), http://publicservice.vermont.gov/Broadband/Broadband%20Deployment%20in%20Vermont%20Final.pdf. (Vermont Broadband Report).

[17] There are isolated examples of municipalities that are deploying fiber networks (for instance in Lafayette, Louisiana, the UTOPIA project in Utah, and in Northern Vermont). And many new home construction sites are installing fiber. Nonetheless, the amount of investment in last-mile fiber facilities pales in comparison to the investment going on in other countries.

[18] Verizon has already completed the sale of its assets in Maine, New Hampshire and Vermont to FairPoint, and it has recently announced sale of 4.8 million access lines in 14 mid-western states to Frontier.

[19] The project was intended to be about 1/3 the costs of Verizon's FiOS project, but its costs have risen, and some speculate that it has proven more costly to condition the copper wires to carry data at the intended speed, which calls into question its decision to rely on copper.

[20] http://eldotelecom.blogspot.com/2009/01/at-slows-project-lightspeedu-verse.html.

[21] Rouzbeh Yassini, known as the "Father of the Cable Modem" praised the cable industry's DOCSIS 3.0 as a "truly impressive technology," but warns that broadband capacity requirements will eventually outstrip

While the lack of investment in last mile facilities is disappointing, it is not intended as a criticism of the private sector. The commercial carriers have a fiduciary obligation to their shareholders and should not be expected to invest where the costs are high and the potential revenues are uncertain. But, as Rob Atkinson, founder and president of the Information Technology and Innovation Foundation, has accurately stated, "there are significant [positive] externalities from high-speed broadband . . . if left to themselves, market forces alone will lead to less investment in broadband than is societally optimal."[22] Policy-makers need to design programs and institute a regulatory and policy environment that changes the economics of providing high-capacity broadband and make these investments more profitable and affordable.

This task is achievable. Many other nations have taken steps to promote deployment. Japan and South Korea have already made significant investments in fiber facilities to the home[23] and Australia recently announced that it will build a comprehensive fiber network serving 90% of homes and businesses.[24] Several European countries are developing and putting into place aggressive strategies to deploy fiber to the home.[25] Even many countries that are more rural than the U.S. (Sweden, Canada, Finland, and Norway) have a higher rate of broadband subscribership than the U.S. because their governments have taken the necessary steps to encourage it. These governments have not looked at their rural geography as an excuse for inaction; rather they have looked at it as a challenge that can be overcome with the right policies (Table 6).[26]

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it. "It's a great technology... a technology that will go on for five, six, seven, or even eight years." http://www.lightreading.com/document.asp?doc_id=172668&site=cdn.

[22] "The Case for a National Broadband Policy," by Rob Atkinson, President and Founder, the Information Technology and Innovation Foundation, June, p.6. Available at http://www.itif.org/files/CaseForNationalBroadbandPolicy.pdf.

[23] "Explaining International Broadband Leadership," by Rob Atkinson, Daniel Correa, and Julie Hedlund, The Information Technology and Innovation Foundation, May 1, 2008, available at http://www.itif.org/index.php?id=142.

[24] *See* Esme Vos, *Australia Plans 100 Mbps to 90 Percent of Homes and Offices*, MUNIWIRELESS, Apr. 7, 2009, http://www.muniwireless.com/2009/04/07/australia-plans-100mbps-national-network/.

[25] See, Presentation by Gerlas van den Hoven, Genexis B.V., Netherlands. The presentation says "FTTH is taking off in Europe" and cites examples of fiber deployment by KPN ("leading telco in the Netherlands is deploying >100 thousand homes per year"), Reggefiber ("investing in fiber infrastructure to every home: > 10 Dutch cities deployed, many more in progress"), Amsterdam ("successful completion of 40 thousand homes. Second phase (whole of Amsterdam!) starting now"), Slovenia ("cable network operators deploying fiber to beat the telco competition"), and says there are "many more in Sweden, Denmark, Germany." … available at http://www.epixnet.org/fileadmin/files/Workshop/ePIXnet_Workshop09_Gerlas_van_den_Hoven.pdf.

[26] It should be noted that the bar graph measures broadband subscribership nationwide and not just in rural areas. Some observers dismiss international comparisons by saying that the U.S. is more rural than other countries and should not be expected to have comparable adoption rates. However, this table indicates that there are several countries that are more rural than the U.S., and that the influence of rurality on U.S.-international comparisons requires further study.

The U.S. must study the strategies being adopted elsewhere and adapt them to our own experience. Suggested policy changes that will help to promote greater investment in, and use of, last-mile broadband capabilities include:

- *Funding:* In many markets, there is no substitute for direct financial investment. It will be extremely difficult for any private or non-profit venture to generate the capital to invest in broadband facilities in the highest-cost areas. The up-front costs of constructing a broadband network are often the biggest hurdle. The Federal government will need to spend significant sums of money to address these construction costs. As Bret Swanson said in his 2007 article in the Wall Street Journal, "Without **many tens of billions of dollars worth of new fiber optic networks**, thousands of new business plans in communications, medicine, education, security, remote sensing, computing, the military and every mundane task that could soon move to the Internet will be frustrated. All the innovations on the edge will die."[27]

  EDUCAUSE has previously estimated that it will cost approximately $97 billion to deploy fiber networks to pass every home and business in America. While this is only an estimate, we believe it to be "in the ballpark."[28] The ARRA provides a modest $7.2 billion in funding, which may provide an important kick-start to the deployment of fiber. Nonetheless, much more funding is likely to be necessary to meet the goals of a truly broadband nation.

  There are a variety of ways to make this funding available. The Federal Government could continue to appropriate funding for this purpose in future years, as in the ARRA. EDUCAUSE/Internet2/ACUTA suggest a 33/33/33 matching fund be established for broadband deployment.[29] This "Universal Broadband Fund" would share the upfront cost between the federal government, the state and local governments, and the network builder. After the network is

[27] "The Coming Exaflood," by Bret Swanson, Wall St. Journal, p. A11, January 20, 2007, available at http://online.wsj.com/article/SB116925820512582318.html.

[28] This estimate is derived as follows: There are approximately 115 million homes in America. Once Verizon completes its FiOS build-out to 18 million homes, and estimating an additional 2 million new homes that will have fiber in "greenfield" areas, there will remain about 95 million homes that will lack fiber. As noted, Verizon estimates that its costs of deploying in densely populate suburban areas will drop to about $700 per home in 2010. It appears that the average costs of such deployment tend to decline as providers develop more efficient ways of providing service. Costs may also decline with volume (and adoption of a national broadband strategy in this proceeding will help to drive this cost lower). AT&T and some other providers are deploying fiber to the node, so their costs of extending that fiber to the home should be less than $700 per home. On the other hand, the costs in rural areas are on average much higher than in suburban areas, and factoring in these costs will bring the average cost higher. About 17% of the population resides in rural (non-metro) areas, according to the USDA. See, http://www.ers.usda.gov/briefing/Population/. So our estimate of about $1000 to lay fiber to every home appears to be reasonable. Note that this estimate does not include the cost of the "drop" to each home, which is an additional expense that is only incurred once a home chooses to subscribe to monthly service. It is reasonable to expect the broadband provider to bear this cost because it can be recovered from the monthly charges to the customer.

[29] Windhausen, John, *Blueprint for Big Broadband*, EDUCAUSE, January 2008. Please see http://net.EDUCAUSE.edu/ir/library/pdf/EPO0801.pdf.

completed, the network builders would gain ownership and responsibility for maintenance. Other alternatives include: establishing the equivalent of a Rural Broadband Bank (similar to the old Rural Telephone Bank) using revenues from auctioning spectrum licenses to fund broadband investments, or transitioning the current high-cost fund of the Universal Service Fund to award grants to broadband providers.

- *Access to rights-of-way:* While it is important that local governments be permitted to make decisions on the use of streets, conduits and other rights-of-way, sometimes municipalities can impose unnecessary and detrimental delays on broadband providers. The process for obtaining access to rights-of-way can vary significantly from region to region. Providing some degree of national consistency regarding rights-of-way management can help to ease the process and reduce the cost of deploying last-mile broadband networks. The FCC can provide greater guidance to local officials to ensure that they recognize the national priority of extending greater broadband capacity to everyone.

- *Municipal Broadband:* The issue of broadband deployment is too important to the future of this country to be dragged down by "turf" battles over which entities should or should not be permitted to build broadband networks. In our view, any entity that wants to build a broadband network should be permitted to do so, including municipal and state governments. If local officials believe that their constituents can be well-served by constructing a municipally-owned network, they should have the right to make that choice. As an added benefit, the possible entry of the municipality into the market may provide greater incentive for the private sector to increase its broadband capabilities. The FCC should examine ways of using its legal authority to preempt any state laws or regulations that inhibit municipal entry. The FCC should also ensure that the right of municipalities to develop their own networks is an essential piece of the overall national broadband strategy.

- *Openness and Competition:* There is increasing evidence that open broadband networks encourage both greater deployment and adoption of broadband networks.[30] Commercial providers can generate more revenue by encouraging the greatest possible adoption, and one of the best methods of promoting adoption is to have multiple retail providers marketing the availability of broadband services over an open broadband network. Several other countries (France, the UK, Sweden, New Zealand) have successfully implemented a wholesale-retail regime. One of the reasons for the poor position of the U.S. is that it has abandoned the

[30] See, presentation of Benoit Felton of the Yankee Group to the Freedom to Connect Conference, March 31, 2009 (notes of his presentation are archived at http://freedom-to-connect.net/index.php?s=felton+presentation.). ("open access actually in incumbent operator's best interest, because it drives faster adoption, which drives faster break-even and sooner decommissioning of copper network" and "open access makes economic sense for private players everywhere in the world; vertically integrated NGA [next-generation architecture] deployment doesn't make investment sense, can't achieve 3-5 year payback; profitable wholesale model crucial to NGA deployment")

pro-competitive policies that European countries have adopted and maintained. The U.S. must re-adopt policies that encourage broadband networks to be available to multiple retail providers as a way to encourage broadband adoption and thus, construction.

There is no reason, however, to restrict the network provider to only wholesale business. Retaining competition from all providers, including network owners, can help stimulate the marketplace and create a competitive dynamic. Of course this will require regulatory oversight to ensure that the retail providers' network access is equivalent to that of the network owner's. However, the value that this oversight provides to all parties in the marketplace will be worth it.

- *Net Neutrality:* Similarly, ensuring that the broadband "pipe" remains open without interference from the Internet service provider (ISP) stimulates greater adoption and use of broadband, and thus aids in changing the economics of broadband deployment. As an example, colleges and universities are extremely large producers and users of Internet content. Many colleges and universities rely upon the Internet for distance learning – allowing them to make their enormous educational resources available to off-campus students throughout the world. Furthermore, university medical schools are engaged in sophisticated telemedicine services that provide essential medical monitoring and treatment via low-cost broadband connections. They are constantly developing new Internet-based applications and services that they hope to share with the American public.

  All of these activities, however, depend upon an Internet that is available on a neutral and nondiscriminatory basis. Under current law, there is no clear provision that prevents ISPs from discriminating against or in favor of a particular content or application provider. As an extremely Internet-intensive community, higher education cannot afford to have commercial ISPs determine which content gets through and which does not.

4. Evaluation of Our Progress.

There are few topics quite so controversial as how to calculate the level of broadband deployment and adoption in a given region. At the same time, data collection is fundamental to any long-term national broadband plan. What we have learned over the past several years, from study after study, is that measurement of broadband needs to be multi-faceted and focused as close to the end user as possible. Geographic and demographic situations may skew results by either understating or overstating connectivity. Relying exclusively on measures of demand may also be deceiving because some populations may not realize how they would use the Internet until they are shown the "must have" applications that provide the incentive for them to make the necessary investment in time, effort, money and skills development. Privacy is a concern for some citizens as well as a need to shelter their children from undesirable content. Just as the methods used to reach a state of ubiquitous broadband must be multi-pronged, so must the evaluation methods be varied and precise.

The broadband projects appropriated through the ARRA will provide a well-spring of information for a national broadband plan as long as grant recipients are required to collect data and make it accessible. With the short completion schedule, good data on what projects most efficiently serve the greatest good, could be available as early as 2012. In the recent NTIA/RUS proceeding, EDUCAUSE proposed that a priority be given to funding for anchor institutions such as schools, colleges, libraries and hospitals,[31] however, much of the data gathered to date on broadband has focused on residential usage. For many rural and underserved areas, these anchor institutions provide the only access available, but they are not accounted for in the data gathering. Community access points such as libraries can clarify the needs of a community by measuring the types of usage and the levels of expertise exhibited by patrons. In fact, libraries already gather extensive data on public Internet usage in their facilities. Analysis of this information would help determine the feasibility of extending networks into the residential areas, general need for training, and the necessity of subsidy programs to defray equipment and subscription costs. However, it is important that the number and types of consumers that are accessing the Internet at an anchor institution be clearly differentiated from "residential usage" in any evaluation schema.

EDUCAUSE/Internet2/ACUTA suggest that when the ARRA grant program comes to an end, there be a thorough and ongoing evaluation of the resulting projects. As the economy recovers, the nation should strive to combine what worked best in the ARRA with what we've learned from our international competitors, tailor the lessons learned to our needs, and complete the job of bringing high speed broadband access to every home and business in the United States.

5. Other Policy Goals.

EDUCAUSE/Internet2/ACUTA would like to take this opportunity to elaborate on some of the other policy goals that directly affect higher education and are mentioned in the request for comment:

Public Safety and Homeland Security:
EDUCAUSE/Internet2/ACUTA believe that the national broadband plan should address cybersecurity, at least with respect to the roles and responsibilities of broadband providers to both secure their networks and ensure that consumers are aware of the risks and available tools to protect themselves. Broadband providers can serve an important role in educating users about computer safety and security, and the bundling of security software and tools with broadband subscription services can add an additional line of defense.

The specific privacy and security concerns of higher education providers are tied to the student or employee's need to connect to campus networks or resources while off

[31] EDUCAUSE submission to the Request for Information on Section 6001 of the American Recovery and Reinvestment Act of 2009 Broadband Initiatives (Docket No. 090309298-9299-01) http://net.EDUCAUSE.edu/ir/library/pdf/EPO0908.pdf

campus. When a person interacts with the campus network via a home computer using a commercial network provider, it is expected that the efforts to secure the campus networks will not be impeded.

Experience shows that commercial network providers can prevent access or negatively impact the security of information resources when protocols are blocked that would otherwise permit users to establish secure connections with campus information systems, for example, over a Virtual Private Network (VPN). Additionally, as colleges and universities move towards more encrypted data transmissions, it is imperative that network providers not unnecessarily prevent the secure exchanges of data. Finally, commercial network providers should take appropriate steps to protect home users against malware and other vulnerabilities so that laptops and mobile media do not present an additional risk to college and university networks when they are used in both environments.

Worker Training:
Broadband in the workplace has become a "staple" for success. Based on a recent Pew Internet and American Life survey, over 62 percent of employed Americans use communication technologies on a regular basis at work for such things as checking email and accessing the Internet. [32] Because technology and communication tools evolve quickly, employees must continually adapt in order to remain productive. Broadband connectivity is not only essential for today's workers to do their job and to take advantage of new online tools, it also provides access to the specialized job training necessary to advance their careers. An added benefit of online coursework is that the employee can complete it on his/her own schedule and the employer saves the expense and lost productivity of having to send workers to off-site training. With unemployment reaching new highs, this is arguably the most important time for all citizens to have access to broadband services in order to remain competitive. Tools like online training to update or learn new skills, resume builders and tutorials, job-search engines, and social networking provide individuals a competitive advantage.

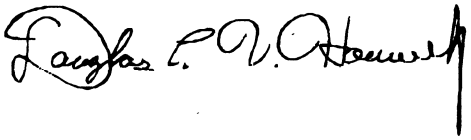
6. Conclusion.

The members of EDUCAUSE/Internet2/ACUTA are concerned about the inadequate level of broadband connectivity in the United States and the impact this shortage of broadband facilities is having on education. We welcome the development of a national broadband plan and offer our members' expertise as a resource for the FCC. We believe America's broadband plan must be bold, must look to the future needs of our country, and must be benchmarked against the progress other countries are making. Making true high-speed broadband available nationwide is a complex issue, with many factors, but our history shows it is very doable. By learning from successful projects at home and abroad, focusing on the most costly areas of deployment and providing capital where needed, and making sure the finished network remains open and allows for maximum

[32] http://www.pewinternet.org/Reports/2008/Networked-Workers.aspx , "Most working Americans now use the Internet or email at their jobs," Mary Madden and Sydney Jones, Pew Internet & American Life Project, September 24, 2008.

competition, we are confident that this plan can produce the broadband roadmap that will last for decades to come.

Diana Oblinger
President and CEO
EDUCAUSE



Doug Van Houweling
President and CEO
Internet2

Jeri Semer
Executive Director
ACUTA

ATTACHMENTS

ATTACHMENT A: Tables

TABLE 1:
Broadband Demand Growth

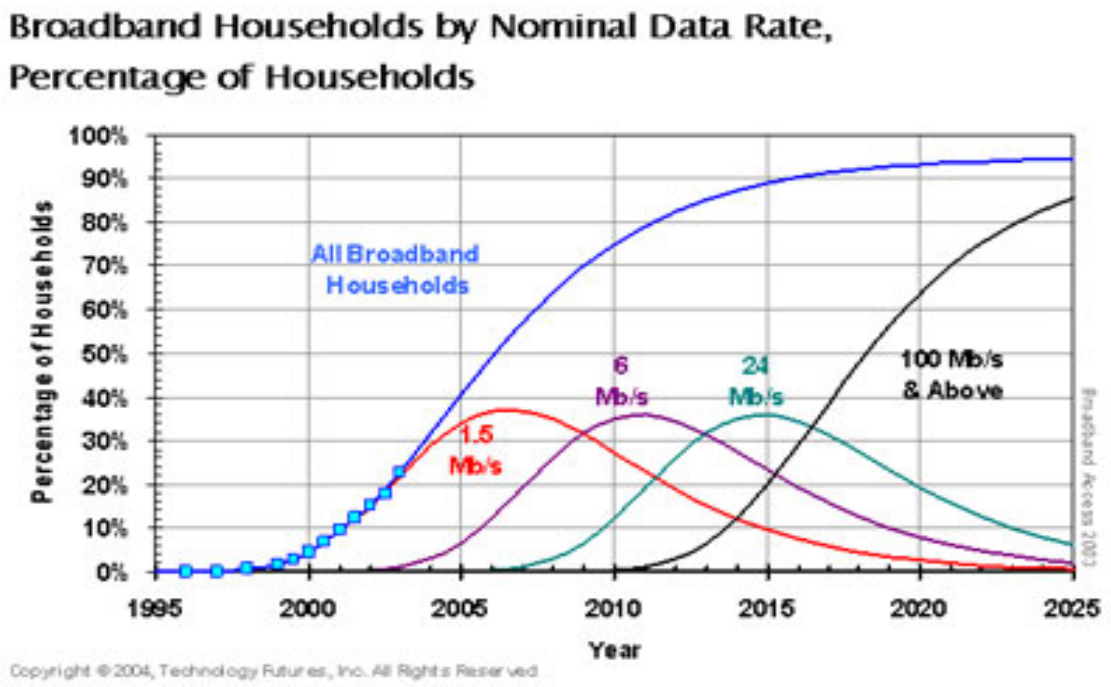


TABLE 2:
Japan: Broadband Demand Growing Per Subscriber

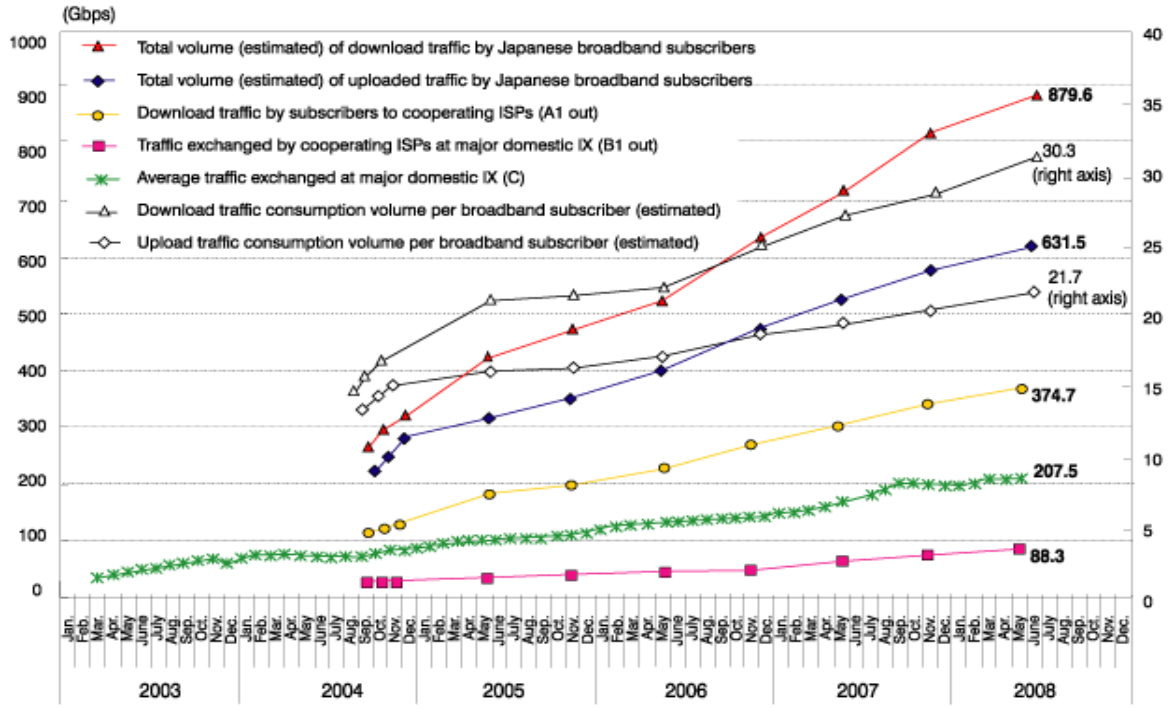


TABLE 3:
Nemertes Research: "North America is behind the rest of the world in terms of access line investment."

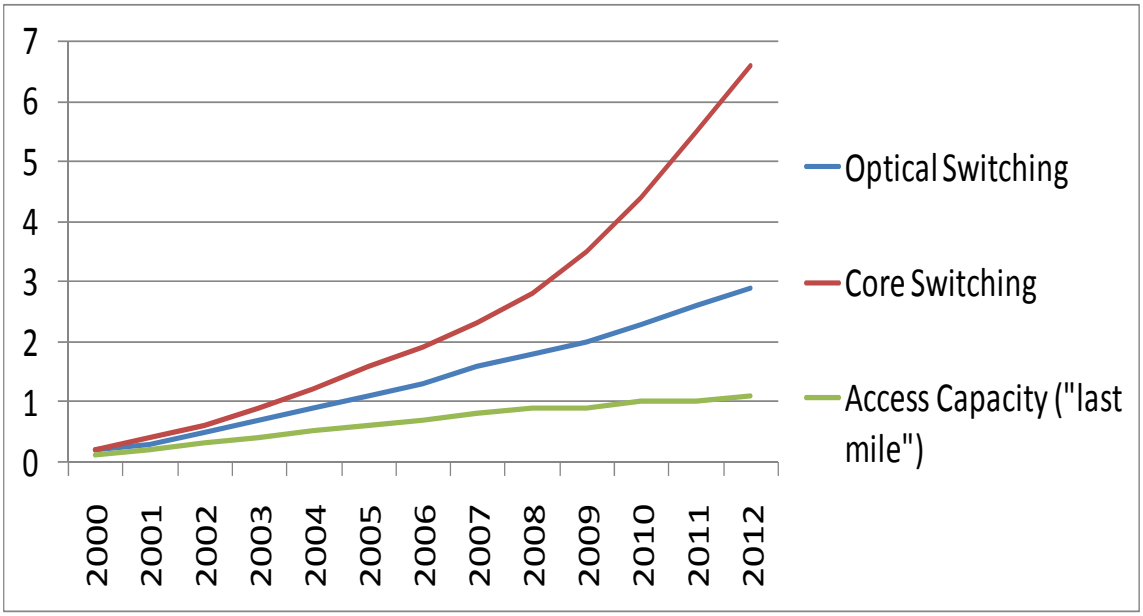


TABLE 4:
Japan: FTTH Growth

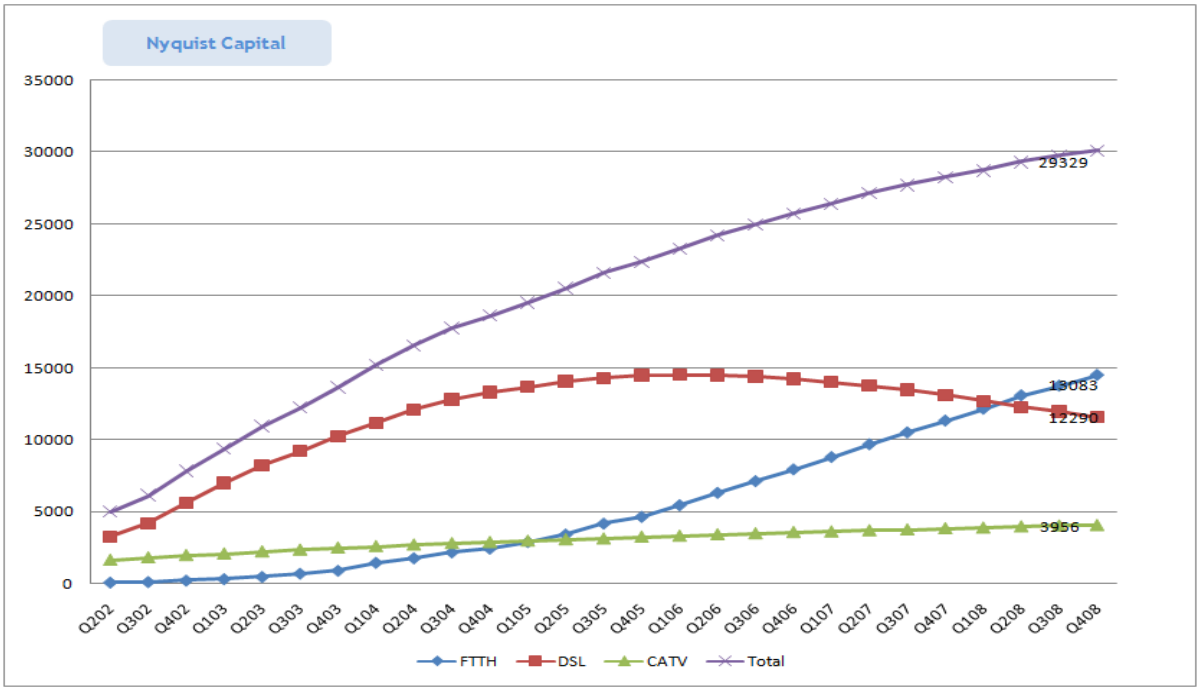


TABLE 5:
International Speed and Price Comparison

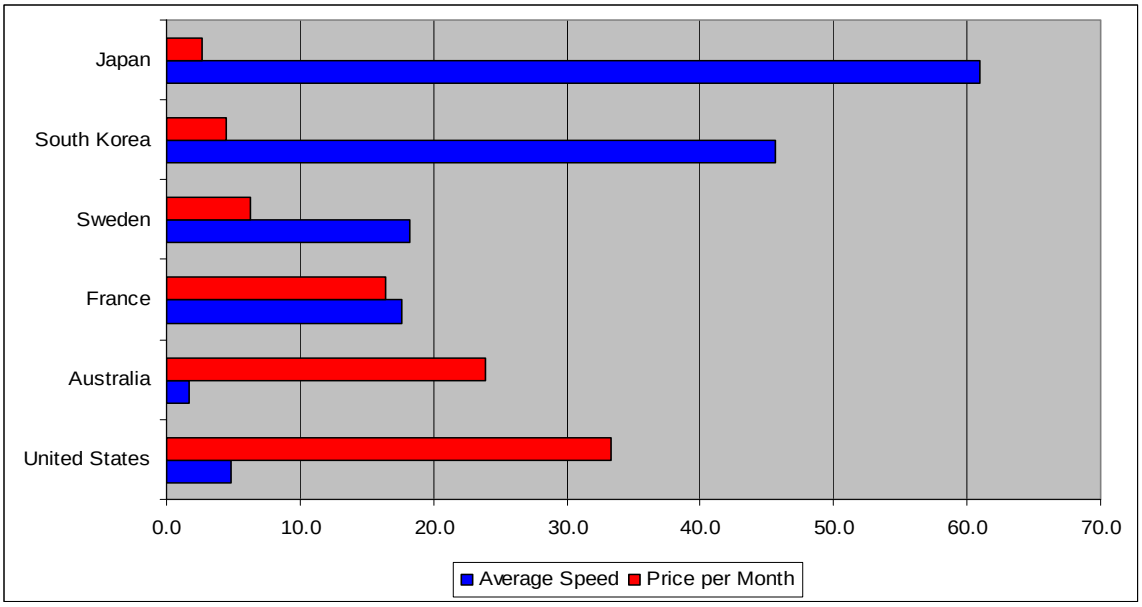
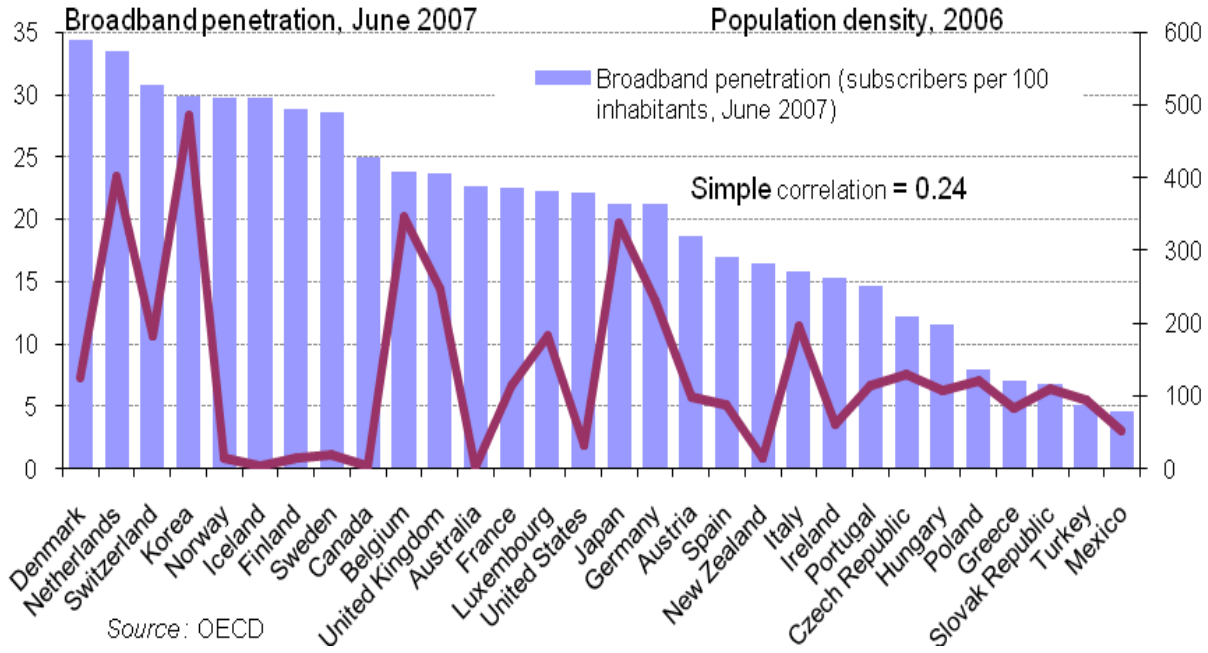


TABLE 6:
Countries with more rural population and smaller GDP per capita than the U.S. have better Broadband Penetration

OECD broadband penetration and population densities



ATTACHMENT B

UNLEASHING WAVES OF INNOVATION:
Transformative Broadband for America's Future

http://www.cra.org/ccc/docs/init/Unleashing.pdf.