

Before The Federal Communications Commission

Washington, D.C.

In the Matter of)	
)	
International Comparison and Survey)	GN Docket No. 09-47
Requirements In the Broadband Data)	
Improvement Act)	
)	
Inquiry Concerning the Deployment of)	GN Docket No. 09-137
Advanced Telecommunications Capability to All)	
Americans In a Reasonable and Timely Fashion,)	
and Possible Steps to Accelerate Such)	
Deployment Pursuant to Section 706 of the)	
Telecommunications Act of 1996, as Amended)	
by the Broadband Data Improvement Act)	
)	
A National Broadband Plan for Our Future)	GN Docket No. 09-51

Comments — NBP PUBLIC NOTICE #12

Cost Estimates for Connecting Anchor Institutions To Fiber

**Comments Submitted by the
Wisconsin Department of Public Instruction
(October 28, 2009)**

The Wisconsin Department of Public Instruction is the state's public school and public library agency. We appreciate the opportunity to offer comments and insights on the important issue of connecting community anchor institutions with fiber. Our comments focus specifically on public school and public library connectivity.

1) Are there other categories of buildings that should be considered anchor institutions?

We think that the institutions referenced in the October 5, 2009, filing by the Bill & Melinda Gates Foundation constitute the great majority of community anchor institutions. Furthermore, public libraries—with their mission to serve all the public—are the quintessential community anchor institution. According to the American Library Association, 98.7% of the nation’s public libraries provide Internet access¹ and the great majority do so at no direct cost to library patrons.

2) How well do the four categories of population density (dense urban, urban, suburban and rural) segment anchor institutions? Is there need to further divide, for example, the rural grouping (<1,000 persons per square mile) to treat more remote areas differently?

We do not think it necessary to further define the population density for these anchor institutions. In fact, we have some questions on the categories as defined by the Foundation. For example, the Foundation lists the average rural fiber loop as 20,000 feet. While not entirely clear in the Foundation’s cited documentation (note 1 on page 4), it appears this figure may be based on providing fiber to rural residences. It is important to note that the great majority of K-12 schools and public libraries are located in communities, although sometimes in very small communities. Our key point is that they are seldom in isolated locations out in the rural countryside. Therefore, the definition of “rural” (<1,000 persons per square mile) may not have too much relevance in this context. Of the 467 schools and libraries in the State of Wisconsin’s Broadband Technology Opportunity Program (BTOP) grant application², only three sites require fiber runs greater than 20,000 feet. Ninety-one percent (423 sites) require fiber runs of less than 5,000 feet. In relation to rural vs. urban, below are some additional statistics from the State’s BTOP application. These data apply to the public libraries in fourteen suburban and twenty rural communities.

¹ Public Libraries and the Internet 2009: Study Results and Findings. 2009. Figure 5, p. 16. (<http://www.liicenter.org/plinternet>).

² The State’s BTOP application, submitted in August 2009, is to install fiber to school districts and public libraries that are on the state’s BadgerNet telecommunications network but do not have fiber. See the application’s Executive Summary at <http://dpi.wi.gov/pld/pdf/btopgrantsum.pdf> for more information.

Location	Average community population ³	Average cost of fiber	Average length of fiber
Fourteen communities in suburban Milwaukee County (not city of Milwaukee)	24,493	\$36,614	0.20 miles (1,056 feet)
Twenty communities in rural northwest Wisconsin (random selection)	2,095	\$47,331	0.44 miles (2,561 feet)

It is assumed that the higher cost to bring fiber to libraries in rural communities is primarily associated with distance but a more in-depth review of our data will be needed to confirm this. For example, in some smaller communities more upgrades are needed at the provider’s central office (CO) facility or for more middle mile upgrades.

3. How accurate is the assumption that 80% of anchor institutions lack fiber? Does it vary across the different population-density groups? Does it vary by type of anchor institution?

The latest American Library Association Internet survey shows that 17.5% of public libraries nationwide have fiber⁴. Based on the State of Wisconsin’s BTOP application, only 9.3% of our state’s public libraries have fiber. The Foundation’s 80% figure is more accurate for our K-12 schools where we know that at least 20% have fiber and we think the exact figure is closer to 25%. A major reason for the lower public library figure is that over 90% of our libraries have a broadband circuit under 5Mbps, which can be easily accommodated over a copper infrastructure. Our school districts often have wide area networks (WAN). Circuits from all the district’s schools hub back to a central location, like the high school. From there a larger capacity circuit, often requiring fiber, is provisioned to the Internet Service Provider. Another reason why the school fiber number is higher is that Wisconsin was a pioneer in building full-motion video distance education networks dating back to the 1970s. At that time the bandwidth needed for this service required fiber connectivity.

³ Forty-three percent of the libraries in Wisconsin’s BTOP application are in communities under 2,000 population.

⁴ Public Libraries and the Internet 2009: Study Results and Findings. 2009. Figure 19, p. 26. (<http://www.liicenter.org/plinternet>).

4. To what extent are the cost estimates for bringing fiber to individual buildings accurate?

As in our answer to #3 above, we can use our BTOP grant application data to provide some insights into the cost to install fiber to Wisconsin's public schools and public libraries. The average cost to install fiber to 467 schools and libraries is \$57,707. This cost includes the following:

- Cost for fiber, conduit, repeaters, manholes, handholes, etc.
- Labor cost to pull fiber to the site
- Cost to install fiber in the building. This is usually a switch with an Ethernet handoff to the library/school side of the demarcation point. This cost does not include any needed local area network (LAN) upgrades in the school or library.
- Any needed upgrades of the provider's central office (CO) infrastructure
- Any needed upgrades of the provider's middle mile infrastructure

The average distance to pull fiber is just 0.436 miles (2,302 feet). This reflects the fact that almost all providers' central offices have fiber and most of our libraries and schools are in communities, not in the rural countryside. We do not know how much fiber will be aerial vs. trenching. However, anecdotal evidence indicates that much of the existing fiber, even in rural areas, is in the ground.

Of interest, rounding the average Wisconsin cost per site to \$60,000, and using the Foundation's figure that there are 14,800 libraries nationwide without fiber, it will cost \$0.89 billion to install fiber. This is well within the Foundation's estimated range of \$0.7 - \$1.7 billion, albeit on the low end.

5. What incremental inside-wiring, or campus-wiring, costs should be added to these estimates? For what type of institutions in what geographies?

We assume the great majority of community anchor institutions, and especially K-12 schools and public libraries, already have local area networks installed. Moving to fiber, with its

likely significant increase in bandwidth, may require some new hardware (e.g., routers, switches). But compared to the average cost of installing fiber we view internal wiring and network upgrades to require a much smaller investment which, in turn, is more likely a cost local institutions can assume. In addition, schools and libraries in high poverty areas can use the federal E-rate program to help offset any LAN upgrade costs.

6. To what extent will right-of-way issues lead to incremental costs not reflected in these estimates?

We agree that this is an issue but do not know the impact or extent.

7. Should operating expenses be a consideration when calculating cost for connecting anchor institutions to fiber? What operating expenses would be associated with running these networks, and how would those vary by type of institution and geography?

Our schools and libraries already employ staff or contract with third parties to operate and manage their LANs and WANs. Most of these institutions will see little if any additional ongoing operating expenses in moving from copper to fiber.

An ongoing expense the Commission does not directly address in this Notice is the cost to community anchor institutions of procuring additional bandwidth made possible by fiber connectivity. It will be frustrating if a school or library procures fiber connectivity only to realize that ongoing costs charged by a service provider for the dramatically increased bandwidth results in an equally dramatic increase in price. In the latest American Library Association Internet survey, 22.9% of respondents⁵ stated that they want to increase their current bandwidth but cannot afford to do so. In this regard, the E-rate program remains very important in helping our schools and libraries pay for any additional bandwidth.

⁵ Public Libraries and the Internet 2009: Study Results and Findings. 2009. Figure 23, p. 29. Of interest, 26.0% of libraries say the bandwidth they already have is the maximum available in their area. Fiber connectivity will address this latter issue.

8. To what extent will providing fiber to these institutions improve the build-out economics in currently un- or under-served areas?

The State of Wisconsin's BTOP application references the fact that providing fiber to our schools and libraries will certainly have broader benefits to both urban and rural communities. As fiber is run from the provider's central office switch to a neighborhood school or library it will pass numerous households and businesses. However, without considerably more in-depth analysis of specific fiber paths it is not possible to accurately know the precise impact of this.

9. To what extent will providing fiber to these institutions directly assist last-mile build-outs in currently un- or under-served areas? For example, will bringing fiber to local schools generally provide shorter loop lengths to surrounding homes, or is the location of the communications plant relative to the school and community the primary driver? How will that vary by population density?

Most of our comments in #8 above are germane to this question.

Thank you for the opportunity to comment on this important issue. If you have any questions, please contact me.

Sincerely,



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