Municipal Trends

Deployments by municipalities now serve a third of the U.S. homes passed by fiber. What are the prospects for continuing growth of municipal FTTH?

by Sharon E. Gillett

Author Profile

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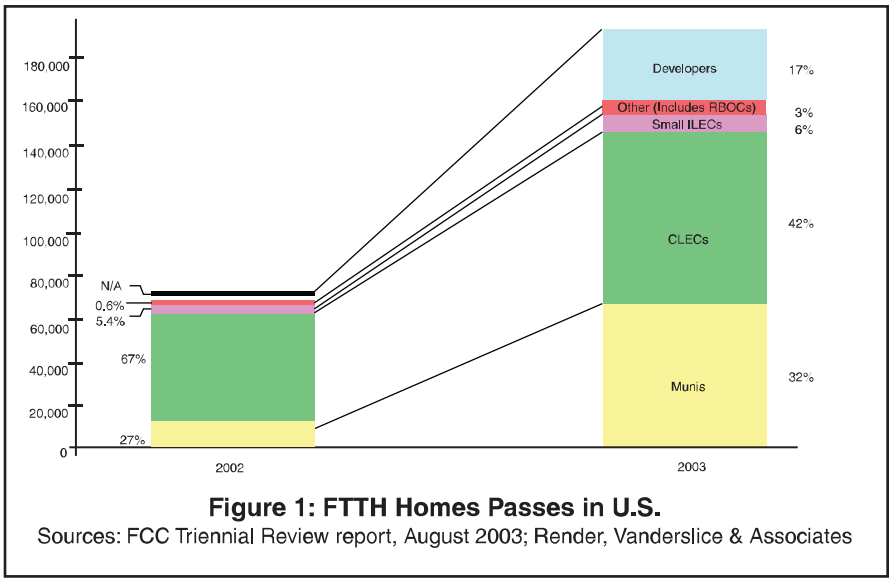

Figure 1: FTTH Homes Passes in U.S.
Sources: FCC Triennial Review report, August 2003; Render, Vanderslice & Associates

How significant are municipalities as a driver of growth in the U.S. Fiber to the Home market? More than they may appear at first glance.

As of last May, according to the FTTH Council, of 128 communities nationwide that have FTTH installed, only 10 were classified as municipalities. But these 10 deployments serve nearly a third of the homes passed by FTTH in the US, and that share has grown – even as other kinds of entities also have begun to offer FTTH, too. (*Figure 1*) One reason is the nature of the municipal offering; once technology trials are passed, municipalities typically commit to serving the entire community with FTTH, not just neighborhood-sized "greenfield" deployments.

Although it is widely expected that FTTH deployments by major telephone companies (particularly Verizon) will eventually dwarf municipal deployment, significant uncertainty surrounds the timing of this trend. In the meantime, it is useful to understand how far the municipal FTTH trend may go, and what paths it may take as it plays out.

To understand the growth prospects for municipal FTTH, it is helpful to segment the municipal market as shown in *Figure 2* – among communities with Municipal Electric Utilities (MEUs), communities that run other types of utilities, and others that run none at all.

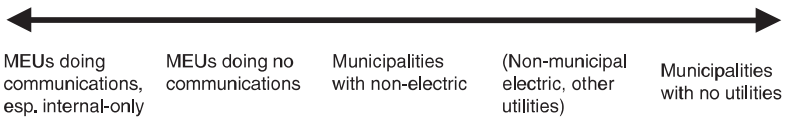

Figure 2: Market Segmentation for Municipally Driven FTTH

Segmented this way, the data show decreases in both the probability of municipal action and the likelihood that such action will result in the

choice of FTTH over competing broadband technology alternatives, as communities move along this continuum. Thus, communities with MEUs are the most likely to deploy FTTH, while communities that run none of their own utilities are the least.

Municipal Electric Utilities

Why are communities with MEUs the most likely to deploy FTTH? The reason is a relatively lower cost of entry into wired communications. As the local power company, the MEU already has access to conduit and/or utility poles, a fleet of trucks to provide outside plant and customer premises servicing, and a service relationship with consumers and businesses in the community. Moreover, many MEUs also enjoy a long history of political support from the local community. As a result, MEUs have been among the earliest to provide municipal communications services, including broadband (*Figure 3*), and make up all 10 of the municipal deployments on the Council's May list.

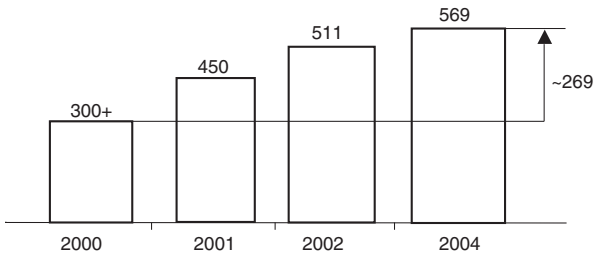

Figure 3: Number of MEUs doing Communications

Source: American Public Power Association (APPA); out of ~2,000 U.S. MEUs

According to an analysis of 2002 American Public Power Association (APPA) data about MEUs that offer communications services, MEUs that provide internal communications services are significantly more likely to offer external communications services to the public, and therefore more likely to consider FTTH (*Table 1*). Internal communications are those that support the internal operations of the electric utility or enable data communications among local government facilities (including schools, in some communities), and external services involve offerings (like FTTH) to the public, aimed at residential and/or business customers.

A strong statistical correlation between communities offering external and internal communications is apparent in the data. This pattern is consistent with a progression often found among MEUs and Public Utility Districts (PUDs) that have gotten into communications.

Typically, the MEU's first step is to "insource" communications – to build its own infrastructure for services to improve its internal operations. The cost of this infrastructure, including rings of fiber optic cables that connect the utility's power substations, often is justified on the basis of operational cost savings derived from more automated monitoring and management of electricity distribution. Sometimes, the concomitant ability to provide voice services to the utility, and perhaps also to the local government, is added to the cost equation as well.

However it is justified, once this first step has been taken, the decision to deploy infrastructure to the public becomes incremental. Deployments can proceed with less cost and risk than would have been possible without the pre-existing infrastructure.

This progression implies two paths for vendors to take to develop FTTH markets among MEU communities. The first path is through MEUs that already offer internal but not external services, which would seem to be extremely ripe targets for FTTH deployments. According to the 2003 APPA data, of the 569 MEUs and PUDs that are doing any sort of communications, 145 fall into this internal-only category. Undoubtedly, some of these 145 communities are already trialing FTTH.

The second path, although harder to travel, is through communities that don't yet have fiber-based internal MEU infrastructure. Municipalities face budget pressures at the same time that their demands for governmental and educational data communications are increasing. Furthermore, requirements imposed by homeland security, energy efficiency, and power grid reliability imply a growing need for automated Energy Management Systems (EMS). Both of these trends suggest increased potential for communications "insourcing" by municipal power companies, which may be considered as either an interim step toward community-wide FTTH deployment, or as an end unto itself; more than 1,500 MEUs and PUDs still do not provide internal commu-

Table 1: Categorization of Communications Services Offered by MEUs (Based on APPA)

Internal Services	External Services	
	Primarily Residential/Consumer	Primarily Business/Commercial
Internal telephone service	Cable Television	Leased (Private) Lines
Automated meter reading (AMR)	Local Telephone	Fiber Leasing
System control & data acquisition (SCADA), *i.e.* network monitoring and management	Long Distance Telephone	
Municipal data communications	Video on Demand	
	Wireless services	
	ISP (including dial-up)	
	Broadband Modem	

nications. Along the way, vendors may choose to develop their own components or systems, or they may partner with companies such as Siemens and ABB that already market EMS solutions.

To be sure, access to an internal fiber infrastructure does not guarantee that MEUs will choose to build FTTH networks to reach consumers. According to a report by MuniWireless.com, several MEUs (including Chaska, MN and the Benton County, WA PUD) have achieved synergies by attaching wireless access points to internal fiber networks, and similar hybrid architectures are possible with alternative technologies, including broadband over power lines (BPL), hybrid fiber-coax (HFC) and wireless solutions (using both licensed and unlicensed radio spectrums).

HFC does not pose a long-term competitive threat to FTTH, however, even where there is an internal fiber infrastructure in place. As the costs of FTTH fall to parity with HFC, competition from HFC will wane.

Without an internal fiber infrastructure in place, all-wireless or all-BPL solutions have added appeal compared to FTTH. Wireless alternatives to FTTH – particularly those that use unlicensed spectrum – will compete with FTTH in the near future, because wireless is much less expensive to deploy. In fact, the low cost of wireless is one reason that municipal wireless networks have grown rapidly in the past year, both inside and outside the U.S. Longer term, wireless will drive demand for FTTH.

Municipal wireless networks also complement fiber, however. In the short term, wireless may drive an MEU to deploy fiber internally. Longer term, wireless is likely to drive demand for FTTH. As broadband availability leads to growth in demand, the technical limitations of wireless systems eventually may prompt the communities that have adopted these systems to consider FTTH instead.

Moving Beyond Economies Of Scope

While economies of scope with an internal infrastructure are a significant driver of MEU FTTH deployments, they are not the only important factor. Data from the APPA and other sources show the effects of demographics, geographic location, local private-sector competition, and state regulatory frameworks on an MEU's decision to offer communications services to the public. Several factors appear to significantly affect the decision-making process:

• **Proximity to Urban Areas**. The more remote an MEU's community is from a major population center, the less likely the MEU is to offer external communications services. This geographic factor proxies for backhaul communications costs, which are generally lower the closer the community is to points of presence for major communications backbones (both data and voice). Extending FTTH to MEUs more remote from major population centers requires co-evolution with regional fiber networks. It is difficult for an MEU to justify building a fat last-mile pipe if the middle-mile backhaul is going to be a soda straw. As a result, any actions that FTTH vendors can take to help develop regional and statewide fiber consortia serving remote areas will help them create more customers among the MEUs and PUDs in those areas.

• **Competition**. In the APPA data, MEUs that offer only residential services (*Table 1*) are significantly smaller than those that offer only business-oriented services, suggesting that MEUs are more likely to diversify into consumer-oriented communications services – including FTTH – when the community feels overlooked by private sector communications firms. Analysis of the data shows that MEUs in communities served with broadband from private sector cable-modem providers were less likely to offer communications services to the public. Similarly, municipal FTTH plans may be driven or constrained by delays or accelerations, respectively, in private sector FTTH rollouts.

• **State Legal Framework**. According to the APPA's 2004 Community Broadband Fact Sheet, 13 states impose a range of legal barriers to municipal entry into communications. These policies range from outright prohibitions – such as in Texas, which "bars municipalities and municipal electric utilities from offering telecommunications services to the public either directly or indirectly through a private telecommunications provider" – to business-model restrictions. An example of the latter is Washington, which prevents county-wide Public Utility Districts (but not municipalities) from offering retail services, but allows them to sell wholesale telecommunications services. Another type of policy sets service-based restrictions. For example, Arkansas "prohibits municipal entities from providing basic local exchange services." Even restrictions on a single service can reduce incentives for FTTH by blocking the "triple play" bundled offering of voice, video and data. States that adopt restrictions on municipal entry into communications will be effective at discouraging municipal FTTH, especially in the wake of the Supreme Court's March, 2004 Nixon vs. Missouri Municipal League ruling that let such state laws stand, on the grounds that the federal Telecommunications Act of 1996 does not actually pre-empt them.

Restrictions aside, there is still room for growth for FTTH. Thirty two states currently have no specific restriction on municipal entry and no

Table 2: Non-MEU Market Segmentation

	Electric Utility	Non-electric Utility
Municipal	MEUs (discussed above)	Municipal gas, water/sewer etc.
Non-municipal	Investor-owned electric utilities (IEUs), and Rural Electric Cooperatives (RECs)	Investor-owned gas, water/sewer etc.

MEUs serving customers with FTTH. These states present a strong growth opportunity for FTTH, especially for MEUs that offer internal communications services, as discussed above.

Beyond MEU Communities

Although MEUs provide strong prospects for FTTH growth, the 2,000 or so U.S. communities with MEUs are less than 10% of the 25,000 or so "places" listed in the 2000 Census. And some of the economies of scope that drive MEU broadband are not limited to MEUs. *Table 2* segments non-MEU communities based on the nature of their utility and ownership. *Table 3* summarizes potential drivers and barriers within each non-MEU segment, listing the segments in decreasing order of likelihood for FTTH deployment, and including municipalities that have no public utility at all.

Communities with municipal utilities other than electricity may be the most likely non-MEU segment to deploy FTTH and other broadband technologies. Public ownership plays a large role in the decision to undertake what may be perceived as a future-oriented, somewhat risky investment toward future economic development objectives.

Municipal gas or water/sewer utilities may not have access to utility poles, but they do share with MEUs other important economies of scope vis-à-vis FTTH, including the internal organizational structure needed to support customers – for example, repair trucks, phone support and billing systems – and the need to automate the monitoring and management of their systems with an internal network. For example, MuniWireless.com reported last July that Corpus Christi, TX "is deploying a citywide Wi-Fi network for use by the city-owned water and gas utilities, public works departments, and public safety agencies." Corpus Christi plans to use the network to automate gas and water meter reading, and existing city fiber will be used to connect the wireless access points.

Municipal gas or water/sewer utilities also may have other broadband-friendly resources that MEUs do not, such as water towers that can serve as wireless antenna sites.

While non-municipally-owned electric utilities share all of MEUs' economies of scope surrounding FTTH, these economies are not their only consideration. Others are geography and demography, and politics.

Cooperatives are typically found in

Table 3: Drivers and Barriers of non-MEU Broadband/FTTH

Who Might Deploy FTTH?	Economies of Scope	Barriers
Non-electric Municipal Utility (*e.g.* gas, water/sewer)	**No:** Pole access **Yes:** Automated system monitoring & management, customer service operations, towers & other physical facilities (antenna siting)	State laws limiting municipal entry into communications
Non-municipal Electric Utility (IEUs & rural co-ops)	Same as MEUs (**Yes:** automated system monitoring & management, customer service operations, pole access)	For IEUs: Business conditions, state-level regulatory barriers
Non-municipal non-electric Utility (*e.g.* investor-owned gas, water/sewer)	Same as Non-electric Municipal Utility	Business conditions, state-level regulatory barriers
Municipality with no public utilities	**No:** Pole access, automated system monitoring & management, customer service operations **Yes:** Internal government/K12 data communications, but…	…Restrictions on public's use of cable-company provided I-Net infrastructure, in addition to state laws limiting municipal entry into communications

rural areas where broadband wireless is a more likely access solution, and in fact at least one rural electric cooperative (Wheatland Electric Cooperative, Inc. in Western Kansas) has followed this path. However, given changing U.S. demographic patterns, some rural electric cooperatives now find themselves located in rapidly growing exurban areas, making FTTH a more viable option to consider in these cases.

Private or investor-owned electric utilities (IEUs) are typically located in higher density areas, but face a different set of barriers to serving the public with communications services. The generally poor financial performance of the telecommunications sector over the past few years has made it difficult to raise capital for this type of diversification. Furthermore, state regulators may impose structural requirements intended to protect electricity ratepayers from bearing the financial risk of communications ventures.

Despite these barriers, however, it remains likely that these private electric utilities or IEUs eventually will gravitate toward fiber as a way to offer broadband to the public – and in the near-term, as a means to build an Energy Management System like those used by some MEUs.

Investor-owned non-electric utilities, such as private gas or water/sewer utilities, may be less likely to deploy FTTH, because they face the same business and regulatory obstacles as IEUs, and have slightly less compelling economies of scope – such as no pole access.

It is clear that municipalities that do not run any of their own utilities are the least likely to deploy FTTH, although some have driven broadband wireless deployments. Economies of scope may exist with fiber used for municipal and school district communications, but can only be directed toward serving the public in communities where this fiber is not part of an "I-net," a municipal network provided by a cable-TV company as part of its local franchise agreement. I-nets typically can be used only for internal government purposes.

Municipalities without utilities that do have their own unencumbered fiber deployments have been more inclined to serve the public with wireless access rather than with FTTH. This outcome is not surprising, because the economies of scope enjoyed by utility operations are missing in these communities.

Conclusions

In the near future, the communities that are the best candidates for FTTH deployments are those with a municipal electric utility that has built or is planning to use fiber for its internal network, communities that are not constrained by state laws from offering communications services to the public, and communities that don't have another attractive option for offering cable television or cable modem services to consumers. Of course, the ability of the community to obtain adequate "middle mile" access to the Internet is important, too

Economies of scope with power networks also present a large market opportunity for more automated utility monitoring and management systems. Such systems are being adopted by utilities other than MEUs – including investor-owned utilities (electric and other) and rural electric cooperatives – and represent both a near-term and long-term prospect for deployment of fiber-based solutions based on these systems.

In addition, in the short term, municipal adoption of competing technologies can be viewed as complementary to fiber deployments, because it builds on existing demand, or stimulates new demand, for fiber.

Long term, demand may outgrow the technical limitations of technologies such as BPL and wireless.

Ultimately, all municipal paths lead to fiber-to-the-home. ❖