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Municipal FTTH Systems

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Municipal Fiber to the Home Deployments: Next Generation Broadband as a Municipal Utility

Updated-October 2009

The market penetration of fiber-to-the-home in North America is increasing, with connections now reaching five and one quarter million U.S. households. Fiber to the home (FTTH) is quickly becoming the broadband service of choice for consumers looking to keep pace with high-bandwidth Internet applications and home entertainment options such as high definition video on demand. What's more, this ongoing transformation to fiber-driven, next-generation networks is now a matter of strategic national importance, particularly as other countries in Asia and Europe proceed toward wiring up their communities with high-bandwidth fiber. Few people understand this better than civic leaders in many of America's outlying cities and towns, where access to the information highway can mean the difference between a future of robust economic development and one of community decline.

Accordingly, a growing number of municipal governments are taking it upon themselves to build FTTH networks – much in the way that they have previously built roads, sewers and/or electrical systems – as a means of ensuring that local residents have access to necessary services, in this case, the Internet connectivity for the 21st Century. These

municipal deployments are usually undertaken after private service providers have declined to upgrade their networks or build such systems.

Deployments by municipalities were among the first FTTH systems operating in the United States. Though, in aggregate, they do not approach the number of FTTH subscribers of a Verizon – which currently accounts for nearly three quarters of all FTTH deployments in the U.S. – municipal systems do have a significant percentage of all non-RBOC subscribers. Further, they represent an important aspect of national FTTH deployment, namely, the option and opportunity for local elected officials and civic leaders to upgrade local connectivity - when private enterprise will not take on the job.

It is in the national interest that higher-speed networks proliferate quickly and to the greatest extent possible – and that special measures be taken to ensure that these networks can be accessed by people who live beyond the major metropolitan areas. Accordingly, it is the position of the FTTH Council that anyone who has the means and the desire to build an FTTH network should be allowed and encouraged to do so – especially when it is an elected local government that is taking the decision



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to build when the private sector will not. Clearing the way for further municipal deployments of FTTH will help ensure that America is wired up for the global competition in technology and information.

Given all the above, what is the current state of municipal FTTH deployments? How are these systems faring, and what is their future? To find out more, the FTTH Council commissioned RVA LLC¹ – the leading market research firm specializing in FTTH – to survey municipal systems for the purpose of gathering first-hand status information from network operators. Its conclusions are summarized below.

1. Municipal FTTH systems are continuing to proliferate where allowed.

By definition, municipal FTTH systems are broadband communications systems run by public entities such as municipalities, counties, municipally-owned electric utilities or public utility districts, and which deliver services such as voice, television and Internet over direct fiber connections to residences. In addition, these systems typically offer reliable broadband connections to businesses, government locations and schools and libraries.

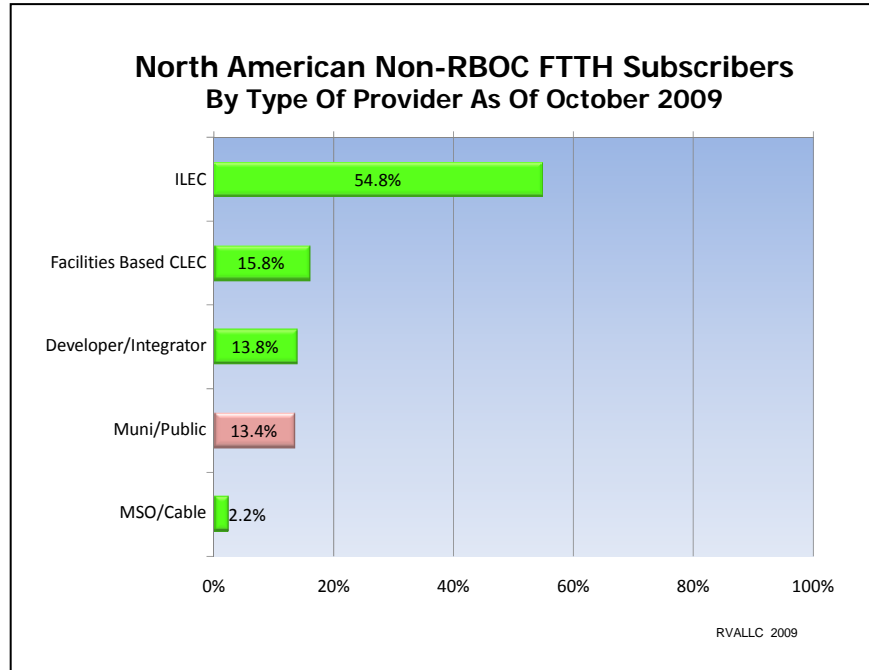
As of October, 2009, there are 57 public providers operating FTTH systems in North America. (These providers represent over 85 individual cities. A few

¹ www.RVALLC.com

cities have banded together to form consortiums and others are part of larger public utility districts.) In addition, to this list there are at least another 15 municipalities offering just fiber to the business.

Altogether, they serve 3.4 percent of the FTTH subscribers in North America. More importantly,

they represent 13.4 percent of the non- RBOC FTTH deployments, with most of the remainder being served by small and medium-size telephone companies. The chart on this page lists FTTH subscribers by type of service provider.²



Systems operated by municipal and public electric

utilities were among the first FTTH networks deployed in North America. Systems like Bristol, VA, Dalton, GA, Chelan County, WA, Grant County, WA, Jackson, TN, Kutztown, PA, and Reedsburg, WI all were started between 1999 and 2003. The average size of the first municipal FTTH systems was comparatively small – under 5,000 subscribers. Today, many new or expanded municipal FTTH systems are considerably larger,

² It should be noted that not all municipal communications systems delivering television or Internet to area premises are FTTH. Hybrid Fiber Coax (HFC) or fiber to the business only (FTTB) systems are sometimes mischaracterized as municipal FTTH systems. (Examples of municipal networks sometimes mistakenly called FTTH systems include those networks deployed in Tacoma, WA and Marietta, GA. While these systems are generally successful, the FTTH Council does not have in-depth information on their financial performance.



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and the average size of municipal deployment continues to grow. Larger cities – including Seattle, WA, San Francisco, CA, Portland, OR and St. Paul, MN – are considering building municipal FTTH systems.

A list of all municipally-operated FTTH systems in North America currently serving customers is included at the conclusion of this report.

2. More, and larger, municipal FTTH systems are under development for 2010

The success of municipal FTTH deployments in improving local economies and attracting new business has led other local governments to pursue this option. Recent FTTH bond referendums have been highly successful. The number of municipal FTTH systems will likely grow in the next two years as there appears to be a resurgence of interest in deployment by municipalities and a number of applications for stimulus funds where incumbent telephone company's are reluctant to invest in upgrading their networks. Older FTTH systems, such as that operated by the Grant County Public Utility District in Washington State, are now expanding again to cover more of the citizens in their service areas. Additional muni systems are in various stages of study, funding and development.

3. The “success” of municipal FTTH systems is substantiated by high subscriber take rates.

Based on interviews with municipal system operators and managers conducted by RVA, municipal FTTH systems have generally been undertaken in areas where it was perceived that there was little chance that private providers would initiate a fiber to the residence program in a reasonable amount of time – and where local leaders felt that having next-generation broadband connectivity was essential to the welfare of the community. (If private parties are willing to participate, municipalities have often sought to partner with these companies to help speed the introduction of FTTH to the community. One example of such a partnership has been the City of Fort Wayne, Indiana, which launched such an effort in

partnership with Verizon rather than build its own city-run system.)

Municipal FTTH systems have generally been successful to date. In some cases, as expected, projects have had to deviate from their original business plans in order to respond to realities and ensure success in the field. A number of systems have far exceeded original expectations, while a few others are behind early expectations. One, Provo Utah was sold to a private company. This transaction allowed the city to retain its FTTH network, and the operator to sidestep the Utah restrictions on muni's operating communications systems. As of this printing, not a single muni FTTH system has failed.

In the case of muni systems, of which many are not-for-profit enterprises, one measure of “success” is defined as the level of their “take rate” – that is, the percentage of potential subscribers who are offered the service that actually do subscribe. Nationwide, the take rates for retail municipal systems after one to four years of operation averages 54 percent. This is much higher than larger incumbent service provider take rates, and is also well above the typical FTTH business plan. Deployments usually require a 30-40 percent take rate to “break even” within planned payback periods.

4. The effect of municipal FTTH systems on local economic development is significant

There is evidence that municipal FTTH systems positively impact local economic growth. Many FTTH cities attribute the success of efforts to retain and/or facilitate the expansion of businesses at least in part to the lure of their local FTTH communication infrastructure. Examples include information-intensive companies such as Google, MSN and Yahoo. Specific examples of large employers moving to communities in part because of the local FTTH system have been noted by many FTTH cities. The chart on the next page lists new business relocations that were attributed in part or in full to availability of FTTH as the community communication infrastructure.



According to community leaders interviewed, the attracted companies believe that local fiber to the premise systems allow them to do business more efficiently online with less cost. The availability of redundant fiber services from local providers is often also mentioned as a plus, as is the prospect of being able to expand quickly to non-adjacent buildings while still being tied to together via a virtual private network. The ease of employees working from home is often mentioned by relocation decision makers as a positive factor. RVA consumer

(There are even documented cases of important employees having dedicated fiber lines between home and office in municipal FTTH cities.) Finally, interviewees noted the importance of improved quality of life for employees thanks to the availability of high bandwidth video and Internet services to nearby homes and schools.

Many municipalities also report an increase in home-based businesses because of FTTH – with many of these businesses bringing in revenue from outside the region. Specifically mentioned were examples of businesses requiring very high bandwidths for tasks such as scientific consulting and video editing.

Several municipalities also noted increased efficiency in city government because of the municipal fiber system.

Examples of such productivity improvements have included: systems to monitor remote inventories more efficiently and systems to reduce physical transport costs such as having prisoners face judges via video conferencing from detention facilities (especially for “first appearances”). Productivity enhancement has also included automated meter reading and the ability to remotely turn on or off the utility for non payment such as the system currently being implemented by Clarksville, TN.

Though more difficult to quantify, the “green” advantages of reduced costs from more telework have also been cited by those interviewed, including the anticipation of less road and bridge maintenance, and lower automobile pollution for the community.

5. Municipal FTTH systems have a positive impact on overall FTTH and broadband use.

One important early result of municipal FTTH systems was to help prove and incubate the technology of direct fiber optic access. From 2000-2004, municipal providers represented some of the largest FTTH trials at the time, and some RVA has interviewed feel that FTTH could not have been implemented as quickly by private providers without this in-the-field experience.

| Municipalities Reporting Plants Locating – in Part Because of FTTH | |
|---|--|
| Auburn IN | Cooper Tire Expansion |
| Bristol TN | Media General |
| Bristol VA | Northrup Grumman CGI |
| Chelan County WA | Yahoo |
| Douglas County WA | Sabey Corporation |
| Grant County WA | MSN (Microsoft) Ask Jeeves Intuit |
| Independence OR | Metal fabrication companies |
| Kutztown PA | Film production companies |
| LENOSIWSKO VA | Data Centers |
| Mason County WA | Louisville Slugger Sims Technology companies Online engineering firms |
| Morristown TN | Colgate Palmolive |
| Powell WY | Alpine Access Virtual Call Center |
| Windom MN | Trucking companies |

research has shown that FTTH subscribers work from home significantly more often than those with DSL, wireless or cable modem connections, because of the speed and reliability of their connections.



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Municipal FTTH systems may influence overall FTTH and broadband penetration. Though the difference does not rise to the level of statistical significance at 95 percent confidence, states that do not restrict public involvement in broadband and telecommunications services generally have higher overall FTTH and broadband penetration than do states with prohibitions of or restrictions on municipal broadband.

It should also be noted that restrictions on municipal broadband are correlated with lower take rates for these systems. As mentioned above, states that mandate open access systems (i.e. Utah, Washington) currently have lower take rates for FTTH systems because of the mandated two-tier operation method.

6. CONCLUSION: Municipal FTTH Systems are an important element of national FTTH deployment and should be encouraged.

Municipal FTTH deployments are alive and well – and expanding on early pioneer success stories.

Current deployments can point to local economy improvements as well as profitable operation and early pay-back of bonds.

States with regulatory barriers tend to trail in overall broadband penetration. Removal of legal and regulatory restrictions on municipal operation of communications networks will accelerate broadband investment, improve subscriber penetration rates and enable local governments in many outlying areas to ensure that their citizens can be part of the high-bandwidth future.

While municipal systems are beneficial and, in general are profitable, there still are restrictions in 14 states limiting or prohibiting such systems. Legislation has been introduced in both Houses of Congress to preempt state and local laws which currently ban the provision of broadband services by public entities. The Council encourages the passage of the Community Broadband Act or similar legislation, which frees municipalities in those 14 states to invest in next-generation networks.

North American Municipal Systems Currently Serving Customers with Fiber to the Home – October 2009

| SYSTEMS SERVING LARGE PERCENTAGE OF SERVICE AREA (41) | | SYSTEMS SERVING LIMITED FTTH AREAS, OR JUST STARTING (16) | |
|---|----------------------|---|---------------------|
| Auburn IN | Jackson TN | Radium Hot Springs BC | Abbingdon, VA |
| Barnesville MN | Kutztown PA | Reedsburg WI | Ashland, OR |
| Bellevue, IA | Lafayette LA | Rochelle, IL | Baldwin, WI |
| Bristol TN | LENOWISCKO VA | Sallisaw OK | Cedar Falls IA |
| Bristol VA | Lenox IA | Shawano WI | Clallum PUD WA |
| Brookings, SD | Loma Linda CA | Spencer IA | CMON BC |
| Burlington VT | Marshall MO | Tullahoma TN | Crosslake MN |
| Chattanooga TN | Mason County PUD WA | UTOPIA UT | Danville VA |
| Chelan PUD WA | Mi-Conection NC | Wilson NC | Glasgow KY |
| Churchill County, NV | MINET OR | Windom MN | Holland MI |
| Clarksville TN | Morristown TN | | Ketchikan AK |
| Crawfordsville IN | North Kansas City MO | | Monticello MN |
| Dalton GA | Phillipi WV | | Pend Oreille PUD WA |
| Douglas County PUD WA | Powell WY | | Sylacauga AL |
| Gainesville FL | Pulaski TN | | Taunton MA |
| Grant County PUD WA | Quincy FL | | Tifton GA |