

# Municipal FTTX Networks

## City Network Plans and Leveraging the Open-Access Model

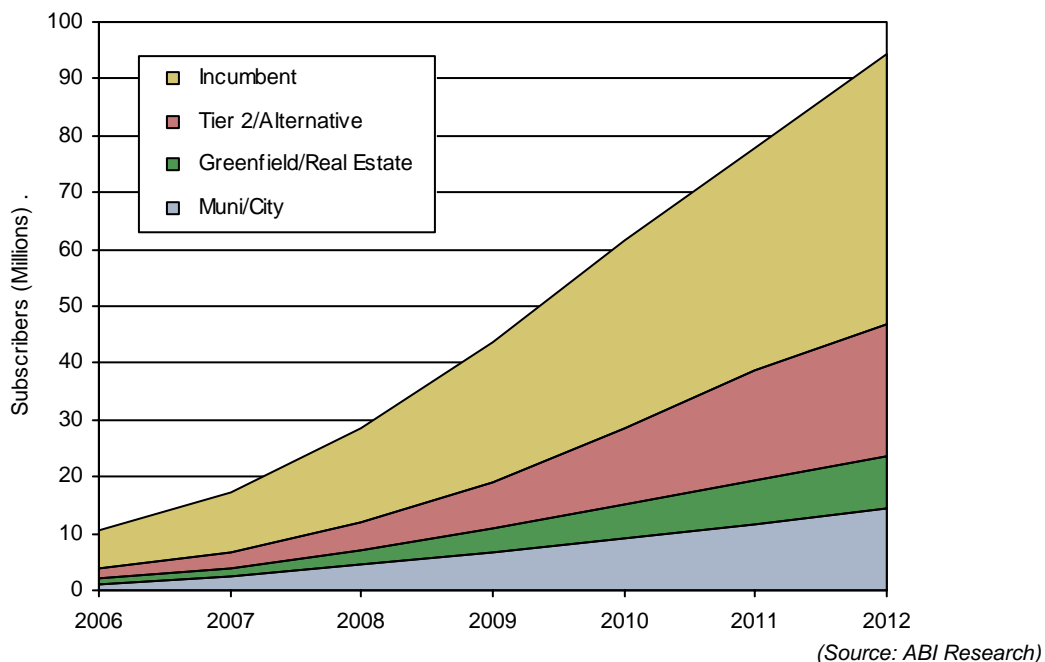
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### Executive Summary

Municipal/City Fiber-to-the-X (FTTX) networks will drive a significant part of FTTX adoption in Western Europe, and they will have an impact in all other markets. Government and municipality interests in developing local economies, providing communications services to low-income residents, and enabling advanced services in areas otherwise under-served by incumbent and competitive operators will drive the municipality/city FTTX market. Many of these networks, along with some Greenfield/real-estate-development FTTX networks, will operate on open-access platforms where multiple service providers can have access to the same network.

- The table below illustrates that municipal/city FTTX subscribers will account for a notable portion of total FTTX subscribers worldwide.
- Early municipal/city FTTX initiatives were undertaken by smaller cities that were under-served by incumbent operators; but larger cities — particularly in Western Europe — will drive municipal/city FTTX deployments in the future.
- Subscriber penetration rates for municipality/city homes passed will be notably lower than overall trends, suggesting that municipality/city FTTX initiatives will not offer as competitive of services as incumbent operators, and will be diluted by the inclusion of low-income residents who are less likely to adopt broadband services.

**FTTX Homes by Network Type, World Market Forecasts: 2006 to 2012**



## Market Update

### Section 1. STRATEGIC OVERVIEW

#### 1.1 Development of the FTTX Market

Fiber-to-the-X (FTTX) technology provides high-speed services to homes over a direct fiber connection. Depending on the type of FTTX deployed, broadband speeds of 100 Mbps can be provisioned to each home on a network. The rollout of this technology has been strongest in Asia-Pacific, driven by deployments by NTT and Softbank in Japan.

North America follows in a distant second behind Asia-Pacific. Although early FTTX deployments took place in North America as many as 20 years ago, it has not been until Verizon's relatively recent rollout of its FiOS service that FTTX subscriber levels began to climb in North America. Table 1.1 provides an overview of the growth in the number of homes subscribing to FTTX services in various regions. Asia-Pacific has the early lead, and it will maintain a larger subscriber base than other regions, although North America will see subscriber growth at a faster compound annual rate.

**Table 1.1 FTTX Homes by Region, World Market Forecasts: 2006 to 2012 (Millions)**

	2006	2007	2008	2009	2010	2011	2012	CAGR (06-12)
Asia-Pacific	7.80	11.90	17.85	24.98	32.62	39.40	45.69	34%
North America	1.23	2.38	4.32	7.49	12.74	16.36	19.25	58%
Latin America	0.06	0.25	1.40	2.35	2.96	3.66	4.52	108%
Western Europe	0.84	1.70	2.86	4.68	6.56	8.59	10.35	52%
Eastern Europe Middle East and Africa	0.31	0.59	1.15	2.13	3.61	5.24	7.76	71%
Total	10.46	17.42	28.68	43.53	61.73	77.93	94.40	44%

(Source: ABI Research)

#### 1.2 Municipal/City FTTX Initiatives

There are three major categories of FTTX initiatives: commercial service provider, municipal/city network, and real-estate/campus development. Several of the earliest FTTX initiatives were tied to municipal/city initiatives and real-estate development, although most of these were focused on rural locations.

Many cities seeking economic development and better residential communications services opted to underwrite the building of FTTX networks to connect businesses, government buildings, schools, and homes to high-speed networks. In general, these initiatives were small-scale deployments. But in the past year, several major initiatives have been announced to take the municipal/city model to a new level. With Rotterdam, Amsterdam, Paris, San Francisco, and other large cities either moving forward with FTTX plans or exploring FTTX options, municipal/city networks will begin to encompass rollouts potentially extending to millions of homes, rather than a few thousand, like most early municipal/city networks.

### 1.2.1 Economic Development

The two reasons most often cited for deploying FTTX networks are economic development and provisioning of communications services to an otherwise under-served community. Because municipal/city networks include communications services for businesses and the government, the deployment of FTTX by cities can help to improve business efficiency and provide reliable (and less costly) voice and data services: a selling point to attract new business to a locale.

Another emerging issue with the shift in municipal/city FTTX initiatives to include metropolitan areas is the focus on under-served communities within a large city. In the Netherlands, public housing authorities have begun several initiatives to provide advanced communications services to low-income units. As of the end of 2006, more than 25,000 housing-authority homes were passed by FTTX rollouts in the Netherlands, with more than 800 homes receiving FTTX services.

In other cities, extending service among all residents has become an issue. San Francisco is considering plans to roll out a Wi-Fi and FTTX network to provide service to all residents. The issues at hand in San Francisco are how to reach all residents in the city, and how to provide equal access to service given the difference in the cost of deploying FTTX compared with Wi-Fi — and the resulting differences in quality of service.

### 1.2.2 Financing

Financing for municipal/city FTTX networks differs dramatically from operator-based FTTX deployments. One key element to early municipal/city FTTX deployments was access to special government funding that supports communications-system development in rural markets. In the United States, the Department of Agriculture's Rural Development department provides Rural Utilities Services (RUS) financing for a range of projects, including communications systems.

Under RUS guidelines, rural communities can buy equipment from vendors with proper certification under the program, and have part of the cost underwritten by the Department of Agriculture. This type of financing helped to push FTTX deployments in rural markets in the United States, and it continues to play a role in the strategies for FTTX deployments today. However, this type of financing is not available to the larger metropolitan players that are beginning to take action on FTTX network deployments.

For larger cities and metropolitan areas, public financing is essential for the rollout of a fiber-access network. Money must come from already-allocated public funds, through bonds or revenue from special taxes levied with voter support, or through some sort of outside partnership.

### 1.2.3 Leveraging Partnerships

Municipal and city governments often turn to outside organizations to provide support for financing communications-networks projects. In many small towns, FTTX network deployments have occurred through partnerships with local utility companies. The involvement of utility companies has several advantages. First, utility companies already have rights of way for deploying fiber to homes. Second, utilities are often willing to pay for part of the network deployment and are willing to allow municipalities to use their poles or other infrastructure, thereby saving costs on deployment. This willingness to underwrite part of the costs is usually done with the understanding that the utility can have access to the fiber network for its own business purposes, which brings us to the third reason for partnerships. Utilities have a need for communication systems to homes so that they can monitor utility usage. By wiring homes remotely, utilities can better gauge electricity and gas usage while also having the ability to reduce power to a given home during peak periods to allocate energy resources more effectively. As such, utilities have a direct business interest in being part of the municipal FTTX strategy.

This same utility-partnership model could work for larger cities as well, although the scale of the larger rollouts and associated costs may scare off most utilities. Additionally, for larger cities, utilities can implement a more cost-effective Broadband over Powerline (BPL) solution that they do not have to share with the municipality.

Another potential partner in municipal FTTX rollouts — particularly for larger cities — are Internet Service Providers (ISPs). ISPs, like EarthLink, seek ways to reach customers directly with their own network, rather than relying on someone else's broadband network. EarthLink partnered with several municipalities on Wi-Fi and BPL projects. Although FTTX is a considerably larger cost, it is possible that a company like EarthLink could help underwrite part of a municipal FTTX deployment if the company were given rights to provide services over the network without competition (or with limited competition). This type of partnership seems unlikely, but it is something that municipalities might pursue.

In addition to ISPs like EarthLink, incumbent or competitive telecom operators could be potential candidates for municipality partnerships. However, these companies are more likely to pursue their own network build-outs.

### 1.3 Open-Access Networks

The discussion of partnerships and rights to control services on a municipal network brings up the issue of open-access networks. Open-access networks are those FTTX networks where the fiber is put into place, and any operator with proper licensing has the option to provide service to people on the network. Open-access networks are not found in commercial-carrier networks, as those operators are installing FTTX for their own use. However, in some Greenfield/real-estate FTTX deployments and most municipal/city networks, service provisioning typically is open to any operator that has an interest in serving the market.

As a result, the build-out of open-access networks is slightly different than that of typical commercial networks. Open-access networks will typically incorporate only the infrastructure required for the transport part of the network, and do not include headends, data centers, and servers that are required for actual service provisioning. The additional services infrastructure must be provided by the service provider — usually through some space leasing agreement with the housing development or municipality/city.

Some housing developments or municipalities/cities may opt to provide services of their own — particularly data services. This allows municipalities to ensure that lower income residents have at least basic data services. As a result, some minimal services infrastructure may be deployed by the municipality/city or housing development. However, this will be far reduced in scope compared with a commercial service provider.

## Section 2. REGIONAL DEVELOPMENT AND COMPETITION

Section 2 provides an overview of the development of municipality/city FTTX networks for various regions. It will also include analysis of municipality/city network deployments that will compete with FTTX.

### 2.1 Regional Development

#### 2.1.1 Asia-Pacific

The development of municipality/city FTTX networks in Asia-Pacific has been far more limited than the rollout of FTTX by incumbent and competitive operators. NTT and Softbank have dominated FTTX rollouts in the region. Nevertheless, there were some municipality/city FTTX network deployments in the region, although these tend to be small towns where the communications infrastructure has been lacking.

One example of a municipality/city FTTX rollout in the region is in Japan's Taki-Cho municipality. This FTTX rollout began in 2005. Using an active Ethernet solution provided by Wave7, the local government is rolling out a high-speed communications network to businesses and residents.

#### 2.1.2 North America

North America has a large number of FTTX rollouts backed by municipalities/cities or other government bodies. The initial uptake in FTTX in the region was performed by smaller competitive operators, real-estate developers, and municipalities/cities. More recently, Verizon's FTTX rollout became the main FTTX driver in the region, accounting for nearly half of all subscriber gains in the last half of 2006, and accounting for a majority of the growth in FTTX homes passed.

Large municipalities/cities in North America tend to focus on Wi-Fi initiatives than FTTX initiatives due to cost issues. San Francisco is among the few non-rural municipalities/cities in the region to announce any intention of rolling out an FTTX network. The San Francisco announcement, however, also noted the inclusion of a Wi-Fi component, and did not address the issue of how much of the city would be served by FTTX versus Wi-Fi municipal communications networks. It seems more likely that the Wi-Fi component will cover the bulk of residents with the FTTX component, focused more on business centers in the city.

Among the numerous cities deploying FTTX solutions for municipal networks are Windom, Minnesota (vendor: ADC), iProvo in Utah (vendor: ADC), Philippi, West Virginia (vendor: Motorola), North Kansas City (vendor: World Wide Packets), and Auburn, Indiana (vendor: Wave7). Other cities include Bristol, Virginia; Fort Wayne, Indiana; Macon, Missouri; and Salem, Illinois.

### 2.1.3 Latin America

In Latin America, there are initiatives from commercial service providers, although these have been limited in nature. The incumbent telecom operators in the region did some trialing of FTTX service, but no major rollouts have taken place. One of the largest potential rollouts for the region, however, is a government-sponsored network in Brazil.

In 2005, the Brazilian Ministry of Education announced that it planned to deploy a FTTX network in order to connect schools and residential communities in rural areas. Wave7 was selected to provide the infrastructure for the FTTX network. Progress on the project appears to be limited, but this particular rollout is included in ABI Research's projections for future municipality/city activity in the Latin America region.

### 2.1.4 Western Europe

Municipality/city FTTX deployment in Western Europe will have a stronger impact there than in any other region. One of the earliest notable FTTX deployments in Western Europe was done by the City of Pau in France. This network was a business and residential communications services network that saw significant success in achieving penetration goals. The network build started in 2005 and was pushed as an economic-growth initiative. In comparison, France Telecom did not begin an FTTX rollout until 2006.

Several larger-scale municipality/city FTTX initiatives started in Western Europe that promise to make the region the trend leader in municipality/city FTTX network development. Rotterdam put forth an initiative for FTTX, and Portaal and other public housing-development organizations in the Netherlands also began FTTX initiatives. The Portaal initiative included a contract announcement with PacketFront in 2006 for deployments reaching a total of 55,000 housing units. Amsterdam has also begun a project to build its own municipal network.

The Amsterdam project plans to reach about 450,000 homes and businesses by 2013 at a cost of €300 million (\$394 million). Cisco announced in October 2006 that it won a contract to supply active Ethernet solutions for the rollout that included its 7600 Series router and Catalyst 4500 Series switch. CityNet Amsterdam — the oversight organization for the rollout — planned an initial 40,000 homes-passed rollout in 2006 with continued rollouts through 2013. CityNet Amsterdam lined up 75 service providers for the open-access system.

Other municipal/city/government FTTX initiatives in Western Europe include the Principality of Asturias in Spain where Alcatel-Lucent will provide equipment and Catalonia in Spain, covering some municipalities in the region at a cost of €500 million (\$657 million). Paris made an announcement that it will deploy a municipal network, and Vienna has an FTTX initiative that would connect 960,000 homes and 70,000 small and medium enterprises.



### 2.1.5 Eastern Europe

Eastern Europe is primed for FTTX, although initiatives in the region are more likely to come from incumbent operators and competitive operators than municipalities/cities. Although some initiatives in rural towns within Russia and some other locations are possible, national operators in Eastern Europe are currently looking to upgrade their networks, and are likely to jump directly to fiber access rather than rebuild failing copper infrastructure. With a strong initiative coming from commercial service providers, municipalities/cities are not as likely to provide their own FTTX networks as is the case in Western Europe, where incumbents are slower to adopt FTTX.

### 2.1.6 Middle East and Africa

Municipality/city and other Greenfield/real-estate FTTX deployments will dominate the rollout of FTTX in the Middle East. Africa will see generally less activity, and FTTX initiatives are more likely to come from existing telecom services providers in affluent markets. But in the Middle East, governments take several initiatives to develop new housing and to improve communications networks. These initiatives have resulted in municipality/city FTTX deployments.

In Kuwait, the Ministry of Communications has underwritten a gigabit passive optical network deployment that will use Siemens and ADC equipment. The Siemens contract announcement was made in 2005 at the start of the initiative. In the United Arab Emirates, tourism and residential development and communications-network initiatives are driving municipality/city interest in FTTX. Dubai's initiatives included the partly public-funded Dubai Internet City, which deploys FTTX equipment from PacketFront.

## 2.2 Competing Municipality/City Network Technologies

Municipalities/cities have turned to some other technologies to develop local networks. These technologies have focused on BPL and Wi-Fi. The argument for these technologies is that they are significantly less expensive than FTTX because they do not require the build-out of FTTX. BPL uses existing electrical lines for broadband service, and Wi-Fi is over-the-air and does not require any fixed line for service. Wi-Fi has the added benefit that its use is not restricted to in-home usage.

### 2.2.1 Wi-Fi Networks

Several cities are rolling out Wi-Fi networks, and many of these initiatives are done in partnership with companies like EarthLink and other ISPs. Philadelphia; New Orleans; Alexandria, Virginia; Anaheim, California; Portland; San Francisco; and about 300 other municipalities/cities have Wi-Fi networks in place or are in the process of building them. In February 2007, two major United States metro areas announced Wi-Fi initiatives: Houston and Los Angeles.

The Houston network would be the largest in the country, covering 600 square miles. EarthLink agreed to help fund the project and will be the service provider for the network. The Los Angeles network would be completed in 2009 and would cover nearly 500 square miles. Cost estimates for the Los Angeles network range from \$54 million to \$62 million, compared with the FTTX initiative noted above for Amsterdam costing \$394 million.



The cost of Wi-Fi is definitely lower than FTTX, and it provides service both inside and outside of the home. However, bandwidth on Wi-Fi is far more limited than FTTX, and Wi-Fi cannot provide adequate video service.

Also, ISPs are more forthcoming in partnering on Wi-Fi initiatives than FTTX initiatives. However, this typically results in a closed network, which limits competition. In some cases, such as the Houston rollout, the ISP promised to provide low-cost services for low-income residents in the city — but in the end, the network services are still controlled by an outside interest.

### 2.2.2 BPL Networks

BPL networks have seen limited rollouts. Issues concerning frequency interference with short-wave radio have sidelined several BPL initiatives. BPL initiatives tend to be in three categories: utility-company initiatives, municipality/city initiatives for under-served residents, and in-building networks for multi-dwelling units.

The largest BPL initiatives tend to be rollouts by utility companies. In the United States, the largest initiative is in Cincinnati, where Cinergy (now Duke Energy) has 50,000 broadband subscribers on a network that reaches 250,000 homes. Alliant Energy, Consolidated Edison, CenterPoint Energy, PG&E, Progress Energy, and TXU have all undertaken trials or full-scale rollouts of BPL. Some of these initiatives, however, have been done in conjunction with municipalities.

Consolidated Edison's BPL project in Briarcliff Manor, New York, uses Ambient technology and delivers 3.5 Mbps to 7 Mbps service. The BPL network passes 700 homes that can opt to receive broadband service. It also partners with the local government to provide video monitoring of local intersections along the network.

There have been a smaller number of direct municipality projects for BPL not initiated by local utility companies, although utilities must partner to some degree to provide access to electrical lines. Penn Yan, New York, used Amperion's BPL technology to build a trial network, but opted to shut it down due to signal-interference complaints. The city decided to go with a Wi-Fi solution instead.

Like Wi-Fi, BPL provides cost advantages to FTTX. However, the quality of service is not as good, and it is relegated to in-home use only. Additionally, issues with signal interference have posed problems for several rollouts. On the plus side, BPL networks often are more readily underwritten by utility companies and avoid rights-of-way issues. This will make the BPL option a more likely route for utilities to take than partnering on municipal/city FTTX initiatives.

## Section 3. FTTX NETWORKS AND OPEN-ACCESS MARKET ANALYSIS

Section 3 will provide an overview of the municipality/city segment development of the FTTX market. Section 3 will also provide insight into the extent of open-access networks — for municipality/city FTTX, and Greenfield/real-estate FTTX deployments.

### 3.1 Municipality/City FTTX Networks Assessment

#### 3.1.1 Municipality/City FTTX Homes Passed

Table 3.1 provides an overview of the growth in municipality/city FTTX homes passed across all regions. Western Europe has the early lead among the regions in homes passed by municipality/city FTTX initiatives, and the larger-scale initiatives now beginning in Western Europe will push that region forward more quickly than in Asia-Pacific and North America, where incumbents will drive FTTX development.

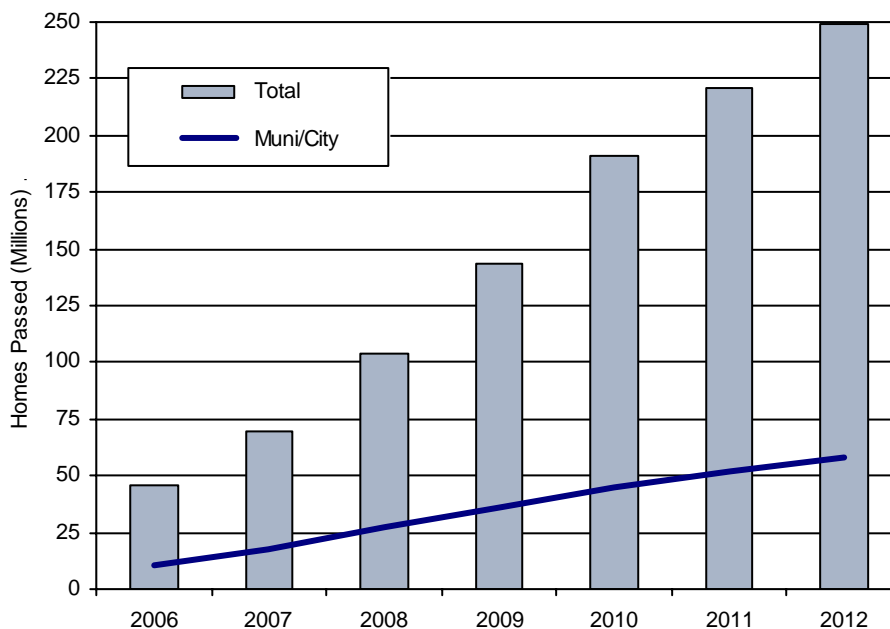
**Table 3.1 Municipality Homes Passed by Region, World Market Forecasts: 2006 to 2012 (Millions)**

	2006	2007	2008	2009	2010	2011	2012	CAGR (06-12)
Asia-Pacific	2.70	3.17	3.61	3.81	4.00	4.15	4.30	8%
North America	1.55	2.27	2.98	3.86	4.84	5.80	6.40	27%
Latin America	0.20	0.83	4.31	6.74	7.62	8.41	9.04	89%
Western Europe	3.39	6.16	9.18	11.57	14.83	16.25	17.26	31%
Eastern Europe	1.16	1.54	2.28	3.10	3.92	5.08	6.21	32%
Middle East and Africa	1.68	3.47	5.05	7.05	9.97	12.58	15.04	44%
Total	10.67	17.43	27.40	36.13	45.18	52.28	58.24	33%

(Source: ABI Research)

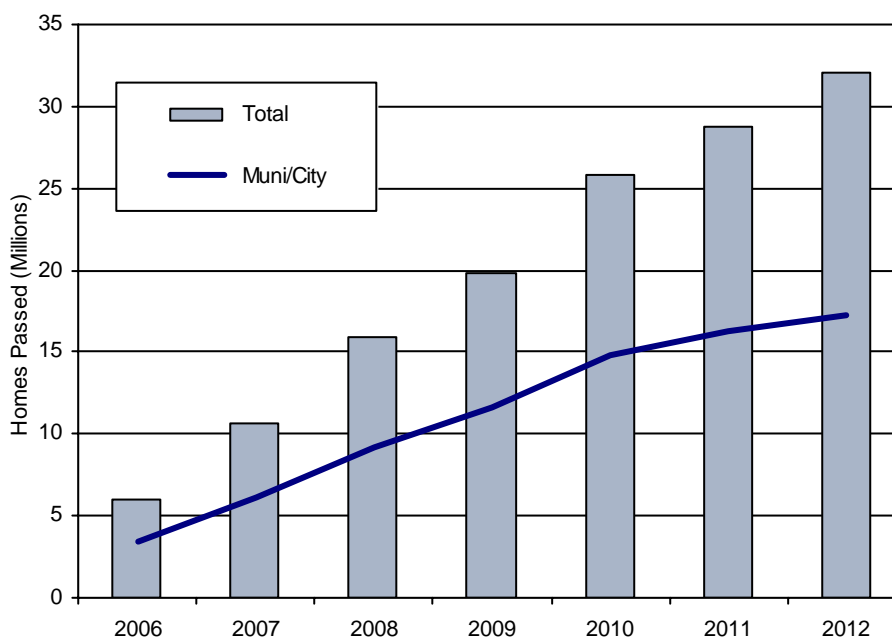
The portion of total homes passed worldwide by FTTX technology and homes passed by municipality/city FTTX networks is around 25% through most of the forecast period, as shown in Chart 3.1. However, this changes when looking only at Western Europe, where the percentage of homes passed by municipality/city networks ranges from 53% to 59% during the forecast period. The patterns for Western Europe are shown in Chart 3.2.

**Chart 3.1** Municipality Homes Passed Versus Total FTTX Homes Passed, World Market Forecasts: 2006 to 2012



(Source: ABI Research)

**Chart 3.2 Municipality FTTX Homes Passed Versus Total FTTX Homes Passed, Western Europe Forecasts: 2006 to 2012**



(Source: ABI Research)

### 3.1.2 Municipality/City FTTX Subscriber Analysis

The rollout of municipality/city FTTX networks in Western Europe will have a slightly delayed effect for the larger-city rollouts in 2006. As a result, North America edges out Western Europe in total municipality/city FTTX subscribers in 2006, despite having fewer homes passed. In 2007, however, Western Europe passes North America and remains the leading region for municipality/city FTTX subscriber volume. Table 3.2 provides an overview of the trends in each region.

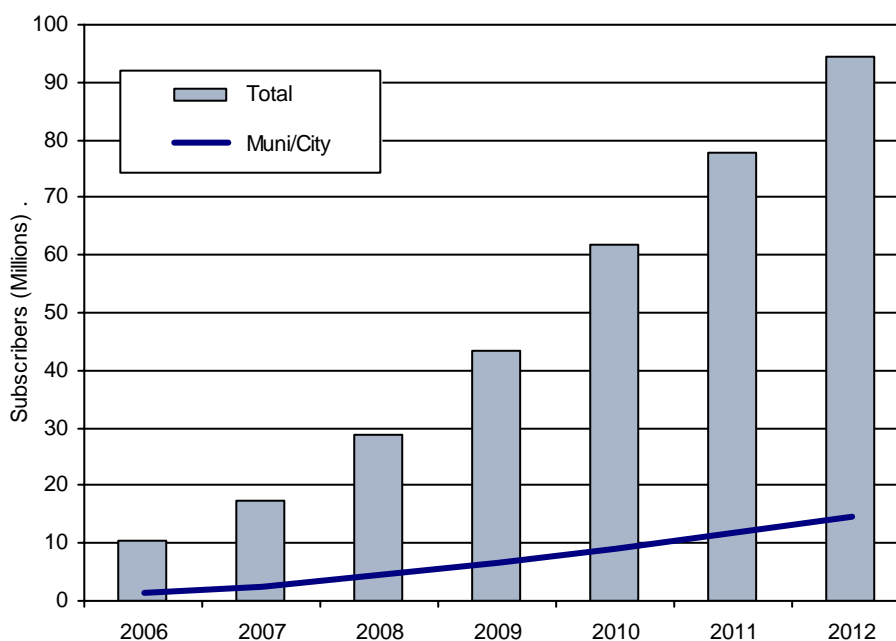
**Table 3.2 Municipality Homes Subscribed by Region, World Market Forecasts: 2006 to 2012 (Millions)**

	2006	2007	2008	2009	2010	2011	2012	CAGR (06-12)
Asia-Pacific	0.13	0.38	0.55	0.71	0.89	1.00	1.10	43%
North America	0.48	0.59	0.71	0.85	1.02	1.38	1.85	25%
Latin America	0.04	0.16	0.84	1.36	1.60	1.83	2.03	96%
Western Europe	0.35	0.88	1.45	2.24	3.13	3.98	4.67	54%
Eastern Europe	0.10	0.19	0.36	0.60	0.90	1.26	1.78	61%
Middle East and Africa	0.13	0.32	0.58	0.97	1.58	2.20	3.01	70%
Total	1.22	2.52	4.48	6.74	9.12	11.65	14.45	51%

(Source: ABI Research)

Chart 3.3 illustrates the percentage of total FTTX subscribers worldwide that are municipality/city FTTX subscribers. Although approximately 25% of the FTTX homes passed worldwide were passed by municipality/city FTTX networks, only 12% to 15% of worldwide FTTX subscribers receive their service from municipality/city FTTX networks. This suggests two trends: customers will be more interested in getting service from an incumbent or competitive operator, and the breadth of municipality/city networks to include low-income homes will result in lower take-rates for service.

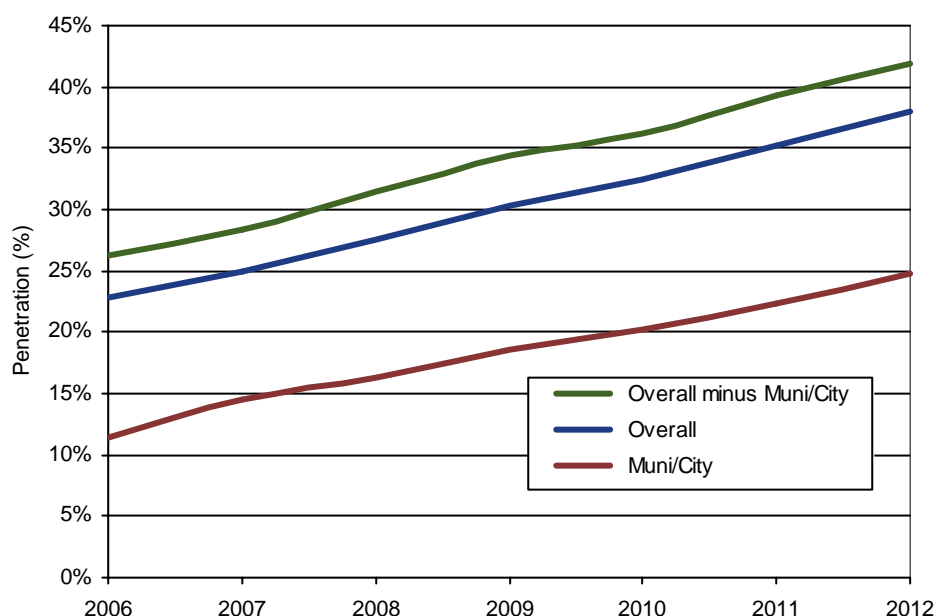
**Chart 3.3** *Municipality FTTX Subscribers Versus Total FTTX Subscribers, World Market Forecasts: 2006 to 2012*



(Source: ABI Research)

Chart 3.4 provides a comparison of take-rates for FTTX service. The best take-rate comes from all non-municipality/city FTTX networks. These penetration rates range from 26% to 42% during the forecast period. For municipality/city FTTX network penetration rates, the range is 11% to 25%, and is the lowest line in the chart.

**Chart 3.4** *Subscriber Penetration Municipal Network Versus Overall, World Market Forecasts: 2006 to 2012*



(Source: ABI Research)

### 3.2 Open-Access Network Market Analysis

Open-access networks include any FTTX network that provides equal access to all service providers so long as they complete the proper licensing agreement with the network operator. Most municipal/city FTTX networks will have open access, and a number of Greenfield/real-estate FTTX networks will also have open access. Municipalities are not in the business of providing services and will only do so on a limited basis in order to ensure services to government buildings and low-income residents. Greenfield and real-estate FTTX initiatives include some incumbent-operator-based networks as well as open-access networks, where a real-estate developer is simply running fiber to homes in a community to improve the value of the planned community. Many of these real-estate networks will be open access networks.

Table 3.3 provides an overview of open-access FTTX homes passed. Western Europe accounts for the largest number of open-access FTTX homes passed due to its strong municipality/city push. When comparing open-access FTTX homes passed with municipality/city FTTX homes passed, North America has a relatively stronger open-access volume of homes passed. This is due to the strong real-estate development/master planned community rollout that has occurred in North America.

**Table 3.3 Open-Access Homes-Passed by Region, World Market Forecasts: 2006 to 2012 (Millions)**

	2006	2007	2008	2009	2010	2011	2012	CAGR (06-12)
Asia-Pacific	2.51	3.09	3.76	4.47	5.39	6.30	7.23	19%
North America	1.69	2.56	3.47	4.50	5.67	6.81	7.51	28%
Latin America	0.17	0.72	3.84	6.14	7.11	8.03	8.72	93%
Western Europe	2.93	5.49	8.37	10.80	14.14	15.67	16.92	34%
Eastern Europe	0.99	1.34	2.04	2.85	3.72	4.93	6.12	36%
Middle East and Africa	1.43	3.02	4.51	6.46	9.34	12.07	14.62	47%
Total	9.72	16.23	25.99	35.21	45.37	53.82	61.13	36%

(Source: ABI Research)

Table 3.4 shows open-access FTTX subscribers by region. Asia-Pacific and North America have far higher comparative figures for open-access subscribers compared with municipality/city FTTX subscribers than is the case for Western Europe. This is because the real-estate and master-planned community markets in Asia-Pacific and North America will play a more significant role than in Western Europe, where open-access subscribers will almost exclusively come from the municipality/city FTTX network deployments.

**Table 3.4 Open-Access Homes Subscribed by Region, World Market Forecasts: 2006 to 2012 (Millions)**

	2006	2007	2008	2009	2010	2011	2012	CAGR (06-12)
Asia-Pacific	0.25	0.57	0.94	1.55	2.42	3.25	4.10	59%
North America	0.59	0.89	1.28	1.61	2.03	2.56	3.08	32%
Latin America	0.03	0.14	0.75	1.25	1.51	1.77	2.00	101%
Western Europe	0.34	0.85	1.51	2.57	3.63	4.68	5.50	59%
Eastern Europe	0.09	0.18	0.33	0.57	0.91	1.30	1.88	66%
Middle East and Africa	0.11	0.29	0.53	0.92	1.54	2.21	3.07	74%
Total	1.41	2.91	5.34	8.46	12.05	15.77	19.62	55%

(Source: ABI Research)



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