

398 Systems in 43 States

Fiber Communities

North American fiber deployments double in six months; ILECs lead the way

By Steven S. Ross ■ *Editor-in-Chief*

The number of American fiber deployments nearly doubled in the six months from October 2004 to this April, from 217 systems to 398 in more than 400 communities. The number of homes passed by fiber increased more than 60 percent, from under 1 million to more than 1.6 million in the same period. By comparison, the United States has 15,000 communities large enough to have a public school system.

The continuing census of operating fiber systems is compiled by Michael Render of RVA (Render Vanderslice & Associates) for Fiber Optic Communities of the United States, the Telecommunications Industry Association and the Fiber-to-the-Home Council. This latest update was released in Washington at a press event hosted on Capitol Hill by Senators Charles Schumer (D-NY) and Gordon Smith (R-OR).

The latest census shows fiber systems more evenly distributed than they were last October (*Broadband Properties*, December 2004, p. 42). Then, fiber systems were concentrated in the Midwest and Plains States. By April, fiber deployments had reached 43 states, with heavy new concentrations in the South, Northeast, and West Coast.

Systems are urban and rural. They serve low-income communities as well as affluent ones. Render says the new fiber has brought first-class service and competition both by price and by type of services offered to previously underserved areas. He cited telework and video on demand as important applications, but said many new uses are being found for fiber's high bandwidth. The high bandwidth brings film editors, computer-aided designers and architects, and even a former NASA employee to rural living.

In Quincy, Florida, court arraignments are being done by video; the Netquincy system (www.netquincy.com) there is the product of cooperation between a CLEC and a developer and uses BPON from Alcatel. CLECs (Competitive Local Exchange Carriers) specialize in selling unbundled bandwidth over copper, coax, or fiber.

Douglas County, in Oregon, uses its active Ethernet fiber network (www.douglasfast.net) to send 3D color medical images from remote locations. In-home video-oriented telemedicine is coming. The system there was established by an electric cooperative using technology from World Wide Packets.

Render says most new systems are triple play, with the important exception of

Verizon, the biggest new player in fiber. Verizon is only just beginning to obtain local franchises for distributing video programming as part of its FiOS service. Former Regional Bell Operating Companies (RBOCs; mainly Verizon) added 66 deployments since October. At that point, there were only two (Keller, Texas and Huntington Beach, California). Keller is Verizon's test-bed deployment.

Although Verizon poured \$1 billion into fiber deployments last year and plans \$2 billion in 2005, it is not setting a universal standard. Render notes that no one type of deploying organization or business model is dominant. RBOCs and incumbent carriers (many of them small regional telcos) account for a bit more than half the deployments. CLECs ac-

A Tale of Three Cities

Currently three cities lead the nation in FTTH connections. These deployments attest to the current diversity of FTTH in terms of the types of companies building FTTH networks, the services offered to consumers over FTTH, and the exact technical solutions used. They are:

Sacramento, California

SureWest

www.surewest.com

Triple play FTTH service is offered in Sacramento by an integrated facilities based CLEC operating in an area with other major telephone and cable TV providers. The company uses an active Ethernet solution and currently has the largest number of FTTH customers in North America.

Jackson, Tennessee

Jackson Energy Authority

www.jaxenergy.com

The city of Jackson, Tennessee is deploying FTTH using a proprietary Ethernet

PON solution. Jackson offers triple play and is starting to offer unique products to customers such as local youth sports programming.

Dalla/Fort Worth, Texas

Verizon FiOS

www.verizonfios.com

Most of the FTTH connections in the Dallas-Fort Worth area are from Verizon, the nation's largest regional Bell operating company. The company is operating an FTTH system in the north Metroplex. Verizon uses a BPON architecture and currently offers voice and data services, with video in a few limited areas.

In addition to Verizon, there are also some other smaller FTTH deployments in a few new home developments in the area from facilities-based competitive providers (CLECs) using both EPON and GPON technologies. These deployments all offer voice, video and data. — Michael Render

Fiber Deployment Growth



Deployments since last October are in red. Note the growth on the coasts, especially in California and the Southeast.

States With the Most Fiber



California and Texas, with the largest state populations, lead the deployment rolls. But Pennsylvania and Minnesota come next. That will change in the next year, as Verizon deploys massively in the Northeast.

Type of System, by Area Served

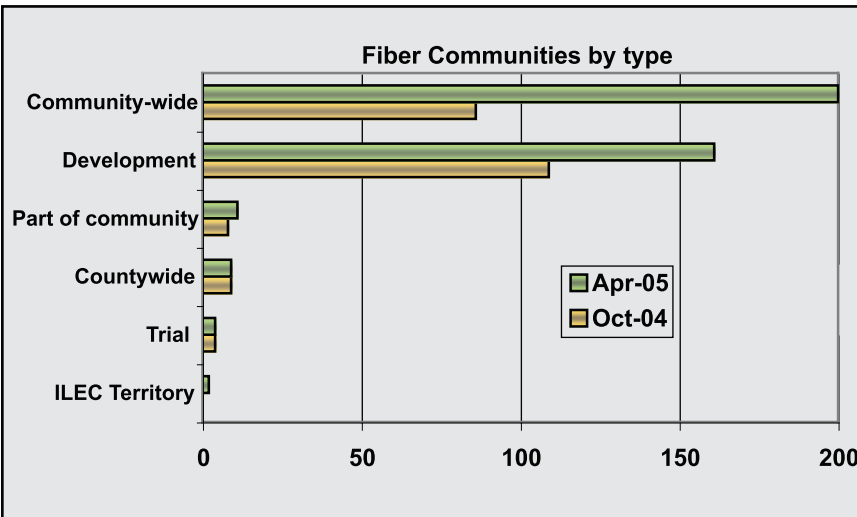


Entire community-wide systems are becoming the norm, mirroring the development of cable a decade ago.

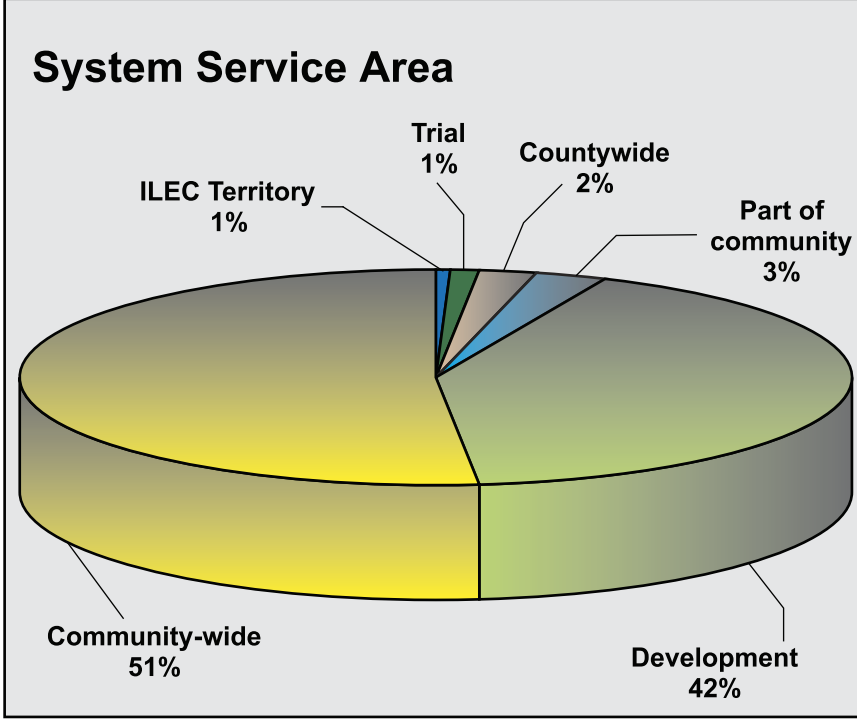
Builders of Fiber Systems



Incumbents have taken the lead from developers in building fiber systems, but CLECs are still strong.



The biggest growth since October has been in community-wide fiber deployments; they more than doubled. Last year, developments (mainly greenfield) were ahead.



Community-wide deployments now make up more than half of all fiber systems in the United States.

NTS Suppliers

- Network equipment – ADC, Optical Solutions
- Fiber – Superior Essex
- Backup power supplies – APC
- Ethernet switch – TrendNet
- Video Headend and Middleware – Minerva
- Customer installation – TESCO
- Set-top boxes – Amino/Thompson

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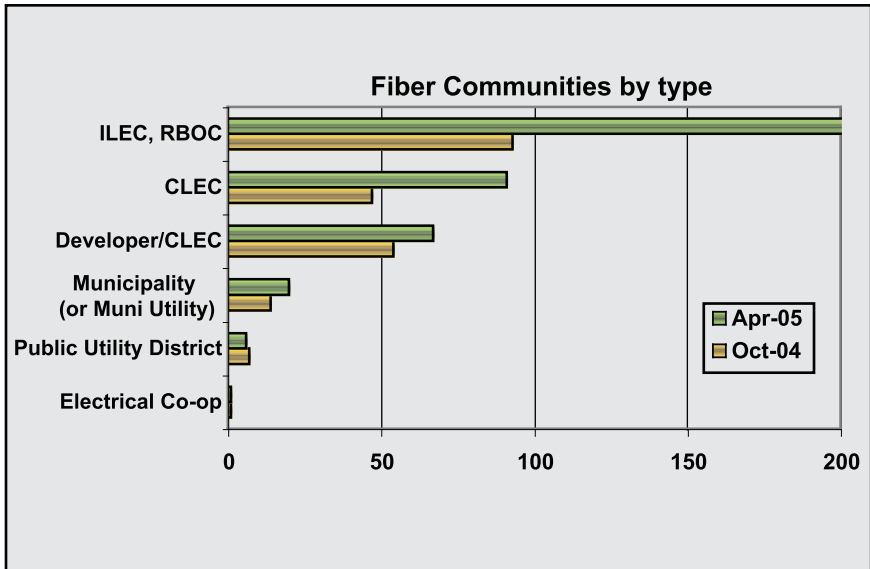
count for 41 percent of the deployments, with more than a third of those (17 percent of all deployments) built in cooperation with developers. Those account for the bulk of greenfield deployments in the United States.

The three largest deployments differ significantly from one another. Dallas/Fort Worth is a PON ATM system developed by a RBOC (Verizon). Jackson, Tennessee, is a municipal public system using Ethernet over PON. And a CLEC in Sacramento, California, opted for Ethernet over an active system (see box on page 10).

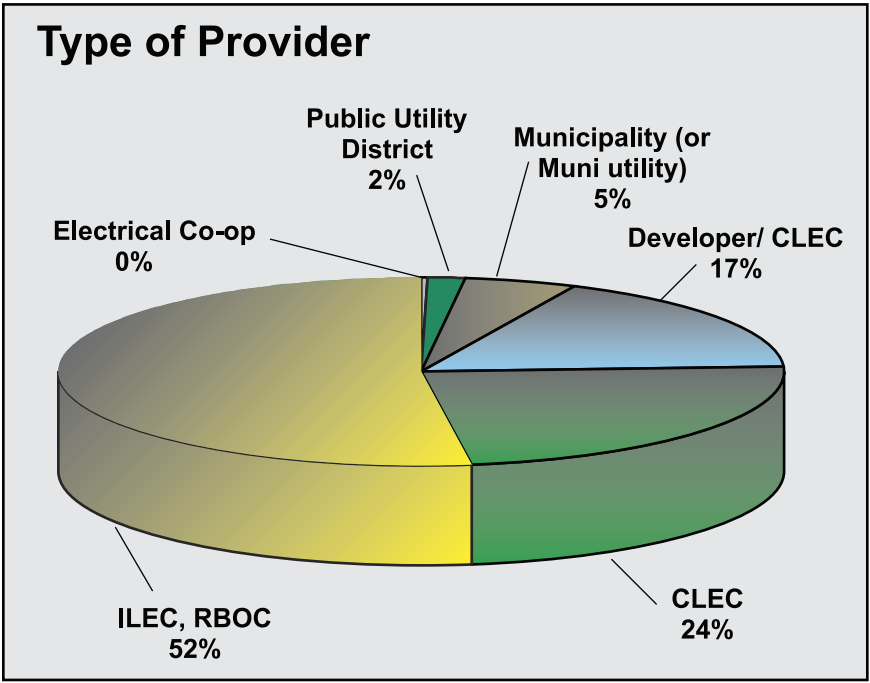
NTS Communications

NTS, a privately held integrated communications company serving the West Texas and eastern New Mexico area around its Lubbock base, offers an interesting model. Scott Cain of NTS spoke at the press conference. The firm has more than 60,000 customers and employs 385 people. It is converting to fiber over the coming decade, financing the project from reserves and internal cash flow. At the end of the 10 years it expects to pass 85,000 residences and 8,000 businesses with fiber. It has already passed about 10,000 premises with fiber in the Lubbock area, and hopes for a 40 percent take rate from businesses, 30 percent from homes. That would allow positive cash flow by Year Three. The major competitors are SBC and Cox.

Most of the current passings – 6,800 – are greenfield. Almost 600 are businesses. The company had installed 1,000 on-the-wall network interface device boxes (NIDs) by last month. In Lubbock, where the video franchise came through only in April, the triple play take



CLEC-initiated systems enjoyed healthy growth, but were overshadowed by telephone companies.



Smaller ILECS were the major engine for growth in fiber systems – 134 by this April. That's about twice as many systems as the 68 developed by RBOCs (mainly Verizon). Together, they are more than half of all deployments.

rate was 16.4 percent by early May. Voice and data take rate was almost 53 percent. In nearby Wolforth, where there was no franchise problem, triple play was at 38.2 percent of customers with another 22.6 percent taking only voice and data. In Lubbock, the company had to agree to pass brownfield areas and not cherry-pick new, wealthy developments.

The marketing is intensive – direct mail, followed by door-to-door sales as

fiber construction is completed, neighborhood-by-neighborhood. That's followed up with more direct mail and with telemarketing.

With the projected 30 percent take rate, the projected construction cost would be about \$107 million, or \$700/ premise passed (at \$65 million total plant cost). Once a customer takes triple play, the installation cost adds another \$1,500 – for the NID, uninterruptible power

Some Key FTTH Vendors

Currently leading the North American market are companies such as Alcatel (BPON), Allied Telesyn (Active), Optical Solutions (GPON), Tellabs (BPON) and Wave 7 Optics (Ethernet PON). Optical Solutions is associated with about half of the North American deployments, but the average size of deployments from the other vendors is larger, so the market share race between these five vendors is much closer in terms of connected homes.

Behind these five vendors are other companies that should be taken seriously in this young market. Some are growing significantly in the North American market, others are developing interesting new technologies, and many have strong international deployments. They include Alloptic (EPON), Alcoa Fujikura (EPON), Amedia Networks (Active), Entrisphere (BPON), Flexlight (EPON), Hitachi (BPON), Motorola (BPON), PacketFront (Active), Telco Systems (Active), World Wide Packets (Active). In addition, most of these companies are also developing other technical solutions besides those noted here. – Michael Render

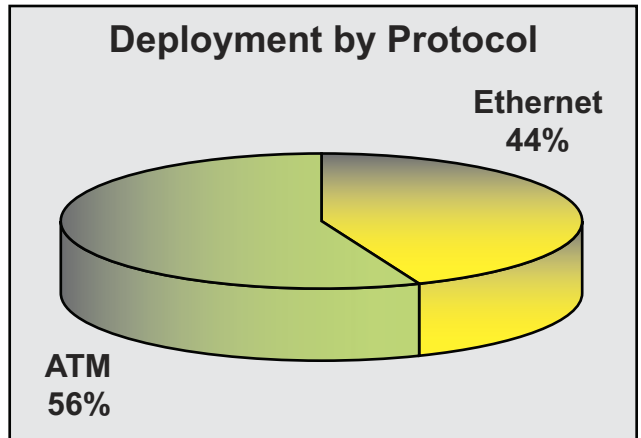
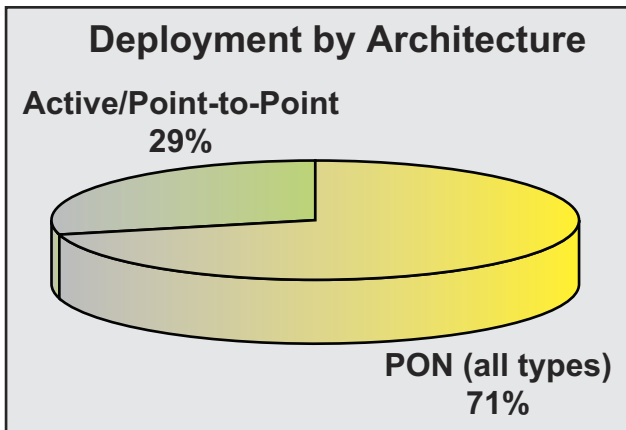
supply and an average of 2.6 set-top boxes per home. That brings the customer premises cost to \$42 million.

NTS typically serves four customers from one pedestal. The drop is run from the pedestal to the home and fusion-spliced.

The headend will eventually be able to serve unlimited channels, interactive TV, VoD, Web TV, video conferencing, caller ID on TV, and of course HDTV. Not all services are available now.

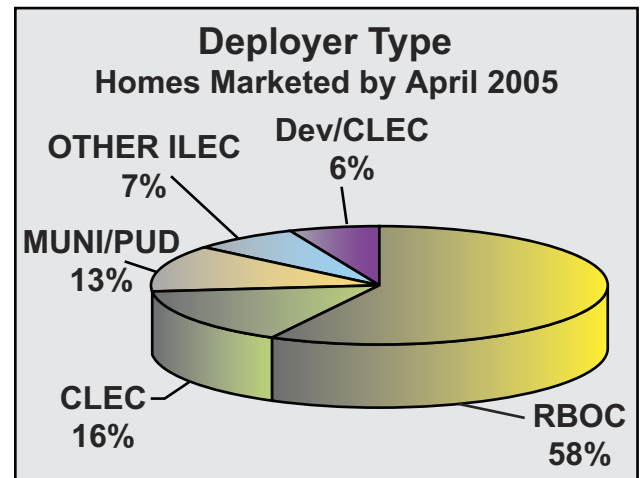
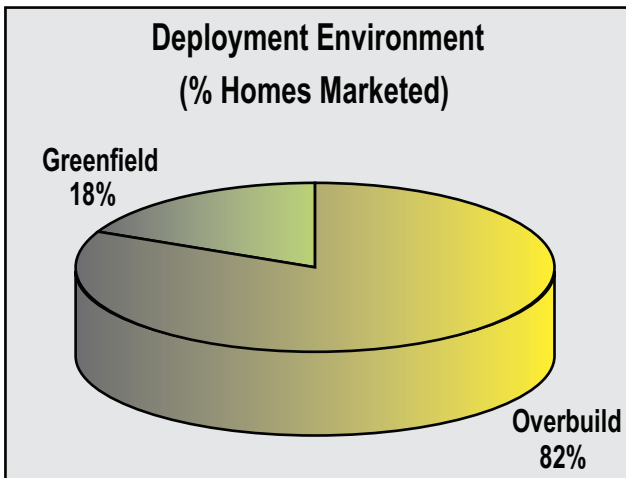
Marketing Problems

The marketplace has not been able to absorb all the new systems. Take rates vary widely – from 20 to 95 percent. Overall, about a quarter of the 830,000 homes marketed to have actually been connected. The 830,000 are, in turn, only about half the homes passed. Fiber operators find it uneconomical to market to small systems; they generally wait



But the various combinations of active and passive, carrying Ethernet and other protocols, suggest that system designers are still feeling their way.

ATM and ethernet networks are running neck-and-neck in terms of number of deployments.



Fiber's cost advantage in greenfield deployments shows here; only 2 percent of the nation's homes are greenfield in any one year but 18 percent of the deployments are greenfield.

RBOCs have been more active in marketing their homes passed than have other types of fiber deployers; the size of their deployments is larger on average.

until a large percentage of the homes in a community are passed by fiber before they start selling.

Take rates after one year range from 23 to 95 percent for triple play (voice, data, video), with an average of about 45 percent, says Render. Data-only take rates are far lower, ranging from 5 to 40 percent. Price is only one factor, Render says. Customer perception of quality counts greatly, as does the strength of marketing efforts, competition, and service offerings (especially triple-play).

Japan has the most homes connected to fiber systems – about 2.3 million according to a Corning estimate in May. IDATE estimated in January that Europe has 547,000 homes buying broadband services over fiber.

Despite ILEC angst (and maybe be-

cause of it), only about 5 percent of the deployments (20 deployments in all) are by municipalities. Another seven deployments are by public utility districts (mainly in the Northwest) and only one of those (Bainbridge Island, Washington) was added since October. Eight of the muni systems were added since October, but several (New Smyrna Beach, Florida and Asheville, North Carolina) cover only part of the community. Muni systems in Palo Alto, California, and Taunton, Massachusetts, are only in trial.

Render says some MSOs (larger cable operators) are doing residential high-bandwidth tests, and that smaller cable companies are using fiber to deploy services in new areas.

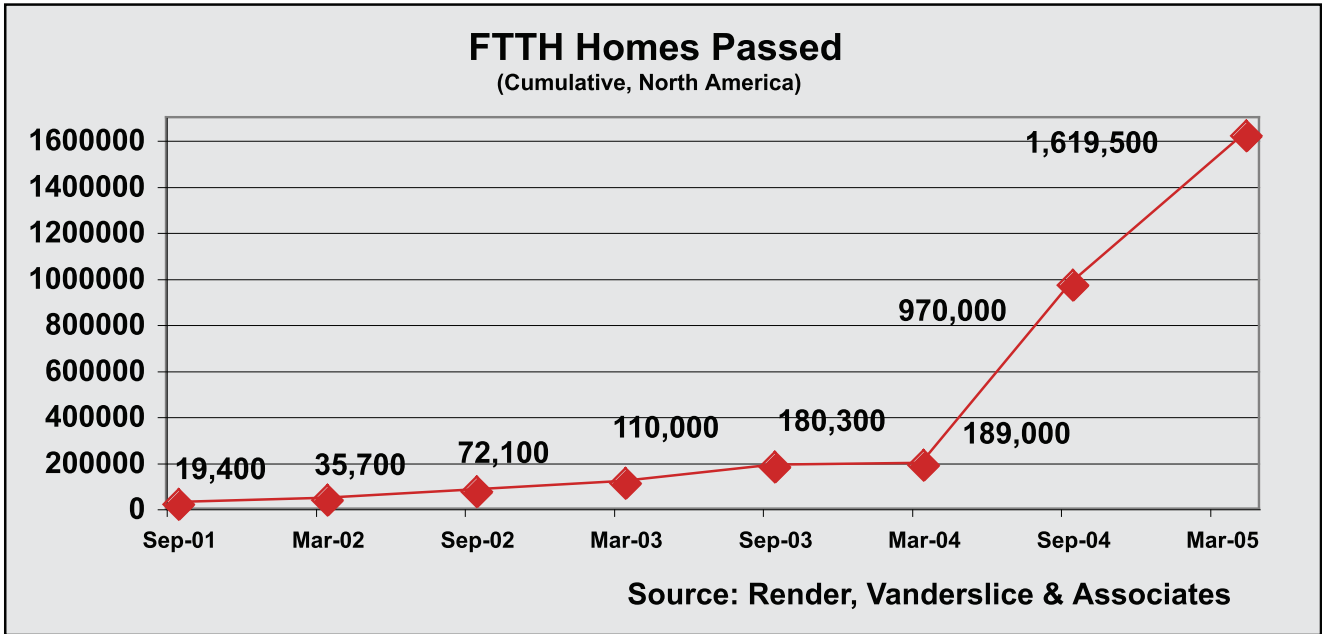
As in Japan, PON (passive optical networks) are most common – more

than 70 percent of the total. But signal protocols carried over the fiber are more evenly split – 44 percent for Ethernet and 56 percent for ATM. The latter is favored by Verizon.

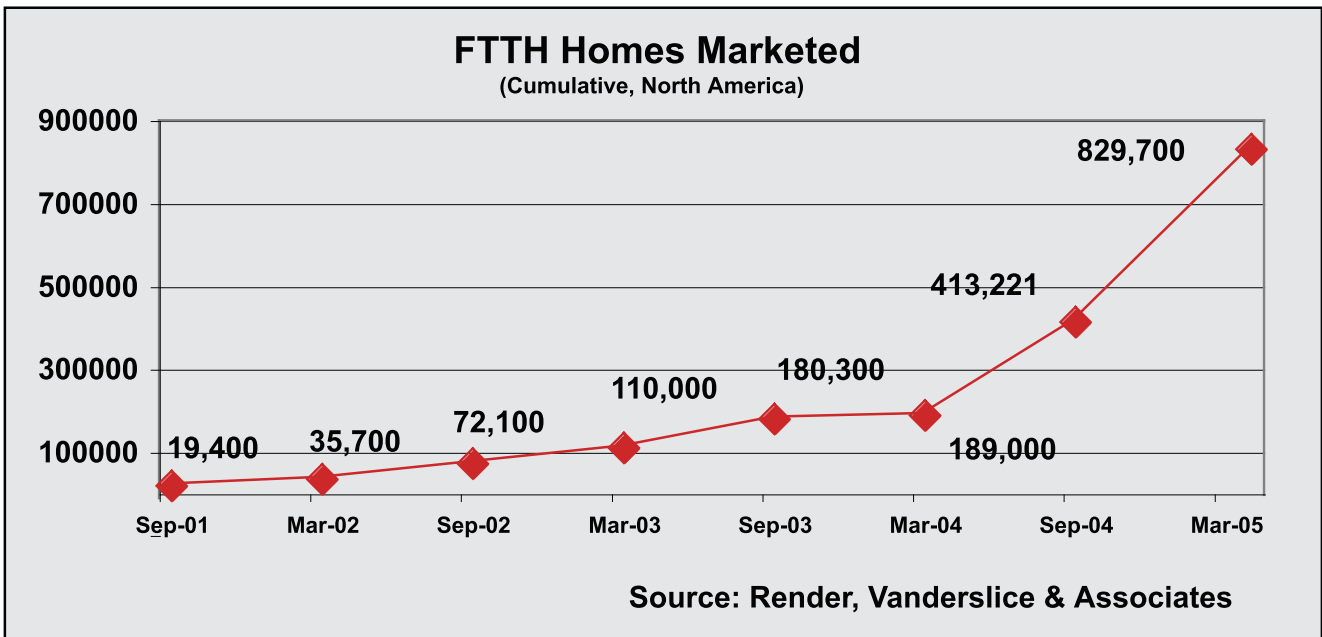
The first fiber deployments, in 1993, cost about \$7,500 per household (almost \$9,000 in current dollars). Deployment costs have dropped greatly since large-scale fiber deployments started in North America around 2000. At that time, published reports suggested a cost of \$4,500 per home connected. RVA surveys peg the price at \$3,600 in 2001, \$2,800 in 2002, and \$2,100 in 2003. Last year, it averaged \$1,650, Render says.

Verizon's Plans

At the press conference, Link Hoewing, VP for Internet and Technology



The number of homes passed by fiber almost doubled in the six months from last October to April.



Homes marketed increased at a faster rate than did homes passed.

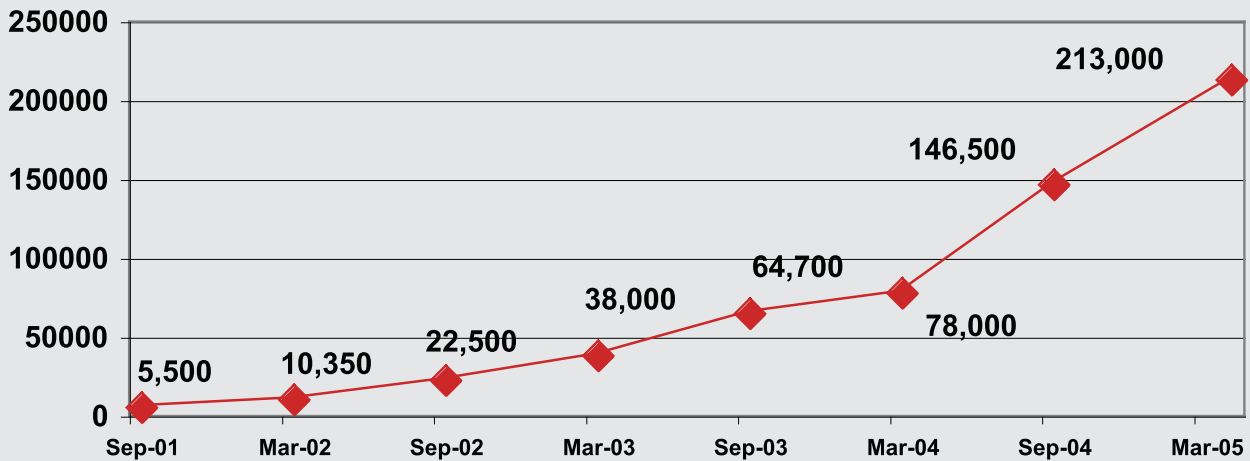
Policy at Verizon, described FTTP as the “next generation” network technology but noted that 80 percent of all Verizon phone lines are now connected to a DSL-capable switch. Verizon has also been testing various wireless technologies in field trials and deploys Wi-Fi and EVDO (Evolution Data Optimized) today. Typical speeds of CDMA-based EVDO technology are 300-500 Kbps, but 2 Mbps is possible.

As of May, Verizon had announced FiOS fiber deployments in 14 states (listed in order of a state’s first announced deployment):

- | | |
|-------------------|----------------------|
| <i>California</i> | <i>Massachusetts</i> |
| <i>Texas</i> | <i>New Hampshire</i> |
| <i>Florida</i> | <i>New York</i> |
| <i>Virginia</i> | <i>Rhode Island</i> |
| <i>Delaware</i> | <i>Pennsylvania</i> |
| <i>Indiana</i> | <i>Oregon</i> |
| <i>Maryland</i> | <i>New Jersey</i> |

Verizon has reached enough critical mass in many communities to offer video. Its lead offer is expected to be 180 all-digital video and music channels, including 20 HDTV and more than 1,500 video on demand (VoD) at any one time. The system is being tested in Keller now without interactive services. Commercial deployment is set for September or October of this year. Verizon expects to hire another 5,000 to handle the FiOS service this year.

FTTH Homes Connected (Cumulative, North America)



Source: Render, Vanderslice & Associates

But homes connected increased at a slower rate than homes passed.

Not all of the issues are technical. New Jersey highlights the political problem Verizon faces. Traditionally, of course, cable franchises have been issued on a town-by-town basis under Title VI of the federal Telecommunications Act.

New Jersey, with a population of about 8 million (less than 3% of the nation's population), has 574 separate communities – only 5,000 households per community on average. Verizon announced FiOS in 31 more towns in the state (for a total of 55) in May. But Verizon has gone to the state legislature seeking some kind of streamlined process for getting its video franchises where it already handles telephone service. Cable companies, of course, are fighting the move. If they had to endure year-long franchise hearings at the community level, why shouldn't Verizon?

Hoewing argues that when cable companies got their franchises years ago, it was to get the authority to build a network. Verizon, he says, "already has that authority and we already have the network – we are now upgrading to fiber." He also says "cable had the luxury of time to build with very little competition," while Verizon faces an entrenched competitor. He insisted that franchise fees "are not an obstacle," and that FiOS has "plenty of capacity" to carry public community channels. But Verizon has been

vague about whether it will pay the same fees as cable does now. In New Jersey, it is offering as much as 50 percent above cable franchise fees to get started, however, said Dennis Bone, president of Verizon-New Jersey. (*Broadband Properties* plans to look at this issue more closely later this year.) ♦

About the Author

Steven Ross can be reached by email at steve@broadbandproperties.com.

Don't miss the powerful presentation on the latest FTTH Communities by researcher Michael Render of Render Vanderslice & Associates at the Broadband Properties Summit.

September 12 – 14.

Register now at: bbpmag.com

Information About the RVA FTTH Report

Render, Vanderslice & Associates (RVA) offers a complete report on the FTTH industry. For the past five years, the company has completed an annual census of deployments in North America and has gathered detailed information from all these deployments. The resulting detailed report helps those who are considering FTTH deployments by providing basic information about FTTH and a "consolidated case study" of past deployments including ways to forecast and increase take-rates.

Author Michael Render says the report also provides detailed information about current status and emerging opportunities in market segments such as telephone companies, real estate developers, municipalities, and overbuilders, which is useful for front tier vendors. For second tier suppliers of components and services to the industry, the report offers information about the market position of front line vendors, overall forecasts for FTTH growth, and forecasts by architectures and protocols.

More information is available at www.RVAllc.com. The cost is \$2,450 for a printed version of the full report.