

BRISTOL: A GOOD PLACE TO LIVE (AND WORK AND PLAY)

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In the quiet Appalachian city of Bristol (motto: “A Good Place to Live!”), in southwestern Virginia, a rather remarkable piece of history can be found. It’s not the fact that it is actually one community straddling two states. (Stand to the north side of State Street and you are in Bristol, Va.; cross that two-lane thoroughfare to the south side and you will find yourself in Bristol, Tenn.)

Nor is it the home on Solar Hill where Confederate president Jeff Davis is said to have given a rousing address to Bristolians during the American Civil War. And it’s not that the Country Music Association recognizes Bristol as the birthplace of American country music.

No, this piece of history is entirely modern, and threads its way through virtually every street, neighborhood and district of this town of 45,000. Bristol, Va., is one of the first municipalities in the United States to deploy ubiquitous fiber to the home (FTTH), and has been extraordinarily successful in delivering the life-enhancing “triple play” bundle of voice, video and data services to its citizens.

Bristol, having deployed its FTTH network in 1999, has been at the forefront of the municipal catalyst for FTTH. Municipalities represent more than 30 percent of all U.S. FTTH deployments, the majority of them overbuilds, which replace outdated copper wiring – the technology of today’s bandwidth-constrained digital subscriber line, or DSL – with infinitely capable optical fiber.

Municipalities have led the FTTH movement in large part because of their role as the ultimate representative of their citizens, says Atlantic Engineering Group chief executive officer James H. Salter. These cities, and their utilities, are uniquely locked into the pulse of their communities.

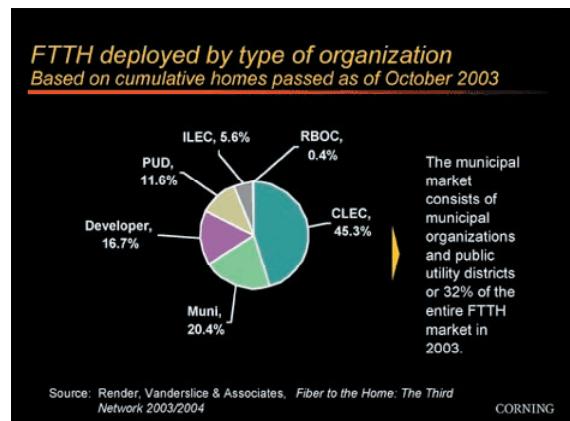


FIGURE 1: MUNICIPALITIES HAVE PLAYED A MAJOR ROLE IN FTTH DEPLOYMENT.

“Municipalities and their utilities are both part of – and an investor in – their communities, and they keep local money local,” said Salter. “They understand the needs of their populations. They understand what it takes to improve their community’s ability to compete, not just on a regional level but on a global one.

“They understand that their economic development, both in new business development and in retaining existing industries, is dependent on a community’s ability to offer world-class services and opportunities. They understand how greater access to the world’s libraries and distance learning accelerates their children’s education. They understand, better than anyone, their citizens’ lifestyle choices and entertainment values. They are uniquely positioned to meet those needs in a local and very personal way.”

Bristol Virginia Utilities: Electric, Water, *Fiber*

Many municipalities, like Bristol, originally bring fiber into the community to enhance public sector services, primarily the government and schools, by providing a state-of-the-art infrastructure. Bristol Virginia Utilities (BVU), the municipally owned utility provider, decided to add broadband to its more traditional utility roster of electricity, water and wastewater management for these very reasons.

“We initially began offering voice, video and high-speed data applications to our local schools and government so that our children and our community could have affordable access to the most advanced technology available,” said Mark Lane, network architect for BVU Optinet, the utility’s fiber-optic infrastructure and services provider. “It was also our hope that an investment in such a network would enhance economic development by enticing a new breed of commercial and industrial entities to our area.”

While Bristol was not the first city to view broadband connectivity as critical to the city’s growth, it was one of the first to dismiss current-generation alternatives such as copper, hybrid fiber-coax (HFC) or wireless in favor of the long-term robustness of fiber. The city wanted the capability to deliver a full suite of broadband-enabled applications, at lower cost, and with limitless flexibility to add more services, and more users, as the city’s needs grew, without facing bandwidth constriction.

Network planners were also interested in deploying a network that would deliver better-quality voice, video and data services than were currently available. To do that, BVU decided fiber was the only choice; in addition to the bandwidth benefits, fiber is resistant to interference, unlike wireless, copper and HFC.

And, despite some perceptions that fiber to the home was far more costly than the alternatives, BVU’s detailed analysis before deployment told a far different story: The first-installed costs of FTTH deployment were only about 15 percent higher than that of the next-lowest-cost option, HFC. And, because optical fiber is infinitely more reliable and requires less power, equipment and maintenance, it would result in significant cost savings to the city over the network’s lifetime.

Bringing fiber home

While BVU's original intent was to provide fiber-optic connectivity primarily to commercial and public sector entities, a survey of existing customers in 2001 returned a 97 percent satisfaction rating with BVU's services and overwhelming demand to provide these services to the larger general population of Bristol and, in fact, all of Washington County. Bristol residents made it clear they wanted more choices than were currently available for their voice, video and data services needs, and if they could receive it from a local provider on a state-of-the-art network, so much the better.

It took two years, and working with state lobbyists and legislators to change existing state laws preventing localities from offering voice and video services, for BVU to clear a path to full-service broadband delivery for its residents. Atlantic Engineering Group was brought in to design and build an extension to the existing fiber network for fiber to the business (FTTB), and was then awarded the city-wide deployment project for FTTH. Corning's fiber-optic cable, hardware and equipment were installed throughout the 125 cabled miles of network.

BVU chose a passive optical network (PON) architecture for Atlantic Engineering Group to build, as it removes more costly and higher-maintenance active electronics from the field, and shares the cost of equipment among many subscribers, significantly lowering the cost-per-subscriber for the network. Also, PON equipment is largely standards-based, which BVU considered a top priority.

"We considered compliance with ITU technical standards to be one of our most important design criteria," said Lane. "That in and of itself limited our selection of network architectures and appropriate equipment vendors."

The result is an advanced communications backbone of 144- and 288-count fiber-optic cables, supporting a fully meshed asynchronous transfer mode (ATM) network operating at 622 Mb/s downstream and 155 Mb/s upstream, capable of robust triple play service. There are nine points-of-presence (PoPs) comprising the backbone architecture, providing collocation and attachment facilities for entities desiring to provide services.

BVU scaled its services to residents, first offering voice and data services, then adding video in July 2003.

"We decided very early on to offer voice, data, and cable television services," said Lane. "Offering only one or two services would not make the network financially viable."

Bristol, Virginia, at a Glance

- Part of the "Tri-Cities" metropolitan area of southwestern Virginia, including Johnson City and Kingsport
- Population:
 - 45,000 in Bristol, Va.
 - 436,000 in greater metro area
- Size: 11.53 square miles within the city limits
- Utilities Tax: 5% of monthly water and telephone bill
- Communications
 - 1 daily newspaper
 - 7 radio stations
 - 6 television stations
 - 6 TV networks

Bristol: A happy, connected community

“We are getting compliments right and left,” said Jim Kelley, BVU’s vice president of operations. “Our customers are delighted. I can hardly go out to eat without customers coming up to me and saying, ‘This is fabulous, we love it.’”

And the numbers prove what Kelley is hearing anecdotally. More than 4,200 customers have signed on among the 10,000 homes and businesses passed, a penetration rate of more than 40 percent in the 18 months since BVU began rolling out full-service delivery. In fact, BVU has already surpassed its 2004 year-end revenue and customer goals, and with very high customer satisfaction rates.

The many success stories are a source of pride for BVU — residential consumers who are receiving more services at a lower cost, local businesses that are able to compete more effectively, the public sector reaching out to its constituents in new ways:

- Cross Stone Products, a brass products manufacturer, required advanced services such as IP Centrex and a virtual local area network (VLAN) and made the decision to move from Tennessee to Bristol, Virginia, due to the fiber-optic infrastructure available there
- Robin Griswold, a BVU residential customer, was able to use the money she saved by switching to BVU phone service to upgrade to high-speed Internet, and is still paying less than she was previously for telephone and dial-up Internet services
- Media General, which owns one newspaper and two television stations in the area, has added a remote newsroom feed between the stations, includes video reports at the Bristol Herald Courier’s Web site, and has a data network for high-capacity file transfers of advertisements and recorded video segments
- Virginia Intermont College will save more than \$18,000 on cable television services alone in 2004, which allows them to provide a quality education to students at a more affordable price
- Eric Clark, the director of the Bristol Area Boys & Girls Club, is both a residential and business customer; he’s saving \$50-\$60 per month at home, allowing him to upgrade to high-speed Internet services, and the Boys & Girls Club is saving nearly \$200 per month
- The Bristol Virginia Public Schools, serving more than 2,500 students, has added *Parent Connect* software capability; families installing the free software on their computers can interface directly with the school district’s student management system, allowing parents to check grades, attendance and discipline and school assignments

And there's more to come. With the aid of a \$2 million Tobacco Grant and a federal Economic Development Administration (EDA) grant for \$1.6 million, BVU will work with other regional authorities to extend broadband capabilities and boost economic development throughout southwest Virginia. The nearby towns of Abingdon and Mendota will be fiber-connected, and another 51 miles of fiber-optic infrastructure will run from Abingdon to Russell and Tazwell counties. The fiber-optic infrastructure in Bristol will also be leased through Washington, Smyth and Wythe counties.

"It's a major investment, but 10 years down the road, you're going to see a fiber-wired America, there is no doubt," said Kelley. "And the city of Bristol and our surrounding communities are going to already be there, already getting it done. We feel great about that, and our residents do as well."