

# Can FTTP Work in Palo Alto?

Municipal fiber to the home has succeeded in cities left behind by the major broadband providers. In a city that already has good broadband service, the story is more complicated.

By Stephen Blum / *Tellus Venture Associates*

**W**ith a very successful municipal dark fiber business to its credit, the city of Palo Alto, Calif., has seemed to many an ideal place to build a fiber-to-the-premises (FTTP) system. However, the retail broadband business is different from the wholesale side. Both the city government and prospective private partners have concluded that an FTTP venture would not be able to support itself. Subsidies – from taxpayers or outside investors – would be necessary for many years, at least. So far, no one has been willing to pick up the tab.

From an engineering perspective, FTTP is an easy case to make in Palo Alto. The 41-mile fiber backbone that runs through much of the city can provide the necessary backhaul capacity, including connectivity to Tier 1 Internet facilities. The municipal electric utility offers access to poles and conduits. The town is relatively densely packed, averaging about 33 single-family homes per block, except for a few houses in the western hills.

Demographically, it looks like prime FTTP territory – at least at first glance. Palo Alto is a college town and home to high-tech startups and global technology giants alike. Average household incomes and property values that are high even by California standards empower affluent consumers.

The incumbent providers – AT&T and Comcast – have seen the numbers and responded. Both deliver high levels of service

at competitive rates. Comcast, for example, offers 100 Mbps service and, by all accounts, can actually deliver it to the relative handful of households that are interested in buying it.

That's where the real story begins. For the most part, Palo Alto residents are happy with the service they are already getting. At the least, they are content enough that there's been no groundswell of support for city-subsidized FTTP service. More than 10 years of vigorous and vocal debate and five rounds of studies, tests and analysis notwithstanding, the governing assumption has been that any FTTP venture has to be self-supporting.

In 2001, the city connected 66 homes in a central neighborhood to test the technical feasibility of delivering television and Internet service via fiber. At a time when DSL and cable modem services were barely mainstream, Palo Alto was living up to its reputation for innovation. The test was successful, to the extent of proving that FTTP technology works. This success led to a business feasibility study in 2002, which projected that a city-operated FTTP system would pay for itself.

## TROUBLE IN PARADISE

Over the next few years, a couple of problems emerged. First, the financing assumptions were based on the city's ability to get low-cost bond financing backed by just the FTTP venture. When those assumptions proved wrong, the alternative – taxpayer-backed bonds – was not

palatable to a financially conservative community.

Second, a business plan prepared by the same company, using similar assumptions, was being implemented just to the north by the city of Alameda, albeit with a hybrid fiber-coaxial system. Although early results were promising, in the end fierce competition, particularly from Comcast, kept the municipal cable system from getting above a 30 percent market share. Alameda couldn't meet its bond payments and sold the system to Comcast for about 50 cents on the dollar. Frustrated bondholders then headed to court.

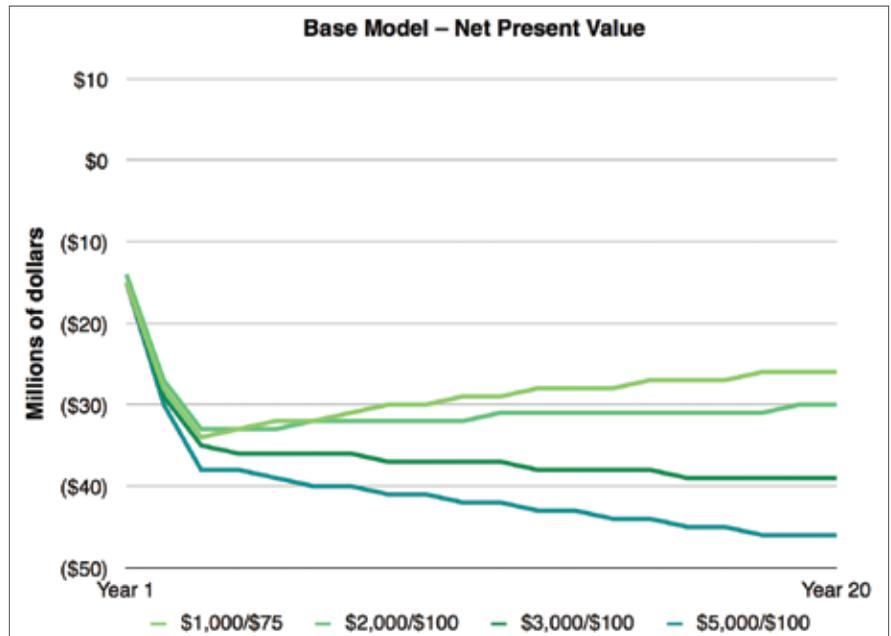
Palo Alto's solution was to look for a private-sector partner to pay for building an FTTP network on top of the city's existing dark fiber. An RFP went out in 2006, and two proposals came back. One was selected but at a time when the municipal Wi-Fi bubble that began in 2003 was deflating, negotiations proved fruitless. The investment case for a municipal-scale FTTP system was not attractive enough for private capital.

### PROFITS FROM DARK FIBER

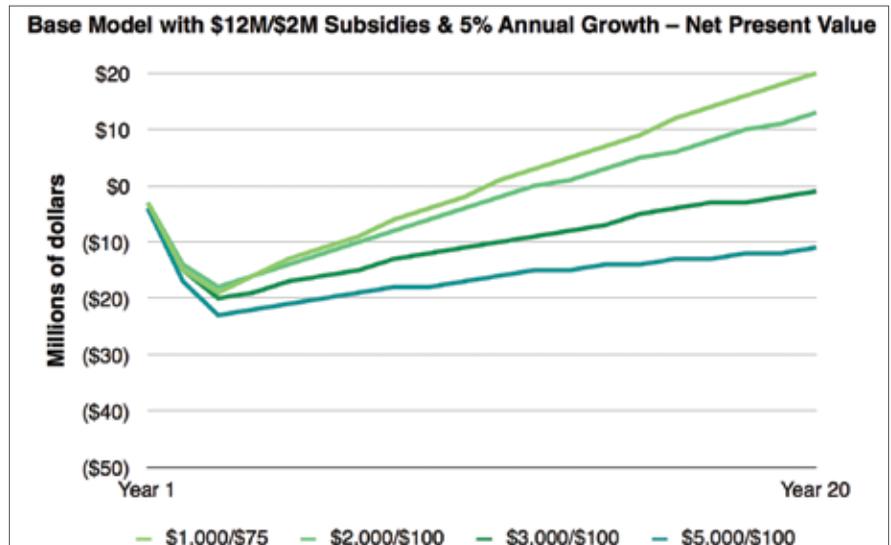
While the debate over FTTP went back and forth, the city's dark fiber business was profitable and growing. It supported city operations and other government needs, although local schools were still using an I-NET system provided by Comcast, under the terms of its franchise agreement.

Operating costs are low, and the city's main responsibility is making sure the outside plant stays intact. The selling proposition is simple: Lease a strand of dark fiber from the city for about \$1,000 or \$2,000 a month, hook it up to the Palo Alto Internet Exchange and buy cheap, raw bandwidth at rock-bottom rates. Big high-tech companies, startups and law firms looking for gigabit buzz jumped at the chance. So did telecommunications resellers, who compete to sell lit service to small and medium companies and are the city's best dark fiber customers.

The dark fiber system was originally installed in 1997 to support the city's electric utility operations. Because



Net present value of the proposed FTTH system over 20 years, with various upfront and monthly charges, using base case numbers  
Source: Tellus Venture Associates



Net present value of the proposed FTTH system over 20 years, using the most optimistic numbers  
Source: Tellus Venture Associates

hanging a 144-strand cable costs nearly the same as running, say, a pair of fibers, the city bet it could recover the small additional cost of extra fibers by leasing capacity to private companies.

This turned out to be one of the best bets ever made. With several dozen customers, the dark fiber utility

generates more than \$2 million a year in surplus cash flow, building up an enterprise fund balance of \$14 million and growing.

That growing cash pile and track record of success led to an assessment of the future of the dark fiber business in 2011 and then to another look at the

viability of FTTP in 2012. This time around, the question was even more focused: Could a viable FTTP system be financed using just the dark fiber surplus and/or one-time connection fees paid by willing households?

To answer it, the city conducted a survey to gauge the community's interest in a municipal fiber venture and test its willingness to pay. It also hired my company, Tellus Venture Associates, to evaluate the results. The previous year, I had performed a market study for the city that looked at potential expansion of the dark fiber system and, as part of it, prepared a brief situation report on the state of municipal FTTP systems. The conclusion was that not much had changed in the five years since the city's unsuccessful RFP effort.

Although there were some apparent FTTP successes (for example Bristol, Va., and Cedar Falls, Iowa), cities that

had more in common with Palo Alto, such as Alameda and Provo, Utah, were failing. Alameda was just emerging from its court battle with disappointed lenders, and Provo taxpayers had picked up the tab for bonds its system couldn't support. Despite building an experimental fiber network to housing on the nearby Stanford University campus, Google decided Kansas City was a more promising environment for fiber service than Palo Alto. If anything, city policymakers were even less inclined than they had been earlier to pursue any FTTP business plan that put taxpayer money at risk.

True to their entrepreneurial roots in the heart of Silicon Valley, local broadband advocates gave it another try, which led to the assessment of a user-financed FTTP business model.

A survey conducted by RKS Research and Consulting found

that Palo Alto residents generally like the idea of FTTP service but are reasonably content with what AT&T and Comcast provide – and that they are price-conscious shoppers. RKS concluded

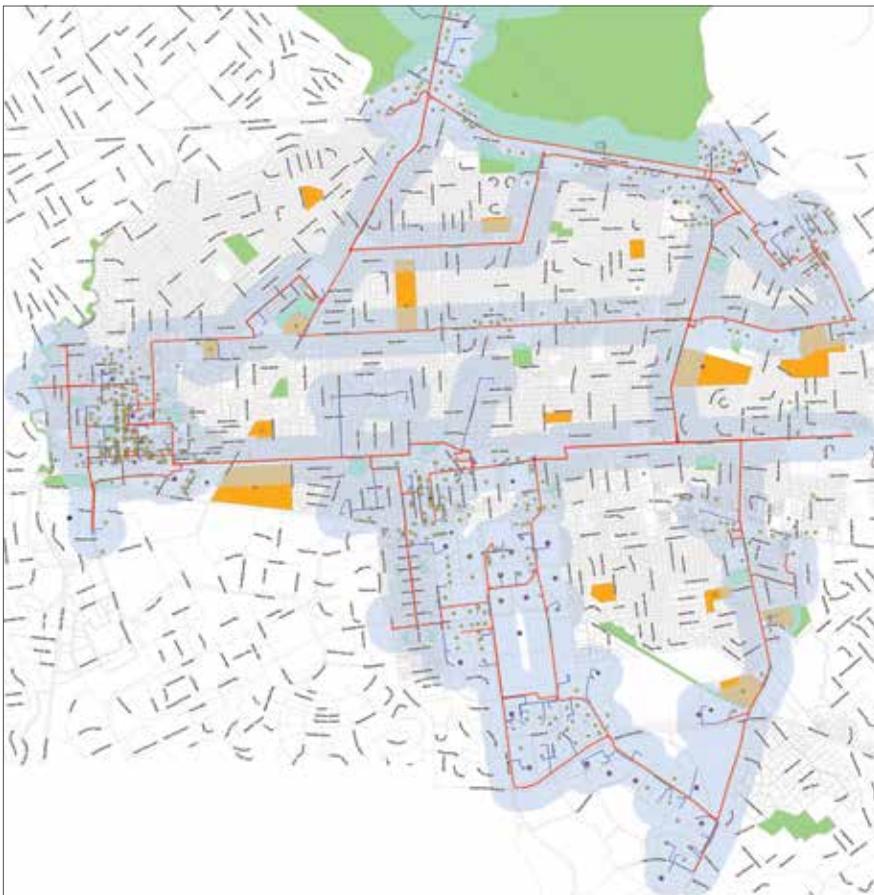
The city cannot expect a drove of homeowners will switch to its offering just because it offers a competitive service. The city must view and approach the FTTP option as a retail product with several well-established and credible competitors all vying for the same limited customer base.

Tellus Venture Associates was again engaged to evaluate the user-financed FTTP business case for the city. A deeper look into the numbers showed a rapidly unraveling business case for user-financed fiber. Several problems emerged.

First, even if just the households willing to pay a substantial hook-up fee are connected, FTTP infrastructure still has to be built out to effectively the entire city. The survey found that demand was evenly spread across the community, with no market, let alone political, justification to skip any neighborhoods.

Overall, 79 percent of households would have to pay \$3,000 apiece to fully fund FTTP construction costs. Under the most optimistic interpretation of the survey results, only 18 percent of homes were willing to pay that much. More were interested at lower price points, of course, but that only meant less money would be on the table. The only way to close the gap was to find money elsewhere.

One place to look was the business operations of the system itself. Under some assumptions – monthly subscription rates in the \$75 to \$100 range and an upfront fee of no more than \$2,000 – financial modeling showed that an FTTP enterprise could bring in enough cash to pay annual operating expenses and contribute a few hundred thousand dollars a year – maybe a few million with extremely optimistic assumptions about subscription growth rates –



Map of the Palo Alto dark fiber network, showing businesses within 200 meters of the fiber

toward repaying construction costs. Another potential source of cash was the dark fiber business, which might contribute as much as \$12 million at the beginning and \$2 million a year after that.

Was that enough to pay off the bonds that would be needed to finance the initial capital outlay within 20 years? The only way to get to “yes” was to pile optimistic assumption on top of optimistic assumption. The simple base case model left the system with a \$26 million deficit at 20 years. Even nearly doubling the projected take rate still left a \$10 million deficit.

Adding in the maximum contribution from the dark fiber business would pay off construction costs, if the more optimistic interpretations of the survey data were used or if significant and consistent subscriber growth was assumed. But if those numbers were discounted to factor in the effect of competition – a dead certainty, given the experience in Alameda and elsewhere – the business would still be \$5 million or more in the red after 20 years.

My conclusion was that a fully user-financed FTTP system was not a possibility in Palo Alto. Subsidies would be necessary, almost certainly more than the dark fiber business was capable of generating. Which meant that someone – taxpayers or private investors – would have to make up the difference.

The city’s immediate decision was to shelve any FTTP plans and focus instead on using the dark fiber system to improve wireless connectivity throughout the city, including, potentially, free Wi-Fi access, better mobile phone and data coverage and beefed-up public safety resources. That effort is still underway.

### GOOGLE’S TEST BED

The dream is not dead. Palo Alto’s newly appointed mayor, Greg Scharff, revived hopes by advocating a sixth try at FTTP during his State of the City address earlier this year. Pointing to Google’s Kansas City venture, he said he thought the market had changed

enough to make a residential fiber venture fly, particularly if it’s supported by the dark fiber business.

Based on my research and experience in Palo Alto and elsewhere, I don’t see enough change – yet. There’s no question the conversation has changed from a year ago, but there’s also no evidence of a sudden shift in the consumer market toward a willingness to spend more on broadband service.

Google’s recent deal to take over and run the Provo system is an excellent opportunity to discover the real truth on the ground, though. The previous user-financed model – with a \$700 connection charge – resulted in an ongoing subscription rate somewhere, it seems, in the 15 percent to 20 percent range. The new deal is \$30 upfront and 5 Mbps service for free, not counting the \$5.35 monthly charge that every Provo household has to pay to service the city’s bond debt.

Provo will soon be a fully fibered city with a competitive market for broadband services. If Google can double or triple the current market penetration rate and then leverage it to upsell residents into faster Internet as well as video and phone service, it will have created a game changer for all concerned. Whatever Google Fiber’s degree of success there, Provo will be a useful and credible benchmark for evaluating FTTP proposals in other cities.

Those results might show that a municipal-scale FTTP system can support itself. If so, expect FTTP plans to be revisited in Palo Alto and elsewhere. If not, at least the cost to taxpayers or private investors will be much clearer. Voters and elected officials will have something much better than surveys, reports, hucksters and the pleas of a passionate few on which to base decisions. ❖

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