

The Triple Play infrastructure, the wholly converged solution, is what people are starting to get. Add to that security and access control, the idea that you can control any device in your home remotely, and the blinders often come off.

The homebuyer may think they can add it later. In fact, builders are now stranding parcels. For example, a prospective homebuyer on a new lot says the community across the way is offering FTTH but the earlier lots you have offered have not been FTTH. In order to stay up, your new section is going to be FTTH. Homebuyers are becoming savvy enough where they recognize they at least want a choice between fiber or not. They don't want to spend a substantial amount of money—sometimes their life savings—only to find that their new home does not have the same telecom capabilities as the one down the road.

Income is always a factor. Some of the younger first-time homebuyers who may not want to spend \$150,000 on a home but need an Internet connection may not even require a landline connection. To someone who is spending \$500,000 on a home another \$10,000 for a fiber connection may not matter.

More and more service providers are following the Verizon model and going with FTTH. There are still a lot of stubborn people who say they are going to use the existing infrastructure because it is going to work. We point out that people who make that decision are going to have to suffer the consequences. Sometimes it's other carriers when the incumbent can't or doesn't want to provide FTTH. Lafayette, La. was important because it demonstrated that.

The battle is being won community by community. We are confident this trend will continue and grow.

Publicly Funded “Open FTTH” An Opportunity for ILECs and the Communities They Serve

by Mitch Shapiro, Independent Consultant

There is virtually universal agreement that FTTH provides the greatest capacity and best technical performance of any wireline network option. At the same time, however, there remain serious questions about the economics of non-greenfield FTTH investments. The fact that only Verizon among the nation's three RBOCs has committed to a large scale FTTH deployment—and for only a little more than half of its footprint—is testimony to the fact that, for most of the country, incumbent telcos do not perceive adequate economic justification for FTTH investments.

This article considers one relatively unexplored model for overcoming the economic challenges of bringing FTTH to the tens of millions of American homes that currently lie beyond the scope of today's FTTH business cases. This model combines a wholesale muni-fiber approach with the participation of the incumbent LEC as an “anchor” retail service provider. Other potential ILEC roles under this “open-FTTH” model could include provision of services and network resources to support network construction and operations.

Incumbent LECs could benefit from this model because it would give them access to a state-of-the-art FTTH network without the capital investment burden and risk associated with building the network themselves. At the same time, the participation of an ILEC would reduce the risk and improve the economics of the muni-FTTH business case.

This model of FTTH deployment would apply especially well to capital-constrained ILECs that have yet to launch aggressive fiber-deployment strategies (e.g., Qwest among the three RBOCs). It could also apply to ILECs like Verizon and AT&T that are planning FTTH and/or FTTN upgrades in only some of their markets. For these companies, the model could be applied to the large number of local markets in which ILEC management cannot cost-justify a fiber-based upgrade. The model could also apply to cable operators, particularly in markets where the cable network has not been fully upgraded to the industry's standard 750-860 MHz HFC (hybrid fiber coax) architecture.

Will ILECs Embrace This Model?

In the October 2006 issue of *FTTH Prism*, James Salter raised a key challenge facing the model proposed here. In his view, ILECs “have no incentive to embrace these networks and become the Service Provider ‘middle man.’”

Why? They can't afford it. They would have to do one of two things—abandon their existing copper/coax infrastructure or compete against themselves for customers. If they abandon their existing infrastructure in order to use the 'better' municipal fiber network, they would have to write-off their plant asset, take a huge hit against net income, lower the equity on their balance sheet, and adversely affect their stock price. If they compete against themselves—copper customers on their old network versus fiber customers on the new network—they would have to replace a high-margin copper customer...with a low-margin fiber customer.

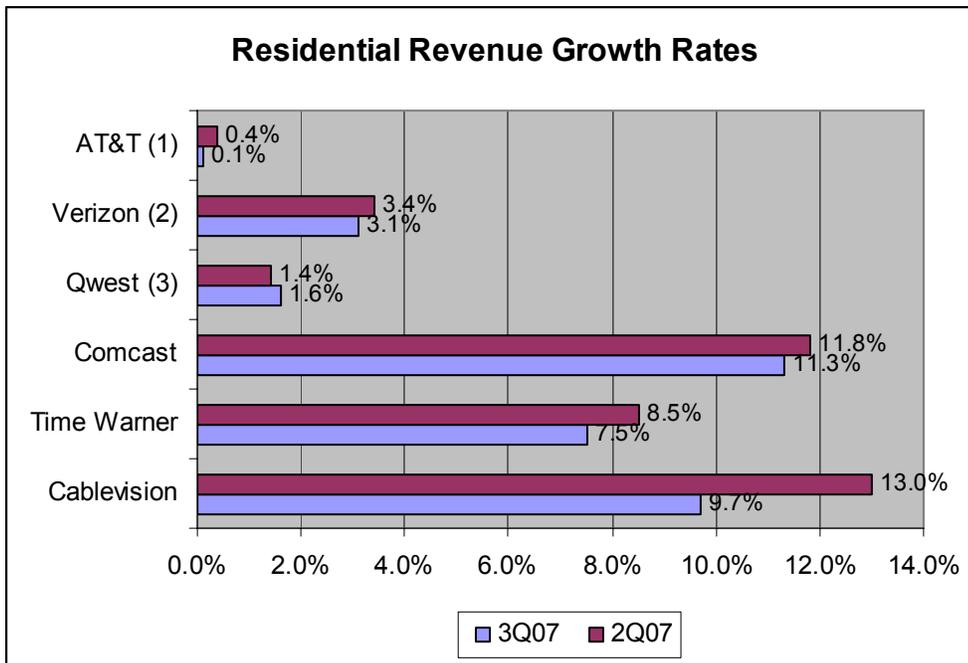
While the above may be an accurate description of historic ILEC attitudes, it remains to be seen whether these attitudes will withstand the mounting competitive pressures facing ILECs in the large number of markets in which they are not planning to deploy fiber-rich, video-capable networks. In these markets, the combination of cable VoIP and Triple-Play bundles, wireless replacement, and low-cost web-based services will increasingly turn what were once “high-margin” copper customers into either low-margin copper customers, or negative-margin non-customers.

Weighing The Relative Risks

Though Salter is correct that the financial risks of accelerated write-offs of ILEC copper plant are significant, this is also increasingly true of the risks associated with other ILEC options.

For example, it seems increasingly likely that ILECs lacking a robust on-network video strategy will face a future of residential revenue stagnation and even decline.

Evidence of this can be seen in the graph below, which compares second and third quarter revenue growth rates for the three RBOCs and three top-tier cable operators. As it shows, year-over-year growth in cable revenue has ranged from the high single digits to the low teens. In contrast, RBOC growth rates have languished in the low single digits.



The graph also shows that Verizon, which has been ramping up its FTTH footprint and FiOS customer base for several years, has been reporting residential market growth rates well above its peers. During this year's second and third quarters, it's in-region residential growth rate (excluding MCI mass market revenues) was in the 3.1-3.4% range, versus comparable growth rates of just 0.1-0.4% for AT&T (which is still very early in its FTTH-based U-verse rollout) and 1.4-1.6% for Qwest (which has yet to undertake a broad video-capable network upgrade).

While risking revenue stagnation if they don't invest in fiber-rich upgrades, ILECs also face significant risk if they do undertake such upgrades in markets with questionable ability to generate returns that are attractive to investors.

Strong concerns about such risks were expressed by Wall Street analysts during Qwest's October 30, 2007 third quarter earnings call, following the company's announcement of an increase in 2008 spending for FTTN deployments. Following the call, Qwest's stock closed at \$7.06/share, down 13.7 percent from the previous day's closing of \$8.18. And during the month following the call, the stock was trading below \$6.80 per share.

Even the nation's two largest and strongest RBOCs have implicitly acknowledged that a substantial portion of their service area cannot justify investments in fiber-rich upgrades. As noted above, Verizon has targeted only a little more than half of its total footprint for its FiOS FTTH build. And in a December 11, 2007 analyst conference, AT&T announced plans to pass a comparable percentage of its total footprint (including BellSouth territories) with its U-verse FTTN network.

In terms of risk, it's worth noting that AT&T's U-verse Internet service offers top speeds of only 6 Mbps, to be upgraded next year to 10 Mbps. This barely matches what most cable operators offer today, and should fall well short of cable's next generation DOCSIS 3.0 technology, and even more so what FiOS and other FTTH networks will be able to deliver. So, while per-home capital costs are substantially lower for U-verse than for FiOS, the former's much lower data rates entails its own

competitive risk. And from a public policy perspective, it could be argued that AT&T's U-verse strategy increases the risk that many American communities will fall far behind their counterparts in other countries in terms of future Internet data rates and services and the associated benefits.

Given the risk perceptions of ILECs and their shareholders, it seems reasonable to consider publicly funded FTTH models in the large number of markets where investments in FTTH—or even FTTN--cannot satisfy private sector risk and return requirements. As discussed below, this is because a “public infrastructure” model has fundamentally different investment criteria than a private sector model.

It is natural that ILECs' historical role and financial structure as facilities-based service providers would make them cautious about the type of model proposed here. But, given their other options, it is the author's contention that ILECs should at least consider this model in markets where they cannot justify their own FTTH or FTTN investments. While this would entail significant changes in the traditional ILEC business model, these changes may very well offer the best (and perhaps only) alternative to stagnation and even decline in these markets.

Given its relatively weak capital structure, its lack of on-network video strategy, and Wall Street's initial resistance to recent signs of accelerated FTTN spending, Qwest might be an especially good candidate for consideration of such a strategy. This seems particularly appropriate in light of its recent change of top management, which has triggered a period of strategic reevaluation.

Externalities Favor A Public Investment Model

In addition to offering ILECs a path to fiber-powered growth that is largely free of investment risk, a publicly funded wholesale FTTH model has the potential to generate substantial public benefits for the communities in which it is adopted. The nature and implications of these benefits are briefly discussed below.

Common sense, anecdotal information and a growing body of research strongly suggest that widespread availability of high-speed open-access IP networks has the potential to deliver substantial positive “externalities”. For the purposes of this discussion, the term “externalities” refers to benefits that do not accrue (or are not perceived to accrue) directly and fully to those paying for communication services. As a result, their value is difficult for service providers to monetize in the form of service fees.

The desire to promote externalities within their communities is one of the chief motivations driving the growing interest among local governments in “municipal broadband” projects. Externalities targeted by muni-broadband projects include:

- *attracting new businesses and strengthening the local tax base;
- *driving economic growth and increasing the global competitiveness of the community's workforce and business base;
- *increased efficiency in the delivery of public and private services, including education and healthcare;
- *bridging the “digital divide”;
- *reducing traffic congestion and pollution; and
- *enhancing the overall quality of life of a community's citizens.

In his 2006 book *America at the Internet Crossroads: Choosing the road to innovation, wealth, and a supercharged economy*, muni-FTTH advocate Mike Bookey considered the potential cost savings associated with widespread FTTH deployment. He focused on two areas well suited to take advantage of the symmetrical HD-quality video transmissions enabled by FTTH: reductions in motor vehicle travel and delivery of home-healthcare to chronically ill patients. As he notes, the latter account for a very small percentage of the population, but a substantial share of total healthcare expenses.

Potential FTTH-Enabled Transportation & Healthcare Savings

	First Year	10-yr. Total*
Transportation		
Savings from fewer miles driven	\$74 billion	\$829 billion
Social savings from less gasoline consumption	\$4.3 billion	\$48.6 billion
Travel time savings	\$47 billion	\$537 billion
Road building savings	\$6.4 billion	\$71.7 billion
Total transportation savings	\$128 billion	\$1.5 trillion
Healthcare		
Total U.S. healthcare expense (2003)	\$1.5 trillion	\$22.8 trillion
Expense for chronically ill	\$500 billion	\$48.6 bil.
Savings from remote monitoring of chronically ill	\$175 billion	\$2.7 trillion
Total transportation and healthcare savings	\$303 billion	\$4.2 trillion

* Assumes 2.5% and 9% annual increases in transportation and healthcare costs, respectively.

Source: "America at the Internet Crossroads," by Michael Bookey

Bookey estimated that these two areas alone could generate total annual savings of more than \$300 billion if FTTH networks were deployed nationwide. That's enough savings in one year to more than cover the cost of building these networks. And while it certainly can be argued that Bookey's estimates are overstated, a case can also be made that they may be understated, since they don't include other potential public benefits in areas like education and economic growth.

Though, as Bookey's analysis suggests, the total value of public benefits, including externalities, may be quite large, there are inherent challenges in trying to maximize this value in access markets dominated by private, profit-seeking companies.

This is because profit-seeking access providers lack sufficient financial incentives to invest in capabilities and services aimed at maximizing externalities. As privately owned companies serving shareholders' interests, it would be difficult (if not illegal) for access providers to justify significant investments targeting externalities whose value they cannot monetize and return in some form to their shareholders.

In sharp contrast to private access providers, local governments are motivated to invest in communications infrastructure targeting externalities. In fact, such "public infrastructure" investments are a central role of government. In keeping with this role, governments also have access to relatively low-cost and "patient" funding sources not available to private network operators, including tax-free bonds and taxes.

Market Entry, Efficiency, Competition And Innovation

Due to their high and largely fixed costs, the market for access networks exhibits substantial barriers to entry. As Diane Kruse noted in the October 2007 issue of *FTTH Prism*, this cost structure makes facilities-based competition an economically inefficient and unreliable means to achieving healthy competition in applications and services. These inefficiencies and barriers to entry are evidenced by today's highly concentrated access market and the history of failure and bankruptcy among CLECs and "overbuilders."

In contrast, the economics of non-facilities based competition (e.g., at the application and device layer) is characterized by relatively low barriers to entry and potentially high and efficient levels of competition. A good example of this is the Internet application market, which is characterized by relatively low startup costs and other entry barriers, rapid cycles of technical and service innovation, and intense and multifaceted competition.

As is strongly suggested by the Internet's dynamic growth, high levels of non-facilities competition and innovation are most likely to occur in an environment in which access providers are not able to significantly extend their market power into application and device markets. Such vertical extensions of market power are likely to generate anti-competitive and innovation-dampening market dynamics, because access providers have both the motivation and ability to position themselves as gatekeepers between service providers and end-users. To the extent they do so, they distort the interaction of supply and demand in the service and device markets in ways that favor their own financial goals at the expense of end users, independent service and device suppliers, and overall market efficiency.

Concerns about such vertical extension of access providers' market power is a key driver of demands for "network neutrality" regulation. (*ed. Note: See Mario Rossi column on "Net Neutrality."*) As implementation issues and other potential pitfalls of this approach have become apparent, some net neutrality advocates have begun calling for "structural separation" as a more effective solution. Such an approach would limit access providers' role to providing wholesale services and would prohibit them from discriminating with regard to the terms of wholesale service offered to retail service providers. As such, it would avoid the anti-competitive impacts associated with vertical integration of access and services.

Getting There from Here

Our discussion thus far suggests that an optimal network model for maximizing total value is a single publicly funded, high-capacity, IP-based FTTH network operated on a non-discriminatory wholesale basis.

This model would avoid the economic inefficiencies associated with duplicate physical networks. It would also achieve the high levels of efficiency, competition and innovation associated with an all-fiber IP open-access wholesale network. And, because the network would be funded as public infrastructure, its business model could target valuable externalities and low prices without triggering conflicts with private shareholders.

The obvious problem with this model is that it posits a single-FTTH solution when, in fact, a substantial majority of American homes are already passed by two copper-intensive legacy networks, owned and controlled by incumbent access providers which have so far preferred a different model. Given this, a key question becomes, how can we migrate from today's status quo to a model that captures as much as possible the benefits of the ideal "open-FTTH" model.

It is at this point that ILECs' competitive weakness in many local markets becomes a potential virtue. This is because their inability to cost-justify fiber-rich upgrades means these ILECs must either accept stagnant or even negative growth in these markets, or look for other means to counter cable's growing competitive advantage.

One such alternative would be to become a retail service provider on a publicly owned and funded open FTTH network. This would avoid the cost of a network upgrade while at the same time giving an ILEC access to the advanced capabilities of an FTTH network. This, in turn, would free up ILEC capital for investments in developing and marketing innovative, high-value, FTTH-powered services, including some that cable's HFC networks could not cost-effectively deliver.

In addition to sharply reducing an ILEC's capital investment risk, this model also reduces the total capex requirement and increases overall economic efficiency when compared to a scenario in which a community deploys a muni-fiber network while the ILEC pursues its own separate network-upgrade strategy.

This model could also reduce the "build it and they will come" risk faced by municipalities pursuing a wholesale model. As James Salter noted in his October 2006 *FTTH Prism* article, a key challenge confronting the wholesale muni-FTTH model is the risk of relying on retail service providers that are "relatively small [and] underfunded" and lack the customer loyalty, resources and brand ID to achieve the necessary take rates.

Since the ILEC is one of two existing service providers in a local market, it would have both strong motivation and proven capability to attract retail customers to the services it delivers on a muni-FTTH network. And its efforts to do so would be enhanced by the fact that at least some of its FTTH-powered services could out-perform the HFC-delivered services offered by its cable competitor.

The combination of a municipality marketing the network as a whole and the incumbent LEC marketing its own retail services would increase the likelihood that an open-FTTH muni network could attract sufficient customers to be financially self-sustaining. At the same time, the municipality would be prohibited from favoring the ILEC's retail services, thus providing a level playing field for entry by other retail providers.

Some might question whether any other entity would choose to provide retail services on a wholesale muni-FTTH network carrying retail services from the incumbent LEC. While some companies and business models might be discouraged from market entry in this scenario, others probably would not. The latter could include a range of IP-based service providers, including:

1. independent VoIP providers, including those attracted to FTTH's ability to support high-quality video communications;
2. large and small video content suppliers, which are already migrating to IP-delivery modes aimed at bypassing cable/telco gatekeepers;
3. the growing ranks of Internet-based companies, led by Google, whose revenue models differ substantially from ILEC models in that they focus mainly on highly targeted advertising rather than end-user fees.

An open-FTTH wholesale network might also attract out-of-market ILECs or cable operators looking to expand their reach without the hefty financial risk associated with facilities-based market entry. But the participation of these entities would probably not be needed for the network to support a healthy competitive ecosystem and achieve penetration rates sufficient to pay for itself.

Other Potential ILEC Roles

In addition to being a competitive retail service provider on the FTTH network, a community's incumbent LEC might also play other roles in the project. Given its existing resources in the local market, it might contract with the municipality to provide construction and network management services. This might make particular sense in communities that do not already have well-developed internal telecom or public utility units capable of handling these tasks.

Given the model's goal of non-discrimination, it would be important to ensure that the network and business structures were designed and managed to ensure that the incumbent LEC would not receive preferential treatment, even if it was involved in some network management functions. This could require safeguards to prevent such preferential treatment and, if need be, include limits on the ILEC's network management responsibilities (e.g., in terms of what network "layers" it would be responsible for managing).

The ILEC's role in building and managing the network could even extend to providing the muni-net with access to fiber, conduit, poles and other facilities, via lease, purchase or other forms of access. This would appeal to a municipality to the extent it could reduce its costs and/or expand network coverage and capabilities. From the ILEC's perspective, such arrangements would represent another component of their business model transition. To ensure they did not provide an ILEC with unfair advantage in the retail market, these arrangements would need to be managed under the same non-discrimination umbrella that would apply to other aspects of the ILEC's involvement in the project.

Challenges Expected, But Manageable

Should ILECs and municipalities begin to develop win-win models along the lines suggested here, it's reasonable to expect that cable operators in affected markets would launch aggressive lobbying, legal and public relations challenges to them. This would follow the typical model of such challenges being mounted against proposed muni-fiber networks, except that, in this case, the challenge would come from only one incumbent, with the other being an active supporter of the project.

This could substantially shift the relative balance of power in such legal and political battles, by applying the ILEC's impressive resources in these areas to support of the muni-fiber project, rather than in opposition to it.

Though an ILEC's involvement in a muni-fiber project has the potential to add ammunition to opponents' PR attacks on the project's fairness and competitive impacts, it does not seem likely to significantly increase the project's legal risks. This is especially so given the open wholesale model proposed here, which would allow an incumbent cable operator to access the FTTH network on the same terms as the ILEC and every other retail provider. In fact, some states only allow munis to deploy fiber networks if their role is limited to provision of wholesale service.

If a pro-muni bill pending in Congress becomes law, some states' current restrictions on muni-fiber projects would be removed, making such projects more viable in these states. The prospect for such passage are likely to improve somewhat if, as expected, Democrats increase their control of both Houses, particularly so if they also win the White House.

Should federal legislation lessen existing barriers to muni-fiber deployments, the pressure on ILECs to consider the model proposed here could increase, since the launch of a competitive muni-FTTH network would greatly increase the risk of revenue decline facing a community's facilities-based ILEC.

While the financial, legal and political hurdles confronting this model are certainly not trivial, the point of this article is that—at least in some markets--both ILECs and municipalities have increasing incentives to seriously consider it.

To the extent these incentives intensify and ILECs' other options become less attractive in some of their markets—which the author believes are fairly likely--the more room there will be to negotiate win-win arrangements that provide a relatively attractive return to ILEC investors, while achieving the substantial public benefits promised by the open muni-FTTH model.

Mitch Shapiro is an independent analyst whose recently published reports have examined the economics and market impacts of municipal broadband, Verizon's FiOS and bundled service competition. He is currently working on a report comparing RBOC network and residential market strategies and their prospects for success. He welcomes feedback on the ideas presented in this article, and can be contacted at mitchshapiro@cox.net.