

Wass Consulting Group, Inc.

Management Insight

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Utility Telecommunications - Part 2

It May Be Now or Never

Summary

This *Management Insight* is the second in a series which addresses potential opportunities for electric utility companies to expand their services into unregulated telecommunications. It addresses different technological, cost, and risk considerations that electric utilities have in spanning the “first 100 feet” in providing internet access to customers, and discusses a few relative advantages and disadvantages of each method. Finally, it proposes a rationale for entering the telecommunications market that may be appropriate for a number of electric utilities who wish to do so, and makes the case that the window of opportunity is rapidly closing as new market entrants capture market share. Thus, if you want to enter the telecommunications market, the time may be now or never.

Introduction

In a previous *Management Insight* (Vol. 6, No. 4), we summarized a rationale for utilities to enter the telecommunications marketplace, or to expand their presence for those utilities whose market presence has heretofore been primarily passive (e.g., leasing infrastructure and rights-of-way to more active telecommunications carriers and cable companies). Reasons justifying a more active involvement were varied, and included:

- The increased coupling of energy production and delivery with telecommunications and information services
- The fact that most utility companies already have considerable experience and investment in telecommunications
- The fact that utilities already possess much of the business infrastructure to provide telecommunications services
- A recent relaxation of both federal and state rules which previously prohibited utilities from providing such services.

In evaluating which telecommunications services to provide, the previous *Management Insight* recognized that each utility is unique, both in terms of its business and regulatory climate, but also in terms of its own corporate vision and strategic plan. Thus, while no preference was given regarding which market segments to avoid and which to enter, it noted that prudence required leading with a company’s strength. For most (but not all) utilities, this would probably rule out head-to-head competition with wired telephone and cellular phone providers, absent some unique local circumstances, at least in the short-term.

It also went on to explain how providing access to the internet for its existing customers might mesh well with its internal needs for two-way communication with its own organization and with its customers, and also serve as a market entry point to the retail telecommunications market.

With explosive growth projected for internet applications, such an entry point could make sense for many utilities.

Time Is of the Essence

In addition, a window of opportunity exists in many geographic areas that can be exploited if companies act quickly. This is because the very popularity of the internet is driving the need for ever-increasing bandwidth communications to homes and businesses. Dial up access using slow 56 Kbps (or slower) modems will soon be a thing of the past. Cable modems and Digital Subscriber Line (DSL) technology are replacing dial up access in many areas, and could replace them entirely if they were uniformly available. High installation costs (primarily labor) and time to install have severely limited such newer, more capable technologies in many areas of the country, however, thus effectively widening the window of opportunity mentioned earlier, but by just a bit.

Because of the number of players attempting to secure access to the “first 100 feet” from the customers’ home/business to an external connection, jumping through this narrow window of opportunity takes on added urgency. Sooner or later, however, the window will close, and gaining access to the customer in the future will become increasingly more difficult. The time to act for most utilities may be now, or never.

Spanning the “First 100 Feet”

Spanning the “first 100 feet” obstacle in order to provide broadband internet access (and perhaps many other services as well, either now or in the future) can take one of three principal forms:

- Communications wiring (either metal or fiber optic)
- Wireless
- Powerline telecommunications (PLT) using existing electrical wiring.

A hybrid system using a combination of approaches over different parts of the system is, of course, a fourth and very likely possibility.

In determining which of these approaches to reaching the customer may make the most sense in a particular application, several considerations, often conflicting, must be addressed. While not comprehensive, the most important of these are:

- Technology
- Cost to implement
- Business risk and timing.

The Wass Consulting Group is an associate member of the Edison Electric Institute (EEI) and the United Telecom Council (UTC - formerly the Utility Telecommunications Council).

Technological Considerations

In terms of technology, the principal question is bandwidth, or throughput. The greater the bandwidth, the greater the amount of information/data that can be transferred. Currently, the greatest bandwidth is provided with “hard wired” communications wiring, be it coaxial cable, conventional twisted pair wiring, or fiber optic cable, although this is changing.

Communications Wiring

Coaxial cable has traditionally been used to transmit video signals for television reception and is already available in most U.S. homes. Digital cable and the ability to provide high speed internet access via cable is not nearly as available,

although cable providers are working feverishly to provide it. While reasonable data throughput is available over cable using a cable modem, one of its technical disadvantages is that overall throughput is fixed on a particular cable segment, and performance decreases considerably as more subscribers make use of it.

Conventional twisted pair wiring is what we've been accustomed to for plain old telephone service (POTS), and is basically limited to fairly slow telephone modem throughput. Using separate wiring, however, and updated technology, telephone service providers are able to transfer both voice and data at reasonable speeds via various forms of Digital Subscriber Lines (xDSL). While xDSL provides both voice and data capability that is always on (i.e., no need to connect each time access to the internet is desired) and throughput does not depend on who else is connected at the time, one of xDSL's technical disadvantages is that the customer must be within a relatively short distance (nominally 12,000 cable feet) of a telephone switching station. If your home or office is further than this distance, xDSL is generally not currently available.

Optical fiber has the greatest bandwidth, by far, of any of the hard-wired alternatives. While it can be somewhat fragile and connections to other "wires" can be difficult, its throughput capability far outweighs these disadvantages. Furthermore, most utilities have some experience using fiber optic cables as they provide a major backbone of long distance telecommunications capabilities in the country. Unfortunately, even as various providers are rapidly installing optical fiber in many locations, most homes and small businesses are not yet wired with optical fiber, and it will likely take quite some time to do so. This is because conventional wisdom holds that running fiber all the way to a home is too costly, so many companies installing fiber backbones often stop at distribution nodes that typically serve hundreds of customers. For example, SBC Communications is spending \$6 billion to lay 20,000 km (about \$482,000 per mile) in the western U.S., but even

then will bring the optical network to only 1.7 miles of most of the homes it serves. SBC isn't alone, as U.S. West is laying fiber to within three-fourths of a mile and Bell Canada to just over one-half mile of its customers.

Where fiber is planned to go to the home, it is almost always in new subdivisions (i.e., green-field developments) in affluent suburban locations (e.g., Bell South's 400 homes in Dunwoody, GA). Digging up the streets in mature areas is much more costly. For example, Palo Alto's city council approved spending \$380,000 (30 percent of the cost) to build a fiber network serving nearly 700 homes in an older area near the city center. Residents will pay about 70 percent of the cost, including monthly charges plus installation costs of \$1,200 to \$2,400 per home.

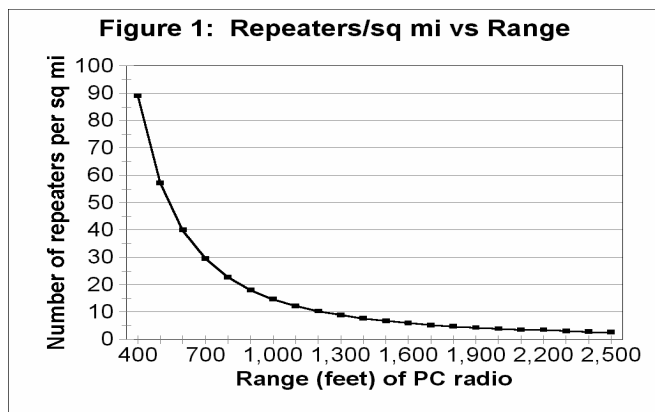
Wireless

Wireless technologies and its applications are exploding, with new products and capabilities hitting the market almost daily. Cellular phones, Personal Communications Services (PCS), paging devices, wireless cable (for TV signal distribution) in addition to traditional radio and television broadcast are examples. More recent innovations include fixed and mobile Wireless Local Area Networks (WLAN), Wireless Local Loops (WLL) which combines basic telephone service with high speed internet or video on demand (VOD) services, wireless internet access using cellular phones, and Metropolitan Area Networks (MAN) which can be wireless, wired, or a combination of both.

Until recently, the greatest technological limitations of wireless applications for internet access involved bandwidth and range. While still of some concern, these limitations are rapidly being addressed and solved. For example, as late as 1998, transmitters contained in personal computers for WLAN access had a throughput of about 2 Mbps and a nominal range of about 400 feet. Coming on the market today are updated versions of these same devices with a throughput of 11 Mbps and a maximum range (at reduced

throughput) of 1,750 feet, and even more capable systems are under development and soon to be released. At the same time, cost has dropped from about \$700 to under \$180 over the past 3 ½ years. Other wireless applications are seeing similar improvement. Using either wired internet access points or wireless extension points (i.e., relay transmitters) and more powerful antennas, such devices can be made to quickly cover a utility's entire service area, or beyond. With the advent of satellite internet access in the future, wireless access will become universally available.

Perhaps the greatest limitation to widespread use of wireless internet access has been range, as wireless signals are susceptible to degradation as distances increase. (Although still of concern, earlier problems with interference and security are being addressed through a combination of technological improvements such as frequency hopping spread spectrum (FHSS) and advanced encryption techniques.) The importance of range is best shown in Figure 1 which plots the required number of extension or repeater stations per square mile versus the range of the radio link contained within the customers' PC. Below a certain range, wireless systems may not be cost effective, whereas above a certain range (of about 1000 feet) economic viability improves dramatically. In many practical applications, the range requirement can be met, although area surveys and demonstration trials still need to be run to identify antenna placement and to ensure link quality and received signal strength are



adequate.

Powerline Telecommunications

Finally, while Powerline Telecommunications (PLT) has been around since the 1920s, its primary use until now has been the protection of transmission lines, as well as for limited telemetry, remote system control, and voice communication by utilities. Commercial and residential applications of PLT include building control, automation, intercoms, and security. All of these are slow, low-bandwidth applications using analog modulation techniques. Nonetheless, considerable time, money, and research effort has gone into making PLT work, and some success has been made with data transmission speeds reaching 10 Mbps and beyond in the laboratory. Unfortunately, while potentially promising in the long-term, PLT technology has not been sufficiently demonstrated to warrant wide-scale implementation in the near-term.

Cost Considerations

The greatest factor influencing the cost of entering the telecommunications market is the presence or absence of an existing, installed infrastructure, and the cost of acquiring it. For example, most homes and businesses already have installed twisted pair (POTS) wiring as well as basic cable already connected to the consumer. Only in limited, special cases would duplicating such infrastructure be warranted. Fiber optic cable, on the other hand, is generally not available to most customer sites, so laying a new fiber infrastructure would be required if that technology were to be chosen. In comparing fiber with other communications wiring, so many unique characteristics of the application, business environment, and geography come into play that it is impossible to easily compare costs. For example, for home installations, costs vary tremendously depending on whether they have aerial cable drops or underground utilities. Also, the cost of any communications wiring varies greatly if we are discussing greenfield installations in new subdivisions or replacement of existing plant in older neighborhoods.

Nonetheless, it is true that in either case, the principal cost is not in the wiring/fiber itself, but rather in the labor to install it. While the installed cost has traditionally been 15 to 25 percent or more for fiber than for conventional communications wiring, this difference is likely to decrease in the years ahead. Even so, the cost of installing wires to the home is expensive.

Compared to a wired infrastructure, the greatest cost advantage of wireless results from the fact that for most applications, access to the home or business premises is not required. Thus, required hardware used by the customer can be self-installed (for the most part), cutting down dramatically on the initial installation cost.

Secondly, with the ability to transfer data outside of the home/business by wireless means, utility infrastructure to receive and send the data on to the eventual Point of Presence (POP, or internet access point) can be dispersed quite widely, resulting in a dramatically reduced infrastructure cost per customer. No significant construction time or cost would be involved either. Also, the entire infrastructure (and hence the capital investment) need not be installed in a given area at once, thus significantly increasing the flexibility of the system over wire-based systems.

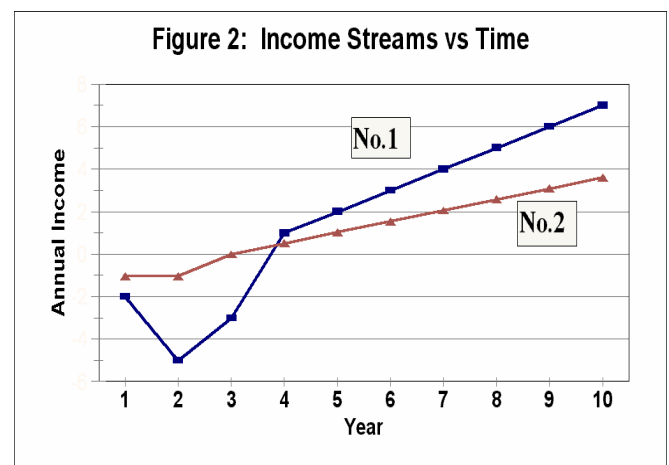
As the PTL technology is still under development, it is impossible to accurately predict the eventual cost of PTL infrastructure installation. As every potential customer already is “wired”, however, the major expense has already been expended. Additional costs associated with signal conditioning so that PTL technology can work commercially would still be borne, of course, but it is likely that these will be less than for competing technologies.

Business Risk and Timing Considerations

Although no longer the case, utilities have traditionally looked at most large capital investments over a very long-term, and (other things being equal) would often select the

alternative with the lowest net present value cost. In a regulated marketplace, such a selection methodology was probably appropriate. In the new competitive market, however, other things are also important, the time over which income and costs are realized may be equally or even more important, and capital investments must match the company’s overall strategy to gain acceptance.

For example, Figure 2 shows income streams from two separate investments. Income stream No. 1 has a larger, more protracted capital investment, but once implemented returns more annual income. Income stream No. 2 has a lesser, shorter



capital investment but returns less annual income. Both income streams have the same net present value. Which is more desirable? It depends. While one could argue that there is no difference, one investment would most likely be preferable to the other depending on the company’s strategic plan, risk comfort level, and other unique business circumstances.

The reason for the difference in perception deals primarily with risk. Investment No. 1 is more capital intensive, takes longer to build, and results in significant operating losses over the first years of operation. Investment No. 2 requires a more modest capital investment, comes on line more quickly, and breaks even in a shorter period. However, if business conditions, the competitive environment, or technology were to change during

those first few years, Investment No. 1 could prove much more risky than Investment No. 2. Traditional utility managers in a regulated environment might have chosen Investment No. 1 or at least have been neutral on its choice. Current utility management, depending on the circumstances, may not.

Conclusion

This *Management Insight*, as well as the previous one (Vol. 6, No. 4), address potential opportunities electric utilities have to expand their service offerings outside of electric generation and distribution and into unregulated telecommunications. We believe that a number of factors that exist in virtually all electric utilities combined with recent technological advances place such utilities in a particularly advantageous position to do so.

Notwithstanding the above, we also feel that the window of opportunity that currently exists for entry into the telecommunication markets is narrow and will close soon as new market entrants capture market share. As such, time is of the essence if companies expect to be successful. There are plenty of competitors who would love to lock up potential customers in your service territory, most of whom do not currently have the market advantages that you do. But they will, and once they gain a substantial market share, it will be exceedingly difficult to replace them.

These two market factors converge with available technologies to suggest a wireless telecommunications entry strategy that would be appropriate for many electric utilities. Clearly, unique circumstances and business strategies may favor another approach in individual cases. Nonetheless, the combination of relatively rapid entry to the market, modest entry costs compared to wired alternatives, great flexibility regarding expansion strategies, and overall reduced financial risk warrant further investigation. We believe that entering the market now, even if on a relatively smaller scale, is more strategically viable than

entering the market later on a much bigger scale. The business will learn and mature as it grows, and it is better to make smaller mistakes when it is evolving and to adjust to them, than to make bigger mistakes when making corrections is no longer possible. Finally, if you wait for the final wireless technology to evolve, you may wait forever. We believe it is better to enter the market with today's best technology and upgrade/change later as technology evolves.

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The Wass Consulting Group

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Our services address the challenges that senior executives and Board members must face in their regulated and non-regulated operations. This includes matters of mission, governance, strategy implementation, organization structure, business process transformation and re-engineering, operational improvement, benchmarking, competitive analysis, merger integration, and market entry.

We combine a base of exceptionally experienced partners with an extensive and expert network of professional consulting staff and affiliated firms. Therefore, our clients receive the full capability of a large, diversified consulting firm with the flexibility and cost-efficiency of a smaller one.

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