Business and Technology Issues in Power-Line Telecommunications

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Power Line Telecommunications (PLT, sometimes also called BPL or broadband over power lines) is a new alternative for broadband connectivity to homes and businesses.

The PLT Concept

The idea behind PLT is to carry communications signals over the electricity distribution wires. Thus PLT could provide new broadband services without the large cost and delay of having to provide new communications wires or cables, potentially overcoming a major barrier to market entry of new broadband service providers.

In addition to owning the electricity distribution wires and having an operational workforce in place, the electric utilities also have a pre-existing commercial relationship with those who could be PLT subscribers.

Even if electric utilities don't wish to become broadband service providers but only provide a platform for broadband service providers to use, PLT could help utilities deploy remote meter reading, demand-side management and power-quality management.

So, with these advantages, why hasn't it become widespread? The issues are bandwidth, cost, margins and regulations.

Managing Limited Bandwidth

Some of the existing, emerging, and proposed PLT technologies have an effective bit rate of perhaps 6-8 Mb/s. This bit rate is shared in both directions of transmission (uploads and downloads) by all subscribers in a particular serving area, like users sharing a local area network. This is relatively limited compared with competing cable and ADSL platforms.

Thus it is important to understand expected demands and demand trends, and to engineer the PLT system layout so that subscriber expectations about bandwidth are met.

Controlling the Cost per Subscriber

The communication signals won't pass through transformers, so PLT equipment may need to be placed at all transformers that serve PLT subscribers.

In Europe, each transformer may supply hundreds of homes, so the cost of the transformer PLT equipment can be relatively low on a per-home-passed basis. In North America, however, with only 6-8 homes per transformer in suburban areas, the cost per transformer may be significant depending on the PLT platform used.

The installed cost of the subscriber terminal equipment is also important. It has two parts. The actual equipment cost has to be low to be competitive, so manufacturing volumes in millions are essential. Using subscriber equipment that is owned and installed by the subscriber rather than the provider is an option.

These factors point strongly to the importance of standards for PLT subscriber equipment. Some creative subscriber equipment approaches have emerged, including using HomePlug home PLT or 802.11 WiFi technology at the subscriber end.

Atop these costs are backhauling from all the transformers to a central location, and connecting from there to the Internet. Backhauling can be done using PLT in urban

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and suburban areas, but rural areas are more problematic, and some fibre overbuilding may be needed. Connecting to the Internet, which doesn't involve PLT, can be costly away from metropolitan areas, but utilities that have their own inter-city fibre optic links may be able to take advantage of those fibres.

Operationally, costs that may be unfamiliar to some electric utilities, for maintenance, repair and customer support, must be taken into account.

Planning for Attractive Margins

Prices for broadband Internet services must meet competition and are relatively low in some countries. Thus PLT profitability may depend on providing service bundles that also include telephone and/or video distribution, perhaps with energy-oriented services. The conceptualization of attractive bundles and the estimation of demand and revenues may be critical to business success.

Careful thought about PLT's sustainable competitive advantage in the evolving competitive landscape, based on an understanding of revenues, platforms, services, markets, processes, and costs, is needed to find the right solutions that make business sense.

Managing Regulatory and Legal Exposures

PLT systems inherently produce radio interference affecting licensed safety-of-life, defence and other services that are entitled to protection from interference.

Electric utilities already know, from managing interference caused by loose electric joints, that interference from a single point can be felt over a wide area. With a large population of PLT devices and sky-wave reflection, interference could potentially be of regional if not intercontinental scope.

The applicable radio regulations never conceived of a huge volume of interferers like PLT. This has led to PLT deployment restrictions in some countries and regulatory changes in others.

Mitigation can include avoiding radio spectrum where specific interference cases could be nearby and severe, e.g., broadcasting and amateur spectrum.

Utilities and manufacturers will wish to intelligently manage this regulatory and legal risk in order to have viable PLT businesses.

Moving Forward

In summary, PLT has potential to provide a new source of revenue for utilities and vendors, but requires an intimate appreciation of:

- What user feature / function / price needs does PLT have to address over the life-cycle of the technology?
- What PLT products and architectures best meet those local needs at reasonable cost and acceptable risk?
- What are the real interference impacts and regulatory issues, and what are the best strategies for addressing these? and
- Can a sustainable business case be developed to diversify operations and strengthen the bottom line for a particular utility?

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