

A periodic look at the competitive telecom industry...

[New Paradigm Resources Group, Inc....Explaining the Competitive Telecom Last Mile.](#)

## Broadband Power Line (BPL): Charged For Prime Time?

Okay, okay. Before you toss this piece as more coverage of another ballyhooed access technology, stick with us. Sure, people have been talking about Broadband Power Line (BPL) for awhile now. Sure, some utilities have tried and failed to implement it. But we've fielded enough calls about it to cause us take another look at BPL and its potential. Will BPL be the next big thing in telecom? We doubt it. But there are reasons to believe that this access technology can find a niche for itself and, perhaps, come to represent yet another form of competition in telecommunications services.

Is Broadband Power Line technology on the cusp of allowing electric utilities to compete with cable modems and DSL lines for broadband Internet customers? The answer to that question is a resounding "maybe," but don't hold your breath about its near-term availability in your area. Will BPL provide Internet access to rural customers unreachable by cable modems and DSL? That seems to be a bit more of a problem.

That said—a little cold water thrown on the excitement—BPL is an intriguing technology with some immediate applications and, if some issues are suitably resolved, *perhaps* an even brighter future.

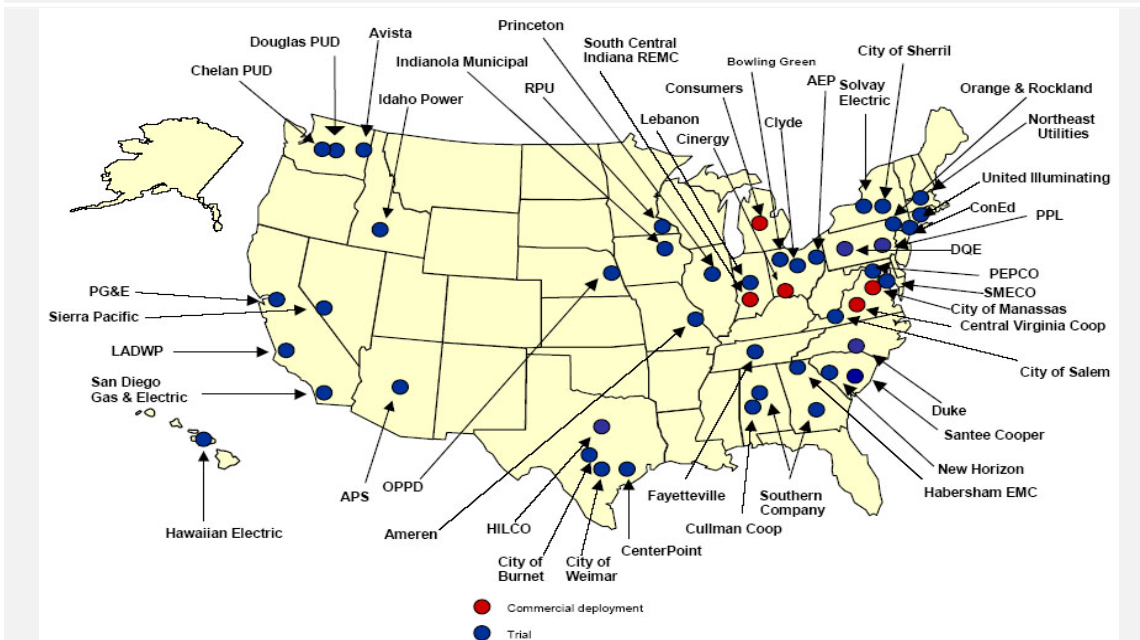
First, it is important to distinguish between the two types of Broadband Power Line—In-House BPL and Access BPL.

*In-House BPL* allows customers to plug devices (computers) into any electrical outlet via an Ethernet cable to receive an Internet connection. The Internet connection can originate from any source which is then connected to the house's circuitry to provide "In-House BPL." In-House BPL provides Internet connectivity from every electric outlet (which can be used to create a Wi-Fi hotspot from that plug, as well). This technology is widely available today and in use by consumers throughout the U.S. An expected future application of In-House BPL is the creation of "smart appliances" which could be monitored (or operated) remotely. As used here, In-House BPL is complementary to cable modem and DSL service and may help promote the adoption of these technologies by making it easier to access high-speed Internet service throughout a home.

*Access BPL* is the transmission of data—typically Internet traffic—over medium-voltage power lines. Access BPL has significantly more challenges in its path-to-market than its In-House cousin, but its success would allow electric utilities to compete with telcos and cable companies for the consumer broadband market. Typically, Access BPL is the technology being discussed in Broadband Power Line discussions, and it is the one we will focus on here. (Unless otherwise noted as "In-House BPL," we are talking about "Access BPL.")

## The “Current” State of BPL

As shown below, there are some 42 trials and 5 commercial deployments of Broadband Power Line (BPL) currently underway.



SOURCE: United Power Line Council (UPLC) web site (<http://www.uplc.org>).

## How It Works: BPL Technology and Challenges

BPL technology carries a signal over the medium-voltage (MV; 1,000-40,000 V) power lines that often serve neighborhoods. The high-voltage, longer-distance lines are not suited to carrying communication signals, so the data traffic must originate in the neighborhood. This requires fiber optic or other connectivity back to the source of the data traffic (the head end/central office). Since power lines are not designed for communication traffic, the signal must be amplified via repeaters every 1,000 to 2,000 feet.

The data signal also cannot penetrate the transformer that connects the medium-voltage lines to the low-voltage (LV) lines (typically serving 1 to 12 homes in the U.S.) To be transferred from the MV lines to the LV lines, the signal is either boosted to push through the transformer or routed around the transformer. Alternately, another method (such as Wi-Fi) can be used in place of the LV lines to connect the signal to the home from this point.

As noted earlier, the need for frequent amplification makes rural BPL deployment unlikely in sparsely populated areas. Also, since U.S. transformers typically serve 1 to 12 homes each, there is more significant investment per home in devices to connect the MV and LV lines than in some other parts of the world. In parts of Europe, for example, the electric grid downstream from a transformer can serve as many as 200 to 250 homes. But with ingenuity, there is always an opportunity for technological advances, and large scale production can help solve cost issues, as well. Already, there are a few places in the U.S. where Access BPL is deployed commercially.

BPL is faced with another significant challenge, as well. Because power lines were not designed to carry communication, they are not *shielded*. As such, the lines act as antennas. Some signal leaks from the power lines causing interference in the radio spectrum, while the signal carried by

the power lines also receives interference from external sources. Uses of the affected spectrum include amateur radio, aeronautical and nautical operations, and government uses, including public safety.

The FCC has limited the emission levels for BPL, with complaint procedures and remedies for interference. If a radio operator experiences interference, there is a complaint process. A technology has been developed that allows BPL “notching”—the removal of a frequency range from use by BPL to reduce or eliminate interference in those frequency ranges. If the problem remains unsolved, however, one of the final remedies is the cessation of BPL services in that area. The BPL industry insists that technology exists to solve virtually every interference situation. Amateur radio operators remain unconvinced.

Of course, underground power lines create significantly less interference, so communities with underground power lines may be more attractive markets (at least from a technology perspective) than those with aerial lines.

### **Where’s the Crystal Ball? The Future of BPL**

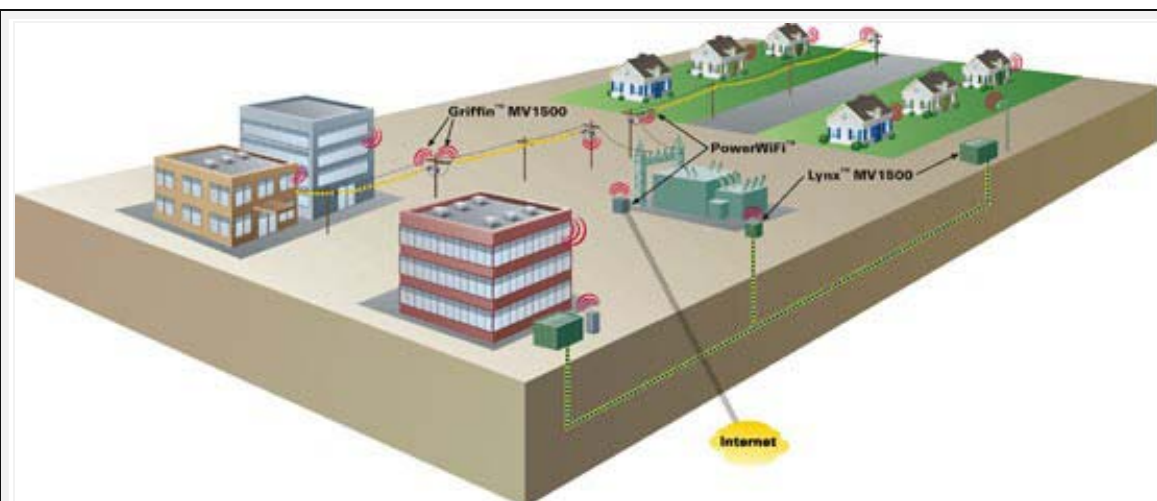
Clearly, In-House BPL is an interesting technology that will allow more customer-friendly in-home Internet access; as such, it seems to have a bright future (as long as In-House BPL technology keeps pace with customers’ bandwidth requirements). As you can tell, the prospects for Access BPL are a bit dicier. The extent of Access BPL’s commercial appeal will become clearer as more of the many deployment trials conclude. In its current state, however—barring additional technological advances—its real-world application seems to be limited by circumstances and demographics.

An additional obstacle to swift Access BPL deployment is that Access BPL falls within the domain of electric utilities—you know, those behemoths that are really known for their quick adoption of new technologies or business ventures. These utilities are also not rewarded by regulators for taking chances and hence, have little incentive to be on the leading edge of a telecom service.

Clearly, Access BPL is a technology worth following closely, but don’t expect a broad, nationwide rollout any time soon.

#### **A Brief Case Study: One Vendor’s BPL Solution —Amperion’s Story**

Since it was founded in 2001, Amperion has focused on the BPL market. Its product line consists of three types of products—the “Injector” that connects the broadband signal to the power line at the origination point; the “Extractor” that connects the signal to the customer (business, residence, etc.); and the “Repeater/Extractor” which amplifies the signal and can serve as an “Extractor,” as well.



Amperion's product line consists of the *Griffin*, for overhead networks, and the *Lynx*, for underground networks. Amperion's preferred method for providing access to the end user is its "Power WiFi" technology, which provides customer access via an 802.11b connection.

Amperion's publicly announced customers include AEP, PPL, Progress Energy, Southern Company, Data Ventures Inc., PUC Telecom, and IDACOMM.

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