What is Broadband over Power Lines (BPL)?

United Power Line Council White Paper

A Solution for Everyone

Up until now, broadband internet access has been a bit of a hit-and-miss proposition. Not every community, due to geography, can get a cable or DSL connection and those who can are often limited (by wires or signal) to certain rooms in their homes or offices. Traditional sources of broadband internet connectivity promise speed but often can't deliver on that promise. And wireless broadband technology isn't always reliable. Signals can be dropped or are simply unreliable throughout the house.

Broadband over Power Lines (BPL) can change all that.

BPL offers new realities to anyone who receives their electricity from a utility company. BPL offers the possibility of three exciting changes: implementation of a smart grid technology; introduction of an alternative form of broadband access; and the enablement of smart home or smart building applications. Smart Grid technology means more efficient, reliable and safer electricity delivery with the potential for cost-savings for the consumer. Alternative broadband access refers to new ways to provide internet access to compete with the existing duopolies (cable, DSL). Smart home or smart building applications translate into more efficiencies and conveniences for your home and office.

What is BPL?

At its most basic definition, BPL is the use of existing medium and low voltage power lines in and out of homes and within buildings to provide broadband internet access to consumers and applications to utility companies. Because BPL rides overtop of existing power lines, there is no need to create new infrastructure.

"Given that 97 per cent of homes—the majority of buildings and homes and communities—have electricity, it's a natural fit," says Greg Moore, Director of Business Development for IP Applications and Chairperson of the United Power Line Council (UPLC) Business Action Committee. "Currently in North America, not everyone has broadband access through cable or DSL. BPL has the ability to widely deliver broadband access. This meets the President's and the Prime Minister's goals to have broadband access in all American and Canadian homes, including rural areas."

BPL, for the consumer, offers those services they have come to rely on, like Internet browsing, email and chat programs, but it also offers the ability to host VoIP (Voice over Internet Protocol), streaming high-definition TV and better access to gaming.

"The advantage for the consumer is that the entire home is networked. They plug into any wall outlet and the speed for uploading and downloading is symmetrical. With cable and DSL, those speeds are dramatically different," says Brett Kilbourne, Director of Regional Services and Associate Counsel for the UPLC. "The modems are

completely plug and play and are very small and easy to use. BPL can reach areas of your home that wireless can't and it is relatively secure."

He says the speed has increased over the years. The chipset speeds have increased from 1.5 megabits per second in 1999 to 45 megabits per second in 2001, and now are reaching 200 megabits per second. As a result, actual speeds to customers are already 3-to-4 megabits per second and are expected to increase fourfold using the next generation chipsets.

What is Smart Grid Technology?

Traditionally, power grids haven't been that smart. In many cases, utilities do not know the power is out until first notified by a customer calling a utility dispatch operator.

BPL, because of its two-way flow of information, can detect exactly when and where there is a power interruption. This allows the effective deployment of repair and maintenance crews. Power stations can be monitored remotely by using cameras, increasing their security. But more than that, Smart Grid enables automatic meter reading. It also allows for demand-side management, where consumers are encouraged to use non-essential power sources in off-peak times. So if you want to run your dishwasher, you can do it at midnight and pay a lower cost for electrical consumption.

Both the USA and Canada are seeing a trend toward demand-side management and automatic meter reading. For example, the USA, Section 1252 of the Energy Policy Act of 2005 – Time Based Metering and Communications, requires that each State *consider* whether to implement time-based metering and communications. Similarly, in Canada, by 2010, all end users of electricity in Ontario must have demand-side management presented to them by the utility companies.

"We see a technology that will leverage the core assets of our business," says Tim Frost, Director of Corporate Planning for Consolidated Edison and Co-chair of the UPLC Board of Directors. "We clearly see the value of power line communications that will enable us to better operate and automate our electrical network."

He says BPL has the potential to enable a new vision of smart metering and controlling demand response in ConEd's consumer products. The Smart Grid would allow the company to provide information either directly or indirectly to consumers to allow them to respond to higher electricity prices and to better and more efficiently manage their energy load.

"It's ultimately more than meter reading," he says. "For utilities, it means the ability to create real-time information. For networks to be functional, they have to have sensors to deal with the flood of information that needs to be managed and that operators can react to. One thing we are particularly interested in, that we've seen, is that BPL may have the unique ability to allow utilities to understand the condition of underground cables. BPL can potentially assist in predicting failures. It still has to be developed."

Who Uses BPL and Why?

Utilities want BPL for its Smart Grid and its promise of new revenue opportunities associated with innovative value-added services that could be provided over the electrical system to their customers.

State Utility Regulators want BPL to drive competition in the broadband internet market.

Consumers want it for its easy-to-use applications for home uses. For consumers, the key feature of BPL is the availability of the network, says Moore. BPL is deployed wherever there is an electrical outlet.

"There's a little modem the size of your fist," says Moore. "Plug it into any electrical grid anywhere and you are ready to access the internet. Your account lets you go anywhere: the neighborhood, a coffee shop, the library. It either recognizes your computer or you type in an account name and password. The ability to roam on the electrical grid makes this far superior to any other method of broadband delivery."

Joe Cufari, Vice President of Business Development for Current Communications and Co-chair of the UPLC Board of Directors, agrees. BPL, he says, offers the biggest advantage over competing technologies as it is a dual purpose network.

"When you purchase services from a broadband perspective," says Cufari, "the whole home is now connected—every outlet in the house. You're not tethered to one location; you're nomadic in the house. BPL also allows the proliferation of more PC-like devices: video-on-demand, PC-centered family rooms, and media-centric PC operating systems."

"You get the best of both worlds;" says Cufari, "the speed of the tethered world and the ubiquity of wireless."

The utility company can use BPL to create smarter, more efficient utilities with the two-way flow of information.

"BPL offers the ability to communicate with devices in the field they've never talked to before," says Cufari. "How do you interrogate millions of transformers about temperature, voltage inconsistencies, overloads? When are they going to fail? With BPL's two-way communication system, you can dispatch a crew or make modifications so power isn't lost to homes and you avoid outages. It's a more intelligent management system."

There are plenty of opportunities from a vendor point of view. Some vendors handle everything from building the networks to structuring the back office and operating support system (billing and account management) to providing the personnel and software to offer helpdesk services. Other vendors specialize in specific aspects of the BPL business.

Competition and Pricing

BPL isn't out to replace other forms of broadband delivery. In fact, the BPL industry expects to see the same type of growth activity as the cellular industry. When Sprint, the third major player in the cell phone sector, joined the race, it didn't fragment the industry. Instead, cellular penetration grew and the number of cell phone users grew with it. BPL is the third alternative in the broadband industry. As it gets a toehold throughout North America, it will bring more consumers into the fold and will help to grow the entire industry.

One of the more attractive aspects of BPL is its cost. BPL can roll out competitively with DSL and cable, says Kilbourne, and can even be deployed in rural and isolated communities and still compete on price.

When Can I Get BPL?

BPL is available now in limited—but quickly expanding—areas. It has been deployed and commercially active for two years. Texas is a hotspot of BPL activity, with BPL deployment to two million homes in Dallas. The next largest operation is 50,000 homes in Cincinnati, Ohio; and 20,000 homes in Manassas, Virginia.

Regulatory Issues Surrounding BPL

The FCC has done its part in providing the technical rules for BPL operations to protect licensed radio users from interference. And most utilities are regulated at the state level especially about issues such as rights of way and affiliate transactions. If a utility uses BPL to offer other than electrical services, there are strict rules about the use of the asset and how compensation is handled. Also, there are currently government subsidies available for those deploying broadband in rural areas.

Interesting Facts About BPL

- Donald Trump uses BPL in his Manhattan properties.
- The US Navy uses BPL worldwide to support the Navy Marine Corps Intranet.
- Companies like Google, Goldman Sachs, General Electric and Motorola have invested hundreds of millions of dollars in BPL companies.

For more information about BPL, contact the United Power Line Council at 202.872.0030 or visit us online at www.uplc.org.