



STATUS OF BROADBAND OVER POWER LINE 2007

Overview

BPL uses existing electric distribution lines to provide last mile broadband connectivity and home networking for both commercial services and a variety of utility and energy management applications. Currently, there are approximately 35 BPL deployments around the country, which vary in size from small pilots to large scale commercial deployments. These deployments are both rural and suburban, and employ varying network topologies designed according to the areas that are served and the services/applications that are supported. As such, BPL is very much an enabling technology that may be used in combination with other technologies. Because BPL is an unlicensed operation under the FCC Part 15 rules, it operates at extremely low levels of power to avoid causing interference to licensed radio services. The FCC has concluded that there is a low probability of harmful interference from BPL that operates at these general power limits; and in addition there are tough new equipment certification requirements that are designed to further protect against harmful interference to licensed radio services. As such, BPL is technically capable of operating in various environments to support a variety of services without causing harmful interference to licensed radio services.

Technology

There are various proprietary technologies, but they all work basically the same way by sending a digital signal over the power lines. This is accomplished by transferring signals onto and off the power lines via couplers. The couplers connect to boxes that house chipsets that process and/or repeat the BPL signals between the end-points of the BPL network (i.e. the customer premises and the backhaul connection point). Modems are typically used to transfer the BPL signal from the wall socket to the computer or other peripheral device receiving the BPL signal at the customer premises.

The heart of the BPL system is the chipsets, which vary in speeds. Currently, maximum (i.e. raw) throughput speeds from BPL chipsets is 200 mbps. Due to attenuation and other factors on the BPL network, actual speeds to the customer are typically less than the raw throughput of the chipset. Still, most BPL systems provide upwards of 2 mbps symmetrical (i.e. same upload and download) speeds to the customer.

As the signal travels over the power lines it attenuates (i.e. weakens). Usually a BPL signal will travel less than a mile before it must be repeated or regenerated again. In theory, the signal can be repeated any number of times; but in practice, every time the signal is repeated, it increases latency (i.e. delay in reprocessing the signal). As such, BPL networks can extend very far, but there are trade offs, particularly for real-time applications like voice and interactive gaming.

Unlike DSL or cable modem, BPL is not anchored to head-ends or central offices. It also enjoys certain advantages over wireless when it comes to underground environments and penetrating through walls and buildings. As a result, BPL can be deployed into areas where other technologies can't reach, either for economic or technical reasons.

Although the technology is not standardized yet, there are several specifications that have been developed through industry consortia and standards are being developed through the IEEE and other international bodies. The development of standards is expected to promote interoperability between different technologies and economies of scale that will accelerate BPL deployment.

Industry

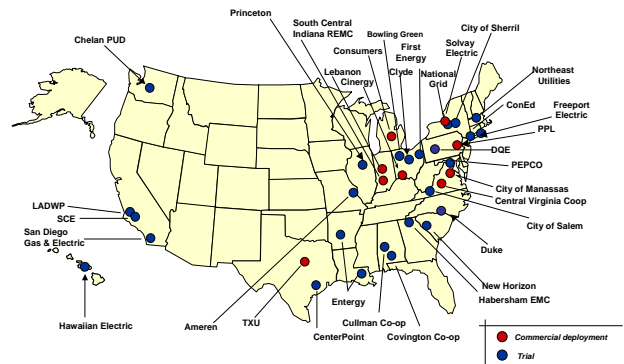
The BPL industry continues to evolve. There is a market for broadband access, home networking, and (now) consumer electronics that are all enabled via BPL. New companies and technologies are entering the marketplace and new strategies are emerging. There are big international companies like IBM, Sony, Panasonic and Mitsubishi, and relatively small, home-grown companies, as well. Some of these companies

are targeting specific BPL markets, such as in-building broadband services. Meanwhile utilities are focusing on using BPL to improve their own services, such that the utility applications for BPL are really driving industry growth at this stage. These developments are an encouraging sign that the industry is taking root.

The list below shows just some of the companies that are deploying BPL technology with their utility partners. The UPLC is the FCC certified BPL database manager; and for complete information about deployments around the country go to www.bpldatabase.org

- Ambient: ConEd, Duke Energy and San Diego Gas & Electric (www.ambientcorp.com)
- Amperion: PPL, Northeast Utilities, Duquesne Light & Power (www.amperion.com)
- Current Technologies: PEPCO, Duke, TXU and HECO (www.currenttechnologies.com)
- IBEC: Central Virginia Electrical Coop.; South Central Indiana REMC (www.ibec.net)
- MainNet: Ameren, City of Manassas, City of Lebanon Utilities (www.powerline-plc.com)

BPL Deployment Map



Public Policy

BPL promotes important energy, communications, environmental and homeland security policy objectives. It promotes energy policy for example by enabling advanced metering initiatives for time of use pricing, load management and outage detection. It promotes communications policy by promoting access and competition for broadband services to rural and underserved areas. It promotes environmental policies through conservation and energy management that reduces greenhouse gases. Finally, it promotes homeland security through network redundancy and video surveillance applications that are being used for public safety and critical infrastructure protection.

Not surprisingly, state and federal policymakers have given strong support for encouraging the deployment of BPL. The FCC has unanimously promulgated technical rules that support BPL growth while protecting against interference to radio services, and it has declared that BPL-enabled Internet access is classified as an information service, consistent with its classifications of DSL and cable modem services as information services. FERC and NTIA have joined in support of the technical rules. Meanwhile, states like Arkansas, Texas, California and New York have passed laws and promulgated rules, which have further encouraged BPL deployments in those states. Other states are considering developing similar laws and rules to encourage BPL deployments.

About the UPLC

The UPLC is an alliance of electric utilities and technology companies to drive the development of broadband over power line communications. The alliance focuses on three strategic areas: 1) Market awareness; 2) Regulatory and legislative advocacy; and 3) Technical operability. Practically every company that is actively deploying BPL or considering deploying BPL in the U.S. is a member of the UPLC. The utility members of the UPLC serve 62.45 million customers in 24 states (including, Alabama, Arkansas, California, Florida, Georgia, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, North Carolina, North Dakota, New Hampshire, New Jersey, Ohio, Pennsylvania, Rhode Island, South Carolina, Texas, Virginia, Washington, and Wisconsin). Technology company members are located in the states of Massachusetts, Maryland, New Jersey, New York, Ohio, Pennsylvania & Virginia. For more information about the UPLC, please visit www.uplc.org.