

BROADBAND OVER POWER LINES: SYMMETRICAL, HI-BANDWIDTH, NEW 400 MBPS SPEED *

FOR "SMART GRID", IPTV, IN-HOME MULTIPLE DWELLING UNIT NETWORKING AND
TRIPLE-PLAY SERVICES- VOIP, WEB, HDTV VIDEOS !

LET EVERYONE KNOW the commercial opportunities of BPL/PLC with killer applications & services: a "Smart Grid", HDTV/IPTV , in-home MDU Networking Solutions and TRIPLE-PLAY.~~~11/3/06 FCC approves Broadband Powerline as "Information Service" like DSL and CABLE re: BPL Audio/video forward to 30:25 minute area~~~~~ *Brett Kilbourne -C-SPAN video on "Broadband over Power Lines" ~~~~~ Enter "Virtual Dark Fiber" Pure BPL technology GEAR-MAKER - Ambient Corporation`s CEO ... John Joyce explains Hi-Bandwidth BROADBAND over POWER LINES technology - now with up to three DS2 200Mbps BPL interfaces=600 Mbps .
~~~ Currently, Nine(9) U.S. Electric POWER UTILITIES had Commercial BPL Deployments and 26 w/ ongoing BPL trials !~~~

"Broadband over Power Line(BPL)is the answer to \*energy ills". -- Judith Warrick of Morgan St "Fit for the Future" DS2 400 Mbps Broadband Power Line Technology Demo. DS2 Introduces 400Mbps Powerline Communications Technolog

MONDAY, DECEMBER 31, 2007

## A Market Overview of BPL in the United States

A Market Overview of BPL in the United States

Brett Kilbourne — Dec 01, 2007

Broadband over Power Line (BPL) has evolved since its advent in the United States in 2001. Whereas then the focus was on commercial services, such as high-speed Internet access and VoIP, now there is probably as much or more interest in using BPL for so-called smart-grid applications.

Meanwhile, the digital divide continues to gape in rural areas,

and some BPL providers are focusing on providing broadband services in these areas. BPL is also uniquely suited to provide broadband services to multiple dwelling units (MDUs) and campus environments, and there are several hotel chains that have signed deals with in-building BPL providers.

At the same time, there is a budding market for using BPL for home networking and consumer electronics applications. Companies like Sony, Panasonic and Intel are actively involved in developing standards for BPL, reflecting their interest in the technology to stream HDTV and other high-bandwidth applications in the home.

All these developments are catalyzing the market for BPL deployment.

### Smart-Grid

There are several factors for the increased focus on using BPL for smart-grid applications. First, utilities are investing heavily on upgrading their infrastructure to improve efficiency and reliability. Second, policymakers are supporting smart-grid to reduce global warming and manage demand for electricity. Third, technology has matured to enable cost-effective solutions for smart-grid applications, and BPL is uniquely suited to work in a variety of environments where smart-grid applications are needed. Finally, and probably most importantly, the market is changing dramatically — generation costs are skyrocketing and demand is outstripping supply.

This trend has contributed to the widespread deployment of BPL by several utilities. In Dallas, Oncor Electric Delivery is partnering with Current Group to deploy BPL to two million customers by 2010, and today the network already passes over 108,000 homes and businesses in both suburban and rural areas.

In Houston, CenterPoint Energy is working with IBM to deploy BPL to 45,000 electric and gas customers, and the system currently passes approximately 10,000 homes and businesses.

The system in Dallas will provide smart-grid and commercial

services, and the system in Houston will be used exclusively to provide smart-grid services.

Not coincidentally, Texas has laws that promote the deployment of BPL. In addition, this year the Texas PUC has established regulations for advanced metering, and these regulations will help utilities to recover investments in their BPL networks for advanced metering. Other states, such as Ohio, Michigan and Massachusetts, are conducting their proceedings on advanced metering as well.

The federal government is trying to further encourage this trend, and Congress passed legislation this year that promotes the deployment of smart-grid technologies by providing funding for research and development and creating other incentives for utilities to invest. As such, there is widespread support among state and federal policy makers for advanced metering in particular and smart-grid in general. BPL stands to gain from this, particularly in states (including California, Arkansas and New York) that have laws and regulations to encourage the deployment of BPL.

## Broadband

The deployment of BPL for smart-grid is a win-win for broadband subscribers as well as electric customers. That's because BPL networks are usually designed to support commercial broadband services, as well as smart-grid applications. Moreover, utilities will tend to deploy BPL for smart-grid across their entire service territory, including areas that may not otherwise be considered economic for broadband services alone. Finally, utilities are willing wholesalers, creating an opportunity for third parties to provide broadband services to their customers by piggy-backing on the BPL network.

There are BPL providers that focus on providing broadband services in rural areas, and there are cooperative utilities and municipal utilities that are deploying BPL networks in rural and isolated communities in several parts of the country. One of the BPL providers, International Broadband Electric Communications Inc. (IBEC), recently announced that the FCC

has granted certification of its equipment, thus enabling it to install the equipment for three rural electric cooperatives in Alabama, Indiana and Virginia, providing broadband service for some 105,000 customers.

IBEC also was granted a \$19.2 million loan from the USDA Rural Utility Service to deploy BPL in rural areas. Another BPL provider, utility.net, uses IBEC's technology to offer BPL in rural areas that are served by investor-owned utilities, and it has announced that it will deploy BPL to 20,000 customers in Grand Ledge, Mich., by the end of the year. These are just some of the examples of rural BPL deployments in the country.

There are also BPL providers that focus on providing BPL in buildings. The advantage to using BPL over other technologies is that it provides ubiquitous coverage throughout a building without needing any new wires. Not only does this mean broadband connectivity to the outlet, but also elevators and HVAC systems as well. As a result, BPL enables landlords to provide enhanced services to their tenants while reducing their operational expenses for heating, cooling and electricity. One such in-building provider, Telkonet, has deployed BPL in the Trump Properties in Manhattan and in the Queen Mary in Long Beach, Calif. These are just some of the more notable examples where BPL is being used to support broadband services and smart-building applications in MDUs and campus environments.

#### Home Networking and Consumer Electronics

There is a robust market already for BPL devices that are used to provide home networking, and there is a burgeoning market for BPL-enabled consumer electronic devices. Most of the home networking devices in the United States are manufactured under a specification developed by the HomePlug Powerline Alliance (HomePlug).

The first specification, HP 1.0, provided raw throughput speeds of 11 megabits per second (Mbps) and the latest specification, HP AV (audio-visual) provides raw throughput speeds of up to 200 Mbps. One such HomePlug manufacturer, Intellon, recently announced that it had shipped 10 million chipsets worldwide. In addition to HomePlug, there is also the Universal Powerline

Alliance, which has produced its own specifications for BPL as well. One of its members, DS2, announced that it has shipped 3 million chipsets. Most recently, the consumer electronics industry has created its own BPL specifications organization, the Consumer Electronic Powerline Communications Association (CEPCA). One of its members, Panasonic, has developed a chip that it claims can provide raw throughput of 190 mbps on existing home power lines, enabling simultaneous use of two HDTVs, IP telephone and data transmission.

## Standards and Regulations

These various specifications are being proposed to the Institute of Electrical and Electronics Engineers (IEEE), which is developing standards for interoperability and coexistence between various BPL devices and systems. Recently, the IEEE P1901 BPL standards group voted to adopt a merged standard proposal by HomePlug and Panasonic for interoperability between in-home and access BPL systems. The standard still needs to be ratified, but this is a significant step toward achieving an industrywide standard.

The development of a standard will not only ensure compatibility between different BPL devices, but it may enable different devices to interoperate with each other. It is expected that such a standard would lead to the mass market production of BPL devices, which could increase economies of scale and drive down prices — further improving the business case for the deployment of BPL systems. The IEEE could develop the standard for BPL in 2008.

Of course, the FCC has already developed standards for the technical operations of BPL in 2004. Those technical standards protect against possible radio frequency interference from BPL systems and are backed by the National Telecommunications and Information Administration (NTIA), which oversees federal use of the radio frequency spectrum. Those standards were challenged in federal court, and the case is winding up now that the briefs have been filed and arguments have been made. The resolution of that case should remove any remaining uncertainty that might still hang over BPL. Thus far, the FCC's standards for

BPL operations appear to be effective, and BPL operators have operated in compliance with those standards.

## Alternative Technologies

BPL is just one of many technology options for broadband services and utility applications, but it has certain features and functionalities that are unique from alternative technologies.

First, BPL provides synchronous speeds. Some technologies, such as DSL, provide relatively higher speeds for downloads than they do uploads. The advantage for BPL is that synchronous speeds are better suited for real-time applications such as voice and video gaming. More upload bandwidth is also better for file sharing, which is particularly important for SOHO consumers.

Second, BPL can reach areas that wireless can't and it can do so without the need to drill or run cable. So, for utilities looking to monitor their underground electric networks, this is one advantage to BPL. Likewise, consumers may prefer BPL to fiber or coax in the home or office, because it provides high bandwidth and is easy to install.

## Conclusion

With all of these things going for it, you may wonder when BPL will be available in your area. The answer is it depends. First, it depends on the extent to which utilities adopt BPL for their smart-grid deployments. That will also depend on the manufacturers to produce equipment that is standardized to utility specifications and is cost-effective.

Finally, it will depend on the success of the large-scale deployments of BPL, which are underway now. If all goes well, other utilities will also adopt BPL, and consumers will reap the benefits both in terms of access and competition in the broadband market and in terms of smart-grid applications that improve the efficiency, reliability and security of the nation's critical infrastructure.

Brett Kilbourne is director of regulatory services at the United

