

**Broadband Power Line Communications
Friend, Foe or Neutral?**

**Prepared for the Coon Valley Farmer's Telephone Company
Board of Directors and Senior Management Staff**

By John Pieper

April 26, 2004

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Chaseburg, WI 54621
April 26, 2004

Wilbert Proksch, Pres.
Coon Valley Farmers Telephone Company
105 Central Ave.
Coon Valley, WI 54623-0398

Dear Wilbert, Board and Staff:

Attached is the report: **Broadband Power Line Communication: Friend, Foe or Neutral?**

The report discusses the various types of high speed communication systems available to a power company, the advantages and drawbacks of these systems. The report describes Vernon Electric's (VEC) potential and intent to introduce power line communications, specifically broadband, i.e. high speed internet and VoIP.

The report also analyzes the various strategies to take as a phone company to maintain market share in our incumbent area.

Sincerely,

John Pieper

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Summary

The report is based on the premise that Broadband Power Line communication is a viable, marketable technology and will be heavily marketed soon. The report asks whether this emerging technology should be viewed as friend, foe or neutral.

The report specifically asks the question: "What is Vernon Electric Cooperative's potential and intent to introduce power line communications?" The research and interviews answered this question satisfactorily.

The background research uncovered other forms of VoIP that are already being marketed and must be dealt with even before BPL. CVFT must develop a marketing strategy in order to successfully compete with them.

The following background areas are covered:

- Types of power line communication and their formats
- The role IPv6 will play in BPL.
- VoIP pressures and opportunities
- The FCC's role in BPL
- Wisconsin and SB 302

The results of the research are not encouraging for hard line phone companies. A market that was once a monopoly for long distance is fracturing into smaller and smaller pieces with more and more companies and technologies competing for market share.

Phone companies will have to resort to marketing strategies similar to those of their upstart competitors. Given that we must develop new marketing strategies. I would recommend seriously looking at the following areas:

- Maximize availability of DSL and video to as many customers as possible.
- Bundle services for customer retention
- Education program; show the customer one on one that the deal we have to offer is as good as anyone's.

Objective

This report is to provide information to the board and senior staff of the company. The information can be used to decide if this technology should be considered friend, foe or neutral. Should corporate resources be diverted to counter this and maintain market share? Should CVFT attempt some type of synergistic relationship in which the power utility provides broadband services from within the house while we provide a fiber backbone in some type of joint relationship? Finally, should CVFT just decide that as far as our ILEC is concerned this is a neutral technology and apply our resources elsewhere?

The report will also look at the projected impact of Wild Blue. Wild Blue is essentially a two way satellite dish formatted to receive Dish TV while simultaneously offering 2.4 gigabyte per second download speeds and 256 kilobytes per second upload speeds.

Research for this report uncovered another threat to our market share in the form of Vonage. While Vonage isn't a power utility what they do offer can hurt us. Unfortunately, for telecos their technology essentially parasitizes the long distance hard line system.

Improvements in an existing technology are coming on line to divide up the market share for long distance hard line companies even further. This technology is called PLC (Power Line Communications). For the purposes of this report the terms PLC and BPL (Broadband Power Line) will be used. PLC is a broad term encompassing all forms of power line communication and BPL refers only to the high speed forms of power line communication data (at DSL like speeds), streaming video, and VoIP (Voice over Internet Protocol, pronounced as voip)). The threat to traditional phone companies' income stream is VoIP. VoIP is free long distance calling over the internet.

PROCEDURES

To obtain the information for this report, appropriate web sites were accessed, telephone and face to face interviews were conducted and a literature survey was also conducted. A small sampling survey of potential customers was also conducted.

PLC comes in several forms. The form most used and least threatening from the perspective of a rural teleco is low hertz system maintenance communications. Vernon Electric Cooperative is in the process of installing this type of system now. This is the Turtle Metering System that allows a customer's meter to self report usage and outages back to VEC. It is low frequency, operating at 9 hertz. .

Another form of PLC is BPL (Broadband Power Line) communications. This form of communication through existing power lines provides DSL like speeds of data and voice transmission (VoIP) over the power grid. BPL is the form of PLC that CVFT should look at.

In their report for The American Public Power Association, Eger and Becker state that "telecommunications can become a new source of needed revenue for the utilities while simultaneously satisfying a social need" (September 2000).

One of the problems facing rural businesses is known as the digital divide. High speed internet access is often unavailable to these businesses through their local teleco. Teleco's in sparsely populated areas don't have the financial resources to put in a fiber backbone or the customer base to support the cost of the AFCs to provide DSL service. They simply can't put the necessary high speed infrastructure in place.

In cases like this a rural power utility stepping in to offer broadband services would be in a position to make a wholesale grab for market share. This is where Wild Blue enters the picture. In long overland runs, BPL has its problems. When Wild Blue launches its satellite in September the rural utilities will have their opportunity. No extra wires, no extra infrastructure. Just sell the system, plug and play. The power utility rather than the phone company just picked up the broadband revenue stream from those customers.

BPL Problems

BPL as it exists now is most effective as a last hop technology. There is no question that high speed internet can be used very effectively between two computers inside a house using household power circuitry. Moving out of the house data loss occurs in the following ways:

- Data loss in the step down phase of the customer's power transformer. This transformer is the green metal box on the ground or grey bucket on the power pole near the customer's house. Because there is an air gap in the transformer there is data loss when the signal is relayed across the gap. This problem is being addressed by using a jump circuit around the step down transformer.
- Another problem showing up in transmitting broadband over long distances is the interference experienced with the power company's own low frequency maintenance signals. Tapping the broadband revenue stream has an adverse effect on the utility's own operating efficiencies.
- Broadband, transmitted over power lines also creates an interference signal that affects police and fire communications. The pro BPL lobby says this isn't a problem. Other groups, especially shortwave radio operators, are adamant that the problems haven't been solved.
- Internet protocols (presently IPv4) weren't designed with PLC in mind. They were for existing telecommunications systems (copper, fiber optic, microwave relay and cellular).
IPv6 will be introduced within the next few months. Jordi Palet of the European Union's 6Power says "IPv6 will allow integration of all different levels of devices. Such auto configuration was not foreseen in IPv4" (May 2003).

As the major technical problems are resolved it will be up to the individual power companies to decide whether or not they want to compete in the communications market.

Legislation and Rulings

- Concerning VoIP and BPL, the FCC is taking a leave it unregulated approach. FCC chairman Michael Powell is quoted at the World Economic forum in January: “[VoIP] is not a telephone service; it is a voice application, completely indistinguishable from any other kind of application that can run on an IP network. If you’re going to say to me that VoIP is something that needs regulation, then you’re going to have to explain to me why e-mail isn’t also, or streaming video or instant messaging is not also” (FCC Due to Explain).
- In a May 2004 ruling the Supreme Court upheld the rights of 18 states to block entry into the telecommunications market by publicly owned utilities. This was a disappointment to public utilities. According to Robert Varela of the American Public Power Association; “Congress is expected to begin work soon on another telecommunications bill ... members of congress are revisiting the Telecommunications Act of 1996 because it has not produced the level of competition (and benefits) that were promised” (May 2004). This Supreme Court ruling only affects municipal utilities; however, the upcoming legislation bears watching.
- The Wisconsin State Senate is considering SB 302. This bill concerns deregulation of broadband at the state level. It proposes to remove broadband from control of the PSC. This would mean that VoIP service providers wouldn’t be regulated by anyone. Telephone companies offering dial tone would still be regulated while providing unregulated access by a VoIP provider over the teleco’s own lines.

BPL and CALEA

Under Homeland Defense all voice capable communications systems are required to upgrade their switches to comply with CALEA standards.¹ Power line communications don’t use a switch. Compliance with CALEA for utilities offering broadband is an issue the FCC is looking at. When asked how the government would enforce the CALEA regulations on power utilities offering broadband Len Leis of CVFT replied: “There’s no way for the government to do it. The government has been granting CALEA extensions (to telephone companies) since 2001. The government mandated something they haven’t been able to figure out how to do. Besides the government hasn’t been budgeting money to get the job done for the telephone companies. Now they’re going to have to try to do it for a brand new totally decentralized technology” (March 31, 2004).

¹ CALEA (Communications Assistance for Law Enforcement Act), under this act federal law enforcement agencies would be able to get a warrant in Washington and tap a phone anywhere in the country from Washington. The local law enforcement agencies and local phone company wouldn’t even be aware of the tap.

Literature Survey

A survey was done of telecommunications trade journals for the first quarter of 2004. The search was not as much for information on BPL and VoIP but for relative numbers of references. The results were that of 12 journals surveyed² there were 10 references to VoIP and only 1 to BPL. It would be safe to conclude that as an industry the concern is focused on VoIP as offered by companies using existing phone systems. The one reference to BPL is how it functions as a VoIP provider. The survey is included as Appendix A.

Potential Customer Survey

A small survey was done on April 3, 2004 among a group of people who were known to be both VEC and CVFT customers. The survey asked 7 questions about computer ownership and high speed broadband. The survey and results are included in the report as Appendix B. The results of the survey were inconclusive. It did establish that 80% of the respondents had computers. Those that had computers were hooked up to the internet. Only 20% of internet subscribers had DSL. Sixty percent of the respondents were interested in BPL. It should be noted that of the people interested in BPL 80% of them wanted the price to be \$35 or less per month. It should also be noted that only one respondent had even heard of BPL. For the survey to truly be successful more time would have been needed for background education to explain to respondents what the survey was about.

² Some journals were quarterly so only one issue was available, others, such as Telephony are weekly and several of the latest issues were surveyed.

RESULTS

The original question this report was to answer was whether or not VEC would adopt BPL and be in competition with CVFT. According to Dave Maxwell of VEC, the simple answer is "No" they aren't interested" (March 9, 2004). Maxwell feels that the Westby Telephone Cooperative and CVFT are providing a very high level of service. He feels that competing for market share under these circumstances wouldn't be profitable.

The research did uncover another challenge all phone companies will be facing in the very near future. The threat is Vonage and its VoIP marketing program. At the Wisconsin State WTCA convention on April 6 & 7 David Lewis of TCA gave a presentation on Vonage.

In this presentation he told how in November 2003 the claims that Vonage was making were considered an industry joke; as of March 2004 Vonage was signing up customers at the rate of 65,000 per month. Vonage's equipment is easy to buy; it's available at Circuit City for about \$80.00. Vonage's target market is businesses with DSL and they are marketing aggressively. Lewis says: "I've been with TCA clients who have seen Vonage take 20% of their customers in one month! And businesses are your bread and butter long distance customers" (April 7, 2004).

DISCUSSION

Initially this report was to analyze the threat that BPL represented to CVFT. By Vernon Electric's own admission they aren't interested in competing for broadband market share in our ILEC.

The research did uncover the extent of the threat Vonage represents to small rural telecos.

TCA's Lewis says: "Right now Circuit City sells Vonage's equipment. What is going to happen if Wal-mart starts to market this stuff" (April 7, 2004)?

CVFT's ILEC is in an area in close approximation to an expanding regional urban center. Our market is largely residential, an area Vonage hasn't started to market yet. I would recommend taking the following steps to preempt any move Vonage will make on our customer base.

- Accelerate the placement of AFC's in as many of our service areas as possible. This would allow us to offer bundled services (Dial Tone, Long Distance, DSL and Video) to as much of our service area as possible.
- Use a front end discount, free hookup, 300 free long distance minutes or something on that order. Lock up the customer with a 1 to 3 year bundled services contract. The longer the contract the bigger the discount.
- Initiate our own VoIP program with \$X buying unlimited minutes.
- Consider joint minutes with U.S. Cellular or Altel. Your minutes, our minutes, it doesn't matter.
- Educate one of our staff to do onsite marketing. Go out and visit our own customers. Show them that what we offer is competitively priced. I would suggest Vicky for this job she has great people skills and she is already doing our video education.
- Use billing flagging. When we are within 90 days of contract expiration an alert pops up. We send Vicky out on a renewal call. As part of its marketing strategy Vonage finds out the contract expiration date of every account they call on. We need to have a live body in that place of business first.
- Sell customers on the higher security aspect of a phone line over a cable modem.
- Sell customers on our service levels. It's the highest in the state. Let's let our customers know this.

The report shows the BPL isn't the threat we as a rural phone company need to react to. Vonage and other VoIP service providers who parasitize our infrastructure are the more immediate concern. If CVFT puts any six of these eight recommendations in place we will be in a position to effectively counteract the threat from VoIP providers like Vonage.

Appendix A**Survey of Industry Journals First Quarter 2004 for BPL and VoIP References**

America's Telecommunications	www.telecommagazine.com			
March, 2004		Articles	BPL 0	VoIP 0
Electronic Design	www.elecdesign.com			
March 15, 2004		Articles	BPL 0	VoIP 0
Exchange	www.ntca.org			
February/March 2004		Articles	BPL 0	VoIP 0
Geo World	www.geoplace.com			
March, 2004	Articles	Articles	BPL 0	VoIP 0
Locating , Testing and Repairing	www.ltrmag.com			
March/April 2004		Articles	BPL 0	VoIP 0
National Cable Television Co-op	www.cabletvcoop.org			
February/March 2004		Articles	BPL 0	VoIP 0
Phone Plus	www.phoneplusmag.com			
March, 2004		Articles	BPL 0	VoIP 1
Telphony	www.telephonyonline.com			
March 8, 2004		Articles	BPL 0	VoIP 1
March 22, 2004		Articles	BPL 0	VoIP 1
VAR Business	www.varbusiness.com			
March 15, 2004		Articles	BPL 0	VoIP 0
March 29, 2004		Articles	BPL 0	VoIP 0
April 5, 2004		Articles	BPL 0	VoIP 0
VSR	www.verticalsystemsreseller.com			
March, 2004		Articles	BPL 0	VoIP 0
Wireless Review	www.wirelessreview.com			
March, 2004		Articles	BPL 0	VoIP 0
Xchange	www.xchangemag.com			
March, 2004		Articles	BPL 1	VoIP 4
April, 2004		Articles	BPL 0	VoIP 3
		Totals	1	10

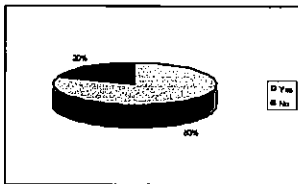
Appendix B

Survey of Local Potential Customers of BPL Services

1. Do you have a computer in your home now?

Yes - 12

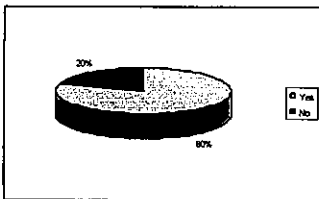
No - 3



2. If you have a computer is it hooked up to the internet?

Yes - 12

No - 3



3. Do you have dialup or DSL?

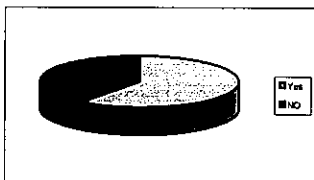
Dialup - 12

DSL - 3

4. Would you be interested in getting high speed internet (DSL like speeds) through your electric wall outlets?

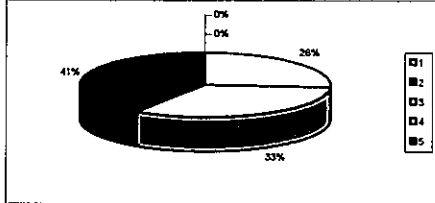
Yes - 9

No - 6



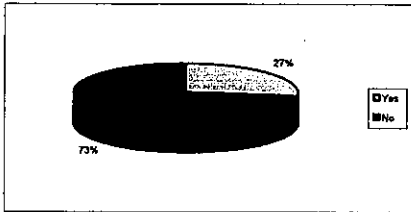
5. How much would you be willing to pay for this per month?

- NA - 2
- <\$35 - 6
- \$35 - 4
- \$45 - 0
- \$55 - 3



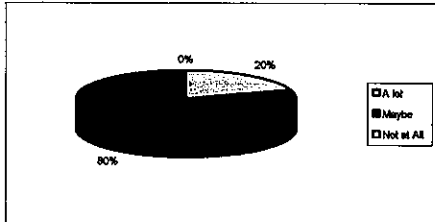
6. Do you think a service like BPL would bring more business to rural areas?

- Yes - 4
- No - 11



7. BPL can cause interference with police and fire radios. This concerns me:

- A lot - 3
- Maybe - 12
- Not at all - 0



Works Cited

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Glossary

AFC - a remote switching substation.

Backbone - A series of heavy service main trunk lines usually from town to town. These can be fiber optic or copper.

Bundled Services – A combination of services offered by a phone company as one package i.e. dial tone with long distance and video for one price.

BPL - Broadband Power Line (Communication) – High speed internet or television through electric wall outlets.

CALEA – Communications Assistance Act for Law Enforcement

CLEC – Competitive Local Exchange Carrier – A telephone company doing business in another company's home area.

Cooperative - A company where the customers own the company. Profits are returned to the customer.

CVFT- Coon Valley Farmer's Telephone Company – The local telephone company serving Coon Valley, Chaseburg and Stoddard. It is the ILEC for this area. It is a stock company not a cooperative.

FCC – Federal Communications Commission-The federal agency with oversight in the area of telecommunications.

Fiber-Communication is transmitted along a fiber optic cable by means of light rather than electrical impulses.

Hard Line Company - A telephone company that uses wire or fiber optic cable as opposed to a cellular company.

ILEC – Incumbent Local Exchange Carrier-A telephone company doing business in its home area.

IPv6 – Internet Protocol version 6- The next generation of internet protocols to be implemented soon. It will replace the present IPv4 operations protocols.

PLC - Power Line Communications-This term is used for all forms of power line communication including very low frequency system maintenance functions. BPL is a form of power line communication.

SB 302 – Wisconsin State Senate Bill 302. This bill makes it clear that the Public Service will have no say in regulating BPL or VoIP services.

6Power - A European association to promote the use of power line communications.

TCA – Telecom Consulting Associates, A consulting company that specializes in marketing solutions for telephone companies.

Tech - telephone service technician

Teleco – telephone company

VEC - Vernon Electric Cooperative- A rural power cooperative supplying electric power to parts of western Wisconsin.

Video – This is the term a telephone company uses to refer to cable TV over a customer's phone line. CVFT offers 110 channels on its video.

VoIP - Voice over Internet Protocol-VoIP allows free long distance phone calls using the Internet.

Vonage - An extremely aggressive VoIP services provider. In November 2003 this company was an industry joke. As of March 2004 they are signing up customers at the rate of 65,000 per month.

Wild Blue - Wild Blue is a two way satellite dish allowing customers high speed internet and dish TV without any wires at all. It is being marketed primarily through rural power cooperatives.

WSTA - Wisconsin State Telecommunications Association, Inc. This is a legislative lobbying group in Madison paid for by the telephone companies.

WTCA - Wisconsin Telephone Cooperatives Association. This is a trade group formed for the benefit of Wisconsin telephone cooperatives. It also has lobbyists in Madison.