

**2007 North American Frost & Sullivan Award for Technology Innovation****PCN Technology, Inc.**

The 2007 Frost & Sullivan North American Technology Innovation Award in smart metering /grids goes to PCN Technology, Inc for its development of an innovative, cost effective and unique embedded Input/Output (I/O) solution for high quality of service powerline communication and mesh networking.

PCN began its technology and market research efforts in 2001 working closely with industry leaders to plan and develop a true mission critical communications and networking technology for the energy and industrial markets. PCN Technology, Inc. was incorporated in April 2004 to begin technology and product testing. In 2005, PCN opened its headquarters in Santa Clara, CA and began commercialization activities. PCN also has engineering & sales offices located in the U.S. in the Midwest and Southeast.

**What is Needed to Move Existing Grids toward Modern Grids**

Issues of greatest concern to existing grids involve upgrading information and communication technologies. Monitoring to reduce incidences of low power quality and power outages is high on the list of issues. Unfortunately the cost of adding new technologies is often a deciding factor for the cash strapped utilities since deregulation. Much of the presently installed grid technologies are proprietary. New communication technologies that are interoperable, backward compatible, future proof and scalable, and also offer the newest technologies at affordable prices, are needed to upgrade the old utility infrastructure to modern grid functionalities.

Modern grids need powerline communication (PLC) systems that will address mission critical data, and interoperate securely with other systems. A PLC system needs to transmit data over large-scale mesh networks on existing utility infrastructure and to deliver bandwidths of hundreds of kilo-bits-per-second over many miles to fully support the emerging needs of smart grids and the demand side capabilities of advanced metering infrastructure (AMI) technologies.

## **Embedded I/O Solution to Smart Grid Challenges**

It is in such a context that PCN Technology has developed its technology. Based on the unique abilities of PCN's patented embedded I/O solutions, the company's powerline technology only requires the existence of a conductive medium to communicate even when the grid is down. This enables the PLC to monitor the grid during power outages, so faults can be promptly detected and isolated within an energy grid. Key to PCN's technology is a novel algorithm called "Dynamic Adaptive Channeling" which is implemented in real time. It analyzes the electric properties of the energy grid and determines the signal-to-noise characteristics across the entire communication channel about 500 times every second to deliver highly reliable communication. The PCN algorithm innovation is not found in any competing product.

PCN's products are extremely inexpensive due to three important reasons. First, the embedded system modules are easily integrated within any existing energy infrastructure without the need for special purpose or expensive hardware. Second, the company's algorithms are implemented using standard digital processing methods so they can be 'mapped' into a variety of hardware architectures. Third, all hardware implementations use industry standard Commercial Off-the-Shelf (COTS) components.

By using advanced microcontrollers (MCU) and Digital Signal Controllers (DSC), PCN provides a feature rich intelligent input/output communication subsystem component module that also provides the many functions traditionally provided by Programmable Logic Controller systems. Because the MCU and DSC are interchangeable components, the PCN products are scalable and cost effective. The current technology is mature third generation that has gone through a number of manufacturing runs and field tests.

## **Competitive Advantages**

Although based on a differential and proprietary technology for communication, PCN's embedded system products have been developed to be industry standard-compliant. They communicate using, and are interoperable across, standard data protocols. They also have convergence to wireless protocols, which enables their seamless integration into hybrid networks. PCN's products have the potential to become the industry standard for PLC networks, interoperating with other systems, transmitting data through transformers and establishing large-scale mesh networks on existing energy

infrastructure to provide for the addressing, switching and routing of data for the build out of a complete, seamless, AMI system. All PCN products communicate data using the regulated approved modulation channels depending on the country where PCN products are being utilized.

PCN is embarking on deploying a unique advanced smart metering and smart grid system. The Grid MicroCircuits™ embedded subsystem modules and GridSweep™ network management software, enable complete switching, routing, and networking management of mission critical utility data for AMI, Backhaul, Endpoint and Building Area Network applications, and the system will be future-proof.

In summary, the Frost & Sullivan Award for Technology Innovation recognizes PCN Technology, Inc. for its unique PLC technology that helps facilitate cost effective implementation and unparalleled system performance in reliable and high communication bandwidth over long distances, and which features the ability to develop large-scale PLC mesh networks. PCN's advanced platform will integrate next generation energy management through powerline, Ethernet, Zigbee, or other architectures, to integrate with current, future, and legacy technologies.

### **Award Description**

Frost & Sullivan's Technology Innovation Award is bestowed upon a company (or individual) that has carried out new research, which has resulted in innovation(s) that have or are expected to bring significant contributions to the industry in terms of adoption, change, and competitive posture. This award recognizes the quality and depth of a company's research and development program as well as the vision and risk-taking that enabled it to undertake such an endeavor.

### **Research Methodology**

To choose the award recipient, Frost & Sullivan's analyst team tracks innovation in key hi-tech markets. The selection process includes primary participant interviews and extensive primary and secondary research via the bottom-up approach. The analyst team shortlists candidates on the basis of a set of qualitative and quantitative measurements. The analysts also consider the pace of research and technology innovation, and the significance or potential relevance of the innovation to the overall

industry. The ultimate award recipient is chosen after a thorough evaluation of this research.

### Measurement Criteria

In addition to the methodology described above, there are specific criteria used to determine the final rankings. The recipient of this award has excelled based on one or more of the following criteria:

- Significance of the innovation(s) in the industry, and across industries (if applicable)
- Potential of the products of innovation(s) to become industry standard(s)
- Competitive advantage of innovation vis-à-vis other related innovations
- Impact (or potential impact) of innovation(s) on company or industry mind share and/or company bottom line
- Breadth of intellectual property related to the innovation(s), that is, patents, scientific publications, papers in peer-reviewed journals.

#### About Best Practices

Frost & Sullivan Best Practices Awards recognize companies in a variety of regional and global markets for demonstrating outstanding achievement and superior performance in areas such as leadership, technological innovation, customer service, and strategic product development. Industry analysts compare market participants and measure performance through in-depth interviews, analysis, and extensive secondary research in order to identify best practices in the industry.

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