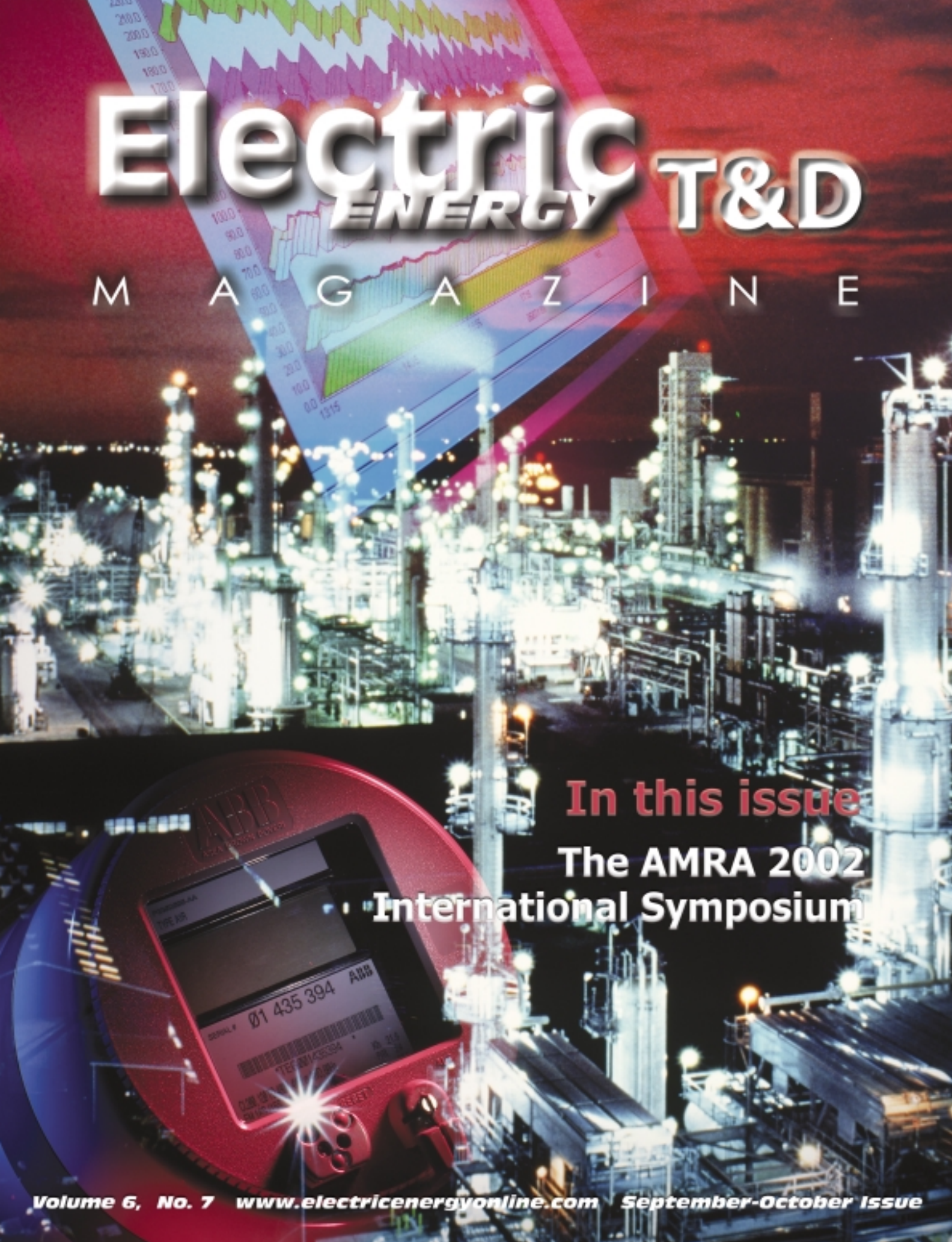

Electric ENERGY T&D MAGAZINE

In this issue

The AMRA 2002 International Symposium

Volume 6, No. 7 www.electricenergyonline.com September-October Issue

Smarter endpoints are just the beginning.

TS2 is an exciting new AMR system that brings the power of endpoint specific data to your entire organization. Not only does it bring the information to you, TS2 also allows you to communicate simultaneously with each individual endpoint, giving you unparalleled bi-directional control.

TS2 is the heart of the EPIC™—End Point Information & Control—solution from Hunt Technologies. Using our proven Ultra Narrow Bandwidth technology, TS2 revolutionizes power line carrier based AMR systems.

TS2 provides the ultimate in flexibility presenting endpoint data that can easily be imported into a variety of utility applications. Imagine the benefits to your utility operations: enhanced customer service, reduced system outages, improved system maintenance capabilities all translating to increased bottom line results.

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Electric Energy T&D MAGAZINE

In this Issue

FIRST LINE PROTECTION

WHEN COMMUNICATIONS ARE THREATENED, THE TELELINE ISOLATOR IS YOUR FIRST LINE OF DEFENSE.

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Teleline Isolator for Wire-line Communications

TWACS by DCSI and BLP Launch New Product

Announce Release of Remote Service Connect/Disconnect

St. Louis, MO – Distribution Control Systems, Inc. (TWACS by DCSI), a subsidiary of ESCO Technologies Inc. (NYSE: ESE) and BLP Components, Ltd. (BLP) announce the release of their respective IMT-3H SCD transponder and service connect/disconnect (SCD) inter-base collar products.

The IMT-3H SCD is a remote power line transponder, which is connected to the SCD collar to provide a whole-house service disconnect. The IMT-3H SCD is based on DCSI's widely deployed IMT-3 meter module family and fits a number of new and existing electromechanical meters including those made by GE and Siemens. The SCD consists of an inter-base collar, a 200 Amp BLP PowerPulse™ switch, and the BLP electronic controller with a built-in arming function. The collar has four jaws to accept the blades from the meter on the top side, and four blades to insert into a standard meter socket on the bottom side.

The connect/disconnect function is controlled remotely via power line communications between the utility control center and the meter site, precluding the need for a service call by utility personnel. Commands are sent between the utility and the meter via the TWACS two-way power line communication system, and can confirm service connect or disconnect within 20 seconds of command initiation.

The BLP PowerPulse switch utilizes a unique latching design allowing it to withstand all of the relevant standard requirements. Combined with its isolated driver board it allows for safe reliable control over the TWACS system.

Remote connect/disconnect service can improve a utility's bottom line by alleviating operations costs and providing the utility with a powerful revenue collection tool for problem accounts. It also enables the utility to enhance their customer service capabilities by providing connect/disconnect services to rental and seasonally occupied premises. Additionally, it improves utility employee efficiency by allowing connects and disconnects to be performed from the safety and convenience of the central office

DCSI, a subsidiary of ESCO Technologies Inc., is located in St. Louis, Missouri, and has manufactured and marketed the highly successful and field-proven TWACS two-way power line communication technology for over 20 years. TWACS cost-effectively provides unique capabilities ideally suited for AMR, Load Control, Interval Data, TOU/Real-Time Pricing, Line-Voltage Monitoring, Outage/Restoration Monitoring, Remote Connect/Disconnect, and Tamper/Theft Detection using open architecture interfaces. There are over 5.5 million devices installed or under contract. TWACS uses the existing power lines for data transmission, and uses the utility's network at the frequency for which it was designed. For more information visit www.twacs.com.

BLP Components, Ltd., part of the Roxboro group of companies, specializes in the design and manufacture of switching solutions for residential Gas & Electricity service applications. The devices are used extensively in a range of residential metering and control applications in the utility industry including, AMR, Prepayment Metering, Remote Connect & Disconnect, Tariff Switching, Load Control and Gas Metering. BLP is located in Newmarket, Suffolk, UK, with North American Sales located in Farmingdale, New Jersey. For more information visit www.blpcomp.com ■

Circle **105** on Reader Service Card

GE Regulators to Use Beckwith Electric Controls

Beckwith Electric and General Electric's Commercial Transformer Department in Shreveport, Louisiana, are proud to announce that, effective immediately, new GE regulators will be supplied with controls manufactured by Beckwith Electric. These new controls will be marked with the GE logo and identified as model number GE-2011.

According to Tom Jauch, Beckwith Electric's Manager of Application Engineering for Control Products and Systems, "The GE-2011 and Beckwith Electric M-2001B tapchanger controls are completely interchangeable-including any M-2001's on your system transformers and Beckwith Electric retrofits to other manufacturers' controls." The GE communication software package, designated as GE-2029, is also interchangeable-with Beckwith Electric's M-2029 TapTalk® Communications Software program. This means that either software program can be used with any GE-2011 or Beckwith Electric M-2001 on your system.

According to Jim Powers, Marketing Manager for GE Power Equipment Business' Commercial Transformer Department, "The new GE-2011 control is just what we have been looking for to complement the GE regulator product family. We have the technology leadership to keep us positioned to provide the best voltage regulation solution for today's needs."

As future enhancements and features are added to the M-2001B, they will automatically be included in the GE-2011 controls and all modifications available in the M-2001's will also be available on the GE-2011.

Beckwith Electric is the major supplier in North America of tapchanger controls for LTC transformers and a leader in providing replacement controls for both LTC transformers and voltage regulators. Providing controls to GE is a step closer toward the marketplace desire of having a universal tapchanger control.

For more information about the GE-2011 tapchanger control, contact your local GE Sales Engineer. For more information on Beckwith Electric's tapchanger controls, please contact your Beckwith Electric sales representative or Ted Murphy at (727) 544-2326 or by e-mail at tmurphy@beckwithelectric.com. ■

Circle **106** on Reader Service Card

Itron to Acquire Emobile Data Corporation

Itron Extends Utility Market Presence with Acquisition of Web-based, Wireless Workforce Management Technology

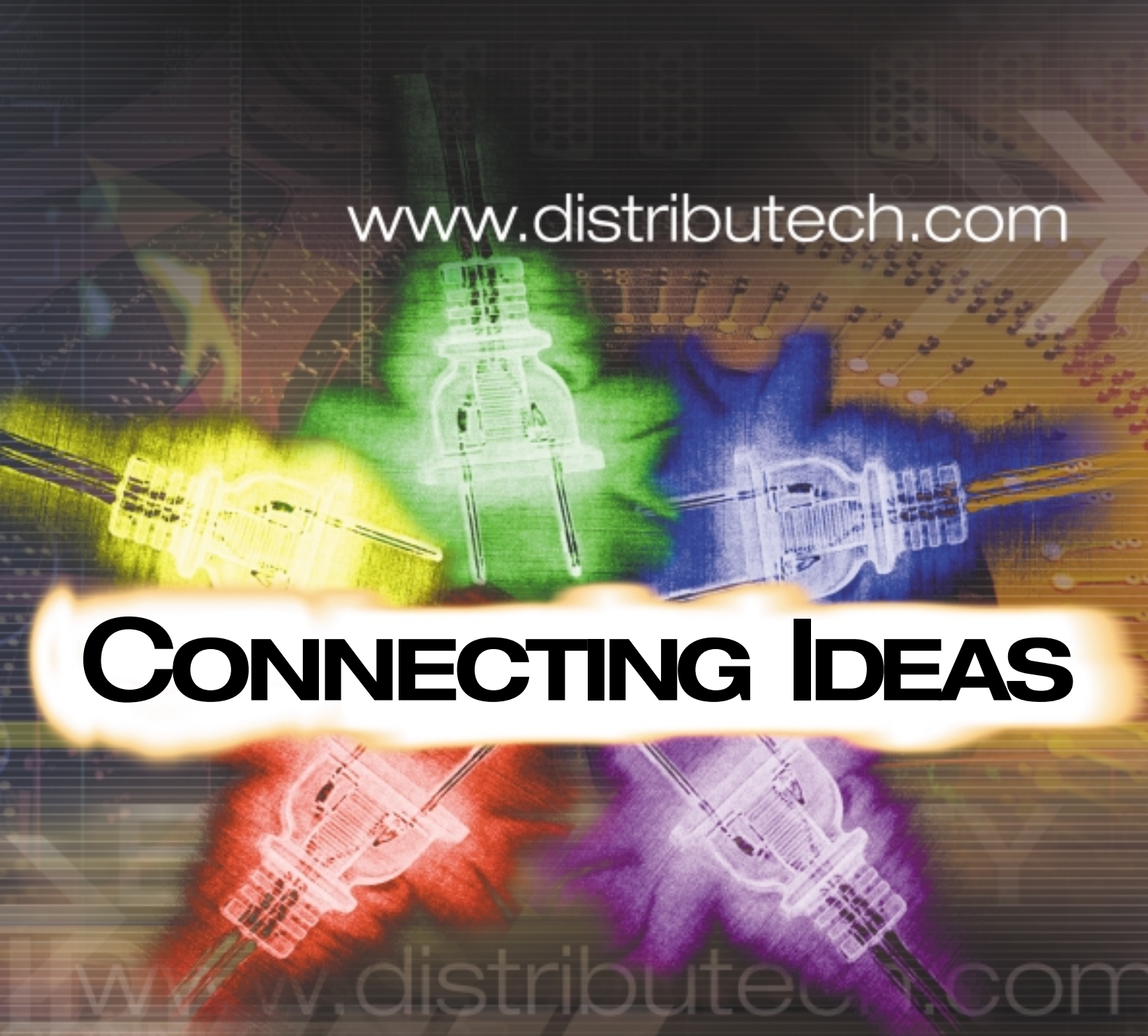
Spokane, WA – Itron Inc. (NASDAQ:ITRI), a leading technology provider and source of knowledge to the global energy and water industries, today announced an agreement to acquire eMobile Data Corporation (TSXVE: EMO & OTC BB: EMOKF) for $6.2 million in cash. eMobile Data is a leading provider of wireless, Web-based workforce management solutions for the utility industry. eMobile Data is a publicly traded company based in Richmond, British Columbia. The company's flagship product is Service-Link, a Web-based application for utility field service dispatching and mobile workforce management. By combining wireless communications with the Internet and real-time information exchange, Service-Link enables utilities to streamline and automate many of the processes associated with field service, including turn-ons/turn-offs, gas leak detection, credit and collections, meter services and trouble calls. An important feature of Service-Link is its ability to be configured to meet the dispatch and data collection needs of any utility, in less time and at less cost than other solutions on the market. ■

Circle **107** on Reader Service Card

CIS Conference Participant Survey Confirms Industry-Leading Status

By Gary M. Vasey

An electronic survey of 66 participants in the 26th annual CIS Conference held in Baltimore, June 9-12, 2002 by VasMark Group suggests that energy industry staff participate in the show primarily to obtain



Unprecedented change in the power industry has brought with it many new challenges for the modern electric utility. Energy providers must deliver reliable electricity via an aging infrastructure, much of which was built long before deregulation was ever a thought. In addition, the digital economy is requiring electricity to be more reliable and of a higher quality than ever imagined. For many energy providers, delivering reliable electricity is not just a challenge, but a crisis. The increased demands on energy delivery companies mean that the industry must develop and embrace new technologies.

With 10 tracks of conference sessions and over 200 exhibiting companies, DistribuTECH will highlight the newest technologies and ideas for the electric utility industry. For more information, visit **www.distributech.com**, or call **1-888-299-8016**.

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information and further education through the conference proceedings. In an industry where there are more and more tradeshows and conferences with declining attendance numbers, CIS conference is bucking the trend and VasMark Group wanted to understand why.

CIS conference is seen as a high quality and focused conference that is well attended and represents good value for time and money. According to the survey, the attendees came from a diversity of employment backgrounds including IOUs, municipal and cooperative utilities, ESCOs, software vendors, IT and IS consultancies, media and trade press, and business consultants serving the industry (Figure 1). Each of these groups had a different primary reason for their attendance; ESCO's and software vendors were more focused on developing business relationships with prospects, IOU delegates with the conference and, municipal and cooperative representatives with looking at software.

The participants also attended CIS conference to visit the tradeshow where they could investigate software offering and visit with the various vendors. For most groups of attendees, the tradeshow was a secondary adjunct to the actual CIS conference proceedings. The combination of the conference and tradeshow provided attendees with an opportunity to catch up with peers and colleagues and, for software vendors and ESCOs, it also provided a focused opportunity to build relationships.

On the tradeshow floor, CIS vendors were the most popular software vendors and were visited extensively by all groups of attendees. The vendors plainly understood the importance of the show, apparently saturating attendees with various forms of marketing pieces prior to the show. The survey data suggests that there were a good proportion of potential buyers of software among the attendees visiting with the vendors but that these prospective buyers were mainly representing municipal and cooperative utilities. Indeed, the survey supports other evidence that suggests that the IOUs have largely retrenched and withdrawn from the software market for this year and that it is the municipal utilities that are shopping for software.

The vendors that had the most booth visits among the respondents were SPL WorldGroup, Peace Software, Cayenta, SAP and Lodestar (Figure 2). SPL WorldGroup was also rated as providing attendees that visited with them with the highest value and had the most visits from the key buying group – the municipal and cooperative attendees. However, the survey suggests that many of the vendors had a good tradeshow and others, notably Peace Software, Advanced Data Systems, Lodestar and SAP, did well also in terms of visitor satisfaction.

Attendees plainly found their tradeshow visits useful because tradeshow hours and availability was one of the things most mentioned by attendees as an area for improvement with this year's show. There were apparently too few opportunities to visit the tradeshow floor and tradeshow hours overlapped too much with the conference proceedings. For those primarily seeking to attend presentations and workshops, it was difficult to find the time to visit the tradeshow floor. Delegates also want to make sure that the conference component of the show, which is their primary reason for being there, remains high quality and on target citing their need for high quality information dissemination as opposed to blatant sales pitches on the part of the vendors. Additionally, the delegates surveyed indicated that they would like to have more sessions at the conference around sharing CIS software implementation experiences.

What seems to set CIS apart from other tradeshows and conferences in the industry is the diversity and quality of the presentations and workshops focused on the CIS and CRM area for utilities. This is the major draw and it is the quality of attendees at the conference that drives the tradeshow component. Many other conference organizers have forgotten this salient point and have placed too much emphasis on the tradeshow component of their offering being, in the process, just another IT and technology show.

About the author

Dr. Gary M. Vasey is President of VasMark Group, Inc., a strategic marketing and marketing communications firm specializing in the energy industry. He routinely writes and speaks on energy technology trends and issues in the industry. For more information, go to www.vasmarkgroup.com. This article is based on the VasMark Group 2002 CIS Conference – Survey Of Attendees Report that is available from the VasMark website. ■

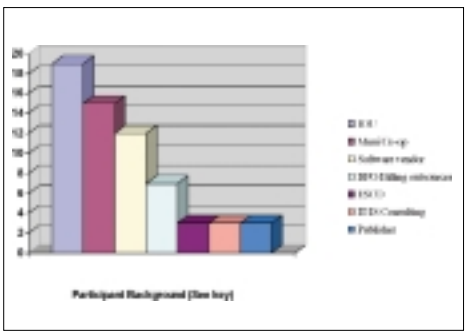

Figure 1: Responding attendees by type of company represented.

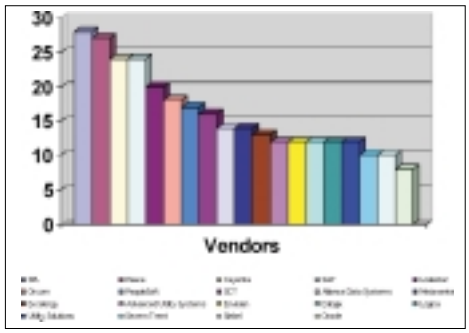

Figure 2: Most visited vendor booths

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U.S. patent granted for Inner-Tite® OneShot Meter Locking Ring

Holden, MA– Inner-Tite Corp.®, manufacturers of security devices for utilities, announces the granting of U.S. Patent 6,406,074 for the OneShot Meter Locking Ring. The patent applies to the unique design of the break-pin and end cap that are the means of securing the locking ring around the meter. The patented design of the break pin and end cap allow for establishing a secure union between the two components requiring a special key for removal.

The OneShot Meter Locking Ring is designed to secure ring style electric meter installations from unauthorized access or removal. Available in Carbon or Stainless steel the OneShot is designed for long term installations such as AMR Meters where frequent service and access are not required. Recognizing the growing AMR deployments, Vice President and General Manager John Mahaney developed the concept for a locking ring to secure these installations. The foremost design criteria required that the ring provide security and be able to be installed without a key. "As electric utility companies began AMR deployments, we responded to the need for a long term and secure device to lock these meters. Because of the use of outside contractors, we required that this product be installed without a key." Mahaney said. The resulting patented product has been well accepted by a growing number of utility companies looking to secure the AMR installations.

Please contact:

Scott Brenner: security@inner-tite.com

Inner-Tite is a registered trademark of Inner-Tite Corp. ■

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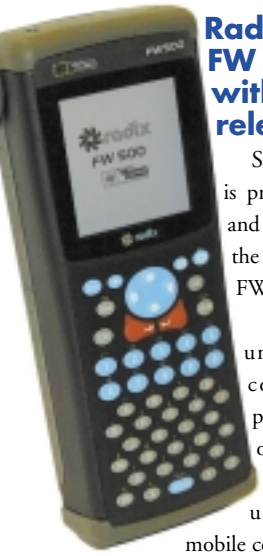


Radix expands its FW handheld family with the newly released FW500

Salt Lake City, UTAH—Radix is proud to introduce the newest and most advanced handheld to the ultra-rugged FW family, the FW500.

The Radix FW500 is a uniquely flexible handheld computer combining the power of a Windows CE™ operating system and integrated peripherals within an ultra-rugged and durable mobile computing package.

The FW500 can also support a full range of integrated peripherals including a thermal printer, laser scanner, image capture and PC cards. Radix's handhelds can withstand repeated drops onto concrete, are submersible and can operate below freezing and in extreme heat, making the FW500 ideally suited for meter reading, field service and AMR.

The new FW500 will be on display at AMRA Sept. 29-Oct. 2 at Radix's booth #511. Radix will also be showcasing its AMR capabilities at the show.

Radix Corporation is a leader in the handheld computer industry, producing ultra-rugged handheld computers, peripherals and portable printers. Their industrial grade handhelds are designed for the toughest data collection and mobile computing applications for harsh environments.

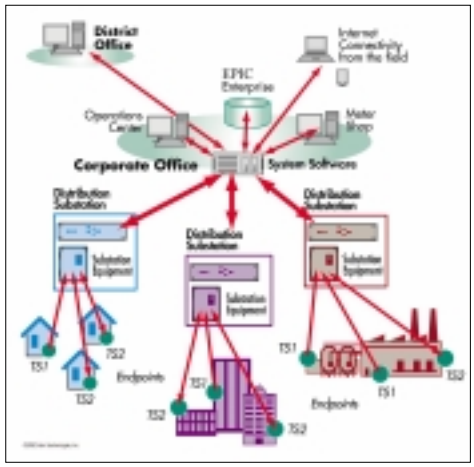
For more information on ultra-rugged handhelds, meter reading, field service, AMR solutions, portable printers and peripherals visit Radix online at www.radix-intl.com. ■

Circle **110** on Reader Service Card

Smarter Endpoints Are Just The Beginning With The New TS2 Bi-Directional Endpoint Information System From Hunt Technologies

Pequot Lakes, Minnesota – Today Hunt Technologies, Inc. introduced TS2 an exciting new Automatic Meter Reading System that brings the power of endpoint specific data to the entire utility organization. In addition to just bringing information in from the service area, TS2 also allows for simultaneous communications with each individual endpoint throughout the service area providing unparalleled bi-directional control.

TS2 is the heart of Hunt Technologies' EPIC – End Point Information & Control – solution taking their patented Ultra Narrow Bandwidth technology



to the next level providing simultaneous, bi-directional data flow. Each TS2 transceiver has its own unique frequency allowing every endpoint to transmit and receive continuously. TS2 is smart enough to know what each endpoint is doing, where it is switched and how it is configured accommodating dynamic distribution systems with ease.

"The flexibility built into the TS2 system means simple 'plug and play' operation for our customers", states Tom Anderson, COO at Hunt. "Because of our open architecture design, TS2 can interface with any number of data collection devices and software platforms unleashing the powerful information behind each endpoint throughout the entire utility organization. This means enhanced control for our customers and a difference they can see in their bottom line results."

Differences such as enhanced customer service through accurate billing and usage information, reduced system outages with improved system planning based on endpoint specific load analysis, improved maintenance capabilities providing quick identification of outages and swift response to restore service. TS2 provides access to a wealth of information to make more informed decisions leading to increased efficiencies throughout the utility.

To take a closer look at TS2 and the EPIC solution, visit Hunt Technologies on line at www.turtletech.com or call toll free 800-926-6254. You'll see that smarter endpoints are just the beginning.

To receive additional information contained in our TS2 Media Kit, simply contact Vicki Trees at vickit@turtletech.com. ■

Circle **111** on Reader Service Card

Probewell's MT-1/NT Field-Testing With Test Board Performance

Designed for field-testing of all forms (1S, 2S, 3S, 4S and 12SN) of single-phase meters, our new MT-1/NT now integrates two new very sophisticated elements. The first is a built-in internal solid-state synthesized AC current source that has the capability to supply any precise and regulated test current from 0.25 to 50 amps at both unity and 0.5 lagging power factor. The second is a new and improved true electronic watthour standard, which offers greater accuracy than the original MT-1. Tests performed by this unit are in full ANSI C-12 compliance.

Two accessories are available for the MT-1/NT. The METERCAM is the most advanced disk sensor available on the market today. More than a simple photoelectric sensor, it is a digital camera which picks up the disk revolutions automatically, is installed in seconds, needs no alignment, and is insensitive to light variations or direct sunlight. An optical pickup is also available to test solid-state meters. When used with the METERCAM or the optical pickup, all tests run automatically with High Load (HL), Low Load (LL), Power Factor (PF) and weighted error ratios being displayed at the same time.

Mainly used when it first came out as a means to settle high bill complaints, utilities have now started using the MT-1/NT for their mandatory population sampling of single-phase meters. By doing field sampling, many more meters can be tested per day with only the meters outside the determined accuracy range needing to come back to the shop (usually less than 10%). Furthermore, no modifications are required to the customers' billing information (meter serial number and register reading) thus removing another possible source of error.

On the market since 1996, both the MT-1 and the MT-1/NT are currently in use in a great number of American utilities large and small. Information is available online at: www.probewell.com ■

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If you are a customer-hungry vendor, expose your products or services to a receptive audience by sponsoring or exhibiting, contact: Craig Raeside, craig@spintelligent.com

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By:

M. Christian Simard
Manager,
Metering and Meter Reading
Hydro-Québec Distribution

AMR: Serving the Needs of Distributors and Customers

Hydro-Québec is one of North America's largest power distributors. The company serves more than 2.8 million residential, commercial, institutional and industrial customers scattered across 587,500 square miles. This represents a unique set of challenges, as the thousand or so employees whose work relates to metering and meter reading know all too well. Each year, Hydro-Québec's 500 meter readers crisscross the province of Québec to take 22 million readings — a task made all the more difficult by the vast distances involved and the remoteness of some metering facilities.

To keep pace with emerging competition in the North-American energy industry, Hydro-Québec has restructured its activities into four separate divisions. The creation of Hydro-Québec TransÉnergie (the Transmission Provider) in 1997, followed by Hydro-Québec Production (the Generator), Hydro-Québec Distribution (the Distributor) and Hydro-Québec Équipement (the Builder) in 2001, has allowed the company to adapt to new market realities. Automated meter reading (AMR) ties in directly with the new business-oriented approach the utility adopted in the late 1990s. In addition to solving meter accessibility problems and reducing operating costs, it allows customers to benefit from new services designed to meet specific needs. Today, more than half of Hydro-Québec Distribution's revenue, which totaled CDN$8.1 billion in 2001, stems from facilities equipped with AMR meters.

Loosening regulations to facilitate AMR deployment

Metering regulations are more restrictive in Canada than in the United States. Like other utilities, Hydro-Québec must meet the criteria defined by Measurement Canada, a federal agency whose mission includes approving new meters, periodically inspecting installed meters and accrediting private sector organizations to provide meter inspection and certification services on its behalf.

Under existing regulations, all meters must be approved by Measurement Canada before being put to commercial use, which limits the number of technologies and suppliers to choose from. The Measurement Canada seal guarantees that a unit meets applicable standards. To ensure full compliance with the agency's requirements and live up to its customers' expectations in this area, Hydro-Québec established a quality assurance policy in 1994 and revised it in 1997. Its quality system, rated one of the best among Canadian utilities, covers all aspects of meter quality assurance, from acquisition to installation on the customer's premises. The company also developed its own meter certification process, based on Canadian and international standards as well as specific climatic requirements. These initiatives are all designed to ensure the quality and reliability of metering equipment—a need that has become all the more pressing with the proliferation of new electronic meters in the marketplace.

To monitor the performance of installed mechanical and electromechanical meters, Hydro-Québec set up periodic inspection programs aimed at complementing existing calibration and inspection procedures. It is thus able to identify units that no longer operate properly and replace them as needed. When it comes to more advanced technologies, however, things are not quite so simple. For starters, instead of calling for the sample testing of meters as in the case of electromechanical devices, Measurement Canada regulations currently require that electronic meters be replaced systematically for calibration every six years. This represents prohibitive recurring costs for distributors, particularly in the residential sector.

To address this issue, the Canadian Electricity Association (CEA) has formed working groups with representation from consumer advocacy organizations, meter suppliers and utilities, including Hydro-Québec. Their task is to develop and recommend solutions more

in line with international standards, that would provide an alternative to the massive replacement of meters over short periods of time and thus reduce costs. Measurement Canada's initial response has been fairly positive, and its final decision is highly anticipated given the huge impact it will have on the modernization of Canada's installed meter base.

Furthermore, under provincial regulations, any improvement of existing facilities that entails significant additional costs must be submitted to the Régie de l'énergie (energy board) for approval.

The evolution of metering at Hydro-Québec

Hydro-Québec's meter base includes some 3.5 million devices, a third of which have been in operation for 25 years.

In the late 1980s, Hydro-Québec began installing remote-reading meters in all its major industrial customers' facilities for load research purposes. These customers were thus the first to benefit from the numerous advantages of AMR, namely greater reliability, higher accuracy and a better understanding of their consumption profile, which made it easier to manage their consumption and power demand.

In the mid 1990s, the company began experimenting with two promising technologies geared to a broader customer base as a means of dealing with accessibility and safety issues and improving efficiency. To date, it has installed Nertec phone home technology, which makes use of shared telephone lines, in 50,000 customer sites and equipped another 100,000 homes with AMRT RF meters that can be read by means of handheld devices.

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The late 1990s were marked by the emergence of competition in the wholesale energy market. Hydro-Québec responded by opening its transmission system to third parties and creating a separate division, Hydro-Québec TransÉnergie, to act as Transmission Provider. In return, it was granted power marketer status by the Federal Energy Regulatory Commission (FERC), allowing it to conduct transactions directly in the U.S. under regular market conditions. Then, in 2001, the company further unbundled its activities by creating three additional divisions: a Generator, a Distributor and a Builder.

In today's increasingly competitive marketplace, Hydro-Québec regards the deployment of advanced metering technologies as an opportunity to better meet customers' expectations. Specifically, these allow distributors to

- launch new services adapted to specific needs;
- promote better consumption management through the introduction of new rate options, tracking tools, etc.;
- gain a better understanding of customers' consumption patterns and adjust their service portfolios accordingly.

AMR also represents an ideal solution for managing energy transactions between Hydro-Québec's divisions, suppliers and wholesale customers.

From meter replacement to data management

In 1999, Hydro-Québec initiated a major program aimed at modernizing the metering equipment of its commercial, industrial and institutional customers. To this end, it implemented a state-of-the-art server platform designed to optimize meter reading and related data processing functions. The company opted for the Itron MV-90 multi-vendor data collection and analysis system, to which all remote-reading meters are connected. Users will soon be able to access metering data via the MV-STAR data management system and the MV-WEB Internet-based data display system, which make use of stringent security profiles to ensure data integrity and reliability. Once uploaded, consumption data are archived for billing and management purposes, based on predefined criteria. Hydro-Québec's processing centre currently manages data generated by over 10,000 business customers (including neighboring systems and private producers), which represents nearly 960,000 readings per day. By 2006, these figures are expected to reach 66,000 customers and 2.5 million readings per day. The collected data constitutes strategic information, both for Hydro-Québec and its customers.

Key benefits which are expected from the progressive deployment of this technology include:

- optimized operations;
- fewer data management and transmission problems and processing constraints;
- secure, upgradable tools with built-in simulation and analysis functions making it easier for customers to track and manage their consumption;
- the ability to support larger volumes of data;
- the ability to adopt the best industry practices.

Extending AMR to the entire customer base

As mentioned earlier, Hydro-Québec's 300 major customers were the first to benefit from AMR and related services because of the complexity of their load management requirements. By 2003, all first-generation AMR devices will have been replaced by state-of-the-art meters connected via dedicated telephone lines. The main technologies adopted for this clientele are the Schlumberger Quantum® Q1000 Electronic Multimeasurement Meter and the ABB ION® 8500 Power Quality/Revenue Meter.

As part of the modernization program launched in 1999, Hydro-Québec also plans to gradually extend AMR to a larger number of commercial, institutional and industrial (CII)

customers and, to a lesser degree, residential customers. By 2004, it hopes to install General Electric kV® or ABB Alpha® meters in the facilities of 22,000 customers with annual electricity bills in excess of $500,000. Power and consumption data will be recorded every 15 minutes and uploaded to the company's processing centre each night via dedicated telephone lines.

Some 40,000 other business customers with a power demand greater than 50 kW, whose meters must be read on a monthly basis under existing regulations, will be issued similar units, as will new and hard-to-reach customers. To keep costs down, communication links other than dedicated lines are being looked into for this customer segment, and facility upgrades will be done as part of regular operations.

On the residential side, Hydro-Québec continues to bank on AMR to make efficiency gains and solve accessibility and safety issues. In addition to the 150,000 homes already served by Nertec phone home technology or AMRT RF meters, other residential sites will be upgraded over the next two years as part of a pilot project aimed at testing new RF technologies, such as fixed and drive-by systems. The results of these projects will help shape the company's future meter upgrade strategies.

Campaigns designed to encourage customers to submit their own readings by mail, by phone or online are also being considered, along with improvements to existing consumption estimation methods.

A technology with multiple benefits

Hydro-Québec intends to make the most of the possibilities offered by AMR in terms of new products and services, metering capabilities and distribution system management.

More services to choose from

With AMR, Hydro-Québec can monitor its customers' consumption profiles more closely and adapt its service portfolio accordingly. Here are a few of the services it has already introduced:

- **Reading date selection –** Customers can have their meters read on the date(s) of their choice, which means that they can schedule their billing dates to fit with their budgeting requirements.
- **Aggregated billing –** Multiple account holders can choose between various aggregation options to simplify their accounting.
- **Consumption tracking –** Customers can access their consumption data and track their usage online.
- **Load management –** A signal is transmitted to the customer when he is about to exceed his contract power. This allows him to shed part of his load and thereby avoid paying optimization charges.

All these services translate into greater flexibility and added value for the customer.

Greater reliability and accuracy

The number of erroneous readings has dropped significantly due to the high accuracy of electronic meters and the inherent reliability of AMR compared with manual readings. Moreover, the remote reading of hard-to-reach sites has led to a decrease in consumption estimates. This in turn has resulted in greater billing accuracy as well as fewer complaints and billing adjustments. In addition, the fact that readings can be taken more frequently opens up new possibilities, such as real-time billing.

Optimized distribution system management

AMR also provides for better system management. For example, remote-reading meters can be programmed to detect outages as soon as they occur. Service can thus be restored more quickly and efficiently, leading to a reduction in the system average interruption duration index (SAIDI). To this end, Hydro-Québec plans to install remote-reading meters in key substations and has already implemented a program to modernize the metering equipment in its interconnection facilities. Remote reading will also facilitate peak load management and help the company avoid power disturbances on its system.

In short, AMR paves the way for an optimization of the power supply, new consumption management capabilities and rate options, real-time billing and enhanced fraud detection. However, it is only by developing know-how and promoting innovation in this area that utilities will be able to tap its full potential. ■

Previous technology

First-generation AMR equipment serving major customers. Active and reactive power were recorded separately by mechanical meters, then added on location by means of an electronic summator programmed specifically for the site. The load profile was recorded by the register. Mechanical output relays transmitted data to the customer.

New technology

The new metering device is a computer that measures both active and reactive power as well as several power quality parameters and records the load profile. Summation is performed virtually by the MV-90. Relays with optically isolated outputs are used to transmit data to the customer. The meter is connected to the server via an external link which can easily be replaced as communication technologies evolve.

Cost-effective AMR Technologies Reach New Territory

Optimizing Efficiencies for the Small Commercial and Industrial Account

By:

Jim Cunningham
Marketing Manager, ABB Inc.
and
Marc Keyes
Senior Marketing Manager
Itron Inc.

In today's market, cost-effective automated meter reading (AMR) technologies exist for two major segments—residential and large commercial and industrial (C&I). A noticeable gap exists however for the small C&I segment consisting of convenience stores, service stations, fast food franchises, and other small commercial facilities. Although AMR solutions exist for the small C&I segment, implementing the technology has been cost-prohibitive for the utility. Until now, AMR solutions for the residential segment have not had the capability to handle the demand and time-of-use (TOU) requirements for the small C&I segment.

This article addresses the newly emerged, small C&I segment and the challenges and opportunities facing it. These challenges exist in the emerging deregulated market, as well as for utilities operating in the more traditional energy market. Currently, the market is demanding an increase in the quantity and quality of meter data as well as an increase in the speed at which that data is collected and shared. So how will a utility meet these demands for their small C&I accounts? Are AMR technologies really practical and economical for this market segment?

This article explores why the small C&I segment has been underserved by AMR technologies and how utilities can implement cost-effective AMR solutions for this segment. Learn how existing technologies have been integrated to offer a new radio-based AMR solution for the small C&I segment. Technical challenges encountered during development, such as having the meter calendar perform self-reads and handling multiple, radio-based endpoint device serial numbers have been addressed and overcome. A cost-effective AMR solution for the small C&I segment is now attainable for a utility. An integrated technology solution exists that offers functionality for time-of-use metering, self-initiated demand resets, an advanced meter calendar, new functionality for walk-by, drive-by and fixed network reading systems, and retrieval of data directly from solid-state meter registers. And, all this is possible without making any code modifications to the utility's existing CIS system.

The Evolving AMR Market

AMR technologies have shown a lot of promise but have not achieved total market saturation as expected. Five years ago, when AMR was less prevalent, the market was divided into two very unique segments – residential and C&I. The residential segment required very minimal information on a monthly basis, whereas the C&I segment required more functionality such as demand, TOU, reactive, and four-quadrant metering. Meter information for the C&I segment was needed for load profiling, often requiring hourly data to be collected daily. The C&I segment also wanted information on power quality monitoring. As the market evolved, three distinct segments emerged rather than two. The third segment, shown as the gap in the market in Figure 1, represents the small C&I segment currently underserved by cost-effective AMR technologies.

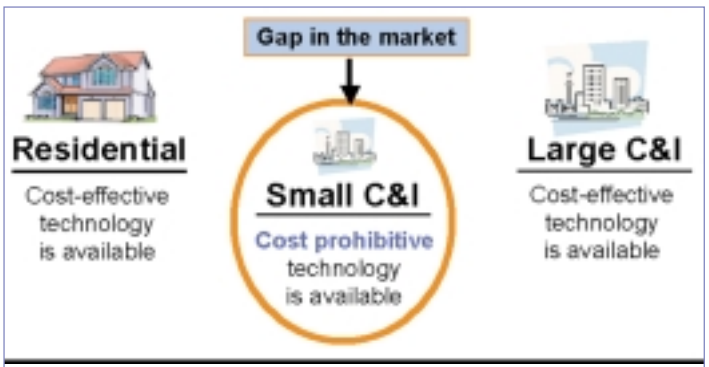


Figure 1 – The market segments and AMR technology

Table 1 shows each market segment and their associated requirements.

Market Segment	Requirements
Residential	• Minimal information on a monthly basis
Large C&I	• Demand rate • TOU rate • Reactive rate • Four-quadrant metering • Load profile information, hourly data on a daily basis • Power quality monitoring
Small C&I	• Demand rate • Simple TOU rate

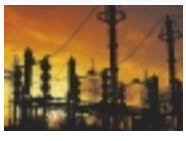
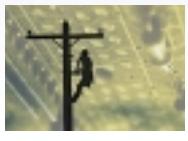
Table 1 – Market requirements

Table 2 shows an estimate of the number of meters in the large and small C&I segments, and the market percentage and revenues of each.

Market	No. of Meters	Percentage of the total C&I market	Percentage of revenues from C&I accounts
Large C&I	2 – 3 million	20-30%	80%
Small C&I	7 – 8 million	70-80%	20 – 30%
Total	10 million	100%	100%

Table 2 – Sizing up the C&I market

Currently, utilities have employed very large, mobile, AMR routes, some encompassing over a million meters. Within these saturated areas are small C&I accounts that are geographically disparate in the service territory. In most cases, utilities must still send meter readers to manually read these small C&I accounts, even though these accounts fall directly on an existing AMR reading route for a drive-by or walk-by system. It is not cost-effective for utilities to reach these accounts.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Taking into consideration the remoteness factor and the distance between each meter, a single meter read may exceed $2.00-$3.00 per month, a significant expense for any utility. Given that meter readers can visit up to 800 meters a day, reading these meters is cost prohibitive. So how can utilities cost-effectively collect demand and TOU meter data from small C&I accounts in far-reaching service territories? How can utilities reduce the number of estimated reads for small C&I accounts? Can current technology be integrated to offer a cost-effective AMR solution for the small C&I segment?

Integrated Technology to the Rescue

The AMR solution for the small C&I segment is the integration of a TOU, solid-state meter and standard consumption messages from a radio-based endpoint device. This offering allows utilities to gather TOU and demand data from small C&I accounts as part of an existing AMR system and an existing route, whether it's a handheld, mobile or network reading system.

The major driving force in developing an AMR metering solution for the small C&I segment is that the implementation must be cost-effective for the utility. To achieve this, it is necessary to use as much standard equipment as possible, thus reducing the utility's costs associated with new designs.

In order for the solution to be a viable product in the marketplace, two major challenges need to be overcome. One of those challenges is having a meter calendar function that performs self-resets. The other challenge is to handle multiple radio-based endpoint device serial numbers associated with one meter serial number, without any code modifications to the utility's CIS system.

The components required for an integrated solution include:

- TOU meter to provide timing for self-initiated reads
- Advanced calendar demand reset schedules
- Transmission of additional status information
- Full functionality for walk-by, drive-by, or fixed network systems
- Retrieval of data from solid-state meter registers
- Handling multiple radio-based endpoint device serial numbers without code modification to the utility's CIS system

The Meter Calendar

Utilities require flexibility with their read schedules. Some utilities want readings on a recurring basis so that the meter calendar never expires. Others have needs that don't adapt to recurring schedules, where the meter must be configured to do a demand reset on a given date. Utilities may want or need to spread out their reads, so flexibility is key.

The simplest way to implement the calendar reset feature is to program each meter with a radio-based endpoint device to do a demand reset the first day of each month. Unfortunately, that's in conflict with most utilities' operational practices. They might not be able to read all the meters fast enough to process their scheduled bills in accordance with regulatory requirements. Or they might have labor issues where they have to spread their readings out over the month or their customers might require unique billing days.

The other extreme is a more complex approach where the meter is programmed with 255 different dates for each monthly demand reset. That means the meter doesn't have to be visited for over 21 years to update the calendar. All these methods provide the same ultimate functionality to utilities – it's just a matter of what is required to meet their internal business processes.

To process meter data, the meter reader approaches the meter, takes both energy and demand readings, resets the demand, notes that the demand is reset, and then moves on to the next meter. In an ideal scenario, the radio device would have a dialog with the meter. For example it would communicate, "Send your readings. Thank you, I received your readings. Now please reset your demand. Thank you, I have your demand reset verified. See you again next month." But since the reading system is a one-way radio device, not a two-way device, it is impossible to do that.

To overcome this obstacle, the meter is equipped with an internal calendar and is configured to read itself on a date preset by the utility. The walk-by, drive-by, or fixed network reading system can then retrieve the readings. A requirement of this solution is that a TOU meter is used even though only demand functionality is provided. When the meter reads itself, it has to know what time it is, therefore, TOU functionality is necessary for the clock function within the meter.

Handling Multiple Serial Numbers

Another key challenge in developing an integrated solution is handling three separate radio-based endpoint consumption messages that send three different types of data back to the head end system. Using three radio-based endpoint messages provides more tamper and power quality information compared to using a standard radio-based endpoint device. This capability represents an enormous value to the utility.

Basically, a utility's CIS system is designed to handle one meter with one associated radio-based endpoint device message. With three radio-based endpoint device messages and a meter, the challenge is in handling four serial numbers. Physically there's a single circuit board, but it sends out three separate messages with different data elements, such as energy or demand data or date of last reset. With a radio-based endpoint device, the reading head-end system creates three records in the system file, see Figure 2.

- Primary radio-based endpoint device ID
- Primary radio-based endpoint device ID+1
- Primary radio-based endpoint device ID+2

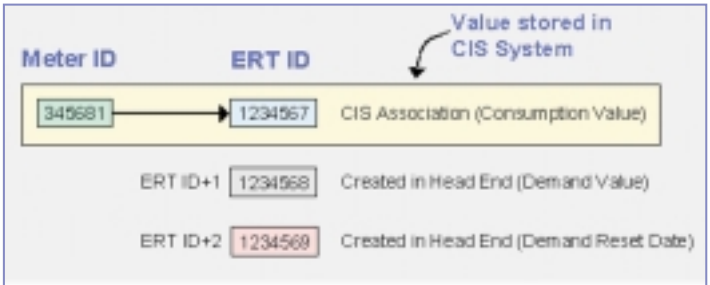

Figure 2 – Triple message data flow – demand functionality

The reading systems must be configured to automatically handle the association of three billing values from each radio-based endpoint device to a single primary radio-based endpoint device identification number. This capability seamlessly handles multiple serial numbers and eliminates major, costly, and difficult modifications to the utility's CIS system – saving the utility both time and money.

Status Flags

Information about site conditions is very important to the utility. If this type of integrated technology solution is deployed in the field, as with any AMR device, it is not necessary to visit the meter each month. This eliminates having a meter reader do a manual reset or visually read the meter. It also means not having a meter reader witness an error or warning code on the meter display or notice that a seal has been broken, indicating tampering.

The radio-based endpoint device captures status information from the meter and then transmits the status over a radio frequency to the utility. With this information, a utility can determine whether to send someone out to the meter to investigate or replace the meter. See Figure 3 for status flags generated by a TOU solid-state meter and a radio-based endpoint device.

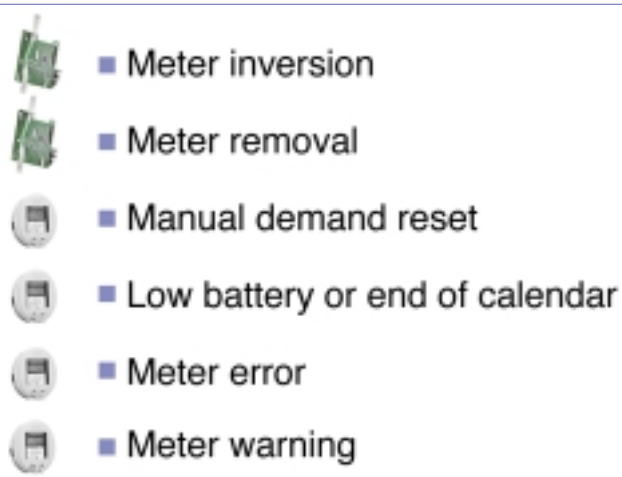

Figure 3 - Status flags generated by meter and radio-based end-point device

Completing the Business Case

Until now, a cost-effective AMR solution has not been in place that meets the business needs for the small C&I segment. Previously, it was easy enough for the utility's business case to justify handling the residential accounts, but they still had to maintain a base of meter readers to go out and read the small C&I accounts. With the residential market saturated, the widely dispersed small C&I accounts presented a huge expense for the utility. Now, utilities can justify their business case with a cost-effective integrated technology solution for AMR.

Those electric utilities that have deployed AMR systems can now populate holes in routes with small C&I accounts and reach these accounts as part of the same meter reading route. For those utilities that have not implemented AMR systems, an integrated technology solution is more attractive because their needs are met with a single system. See Figure 4 for a representation of the integrated solution's architecture.

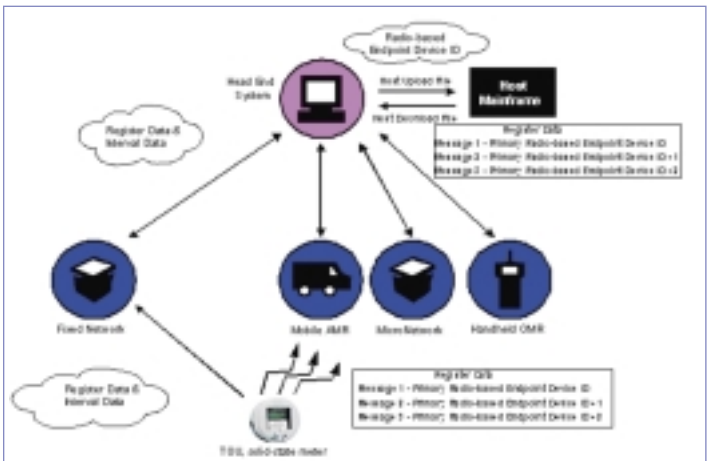

Figure 4 - Architecture of integrated solution

While AMR implementation for the small C&I segment has yet to be fully optimized, an integrated technology solution now bridges the gap in the market to deliver cost-effective meter reading efficiencies for the utility. It fulfills a key value proposition for the utility—collecting all the data in one sweep without having to make multiple or extra visits to the meter. After all, the purpose of AMR is to eliminate the need to visit the meter, and that's a huge efficiency gain for the utility. ■

About the Authors

Jim Cunningham is a marketing manager for ABB's electricity metering business in Raleigh, North Carolina. He is responsible for marketing electromechanical meters and integrating ABB metering products into various communications systems. Jim is a liaison between ABB and AMR systems providers. He worked at Westinghouse prior to ABB and has 35 years of combined experience at both companies holding positions in design engineering, engineering services and marketing. For further information, contact jim.c.cunningham@us.abb.com or 919-212-4800.

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By:

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Beyond Revenue Metering

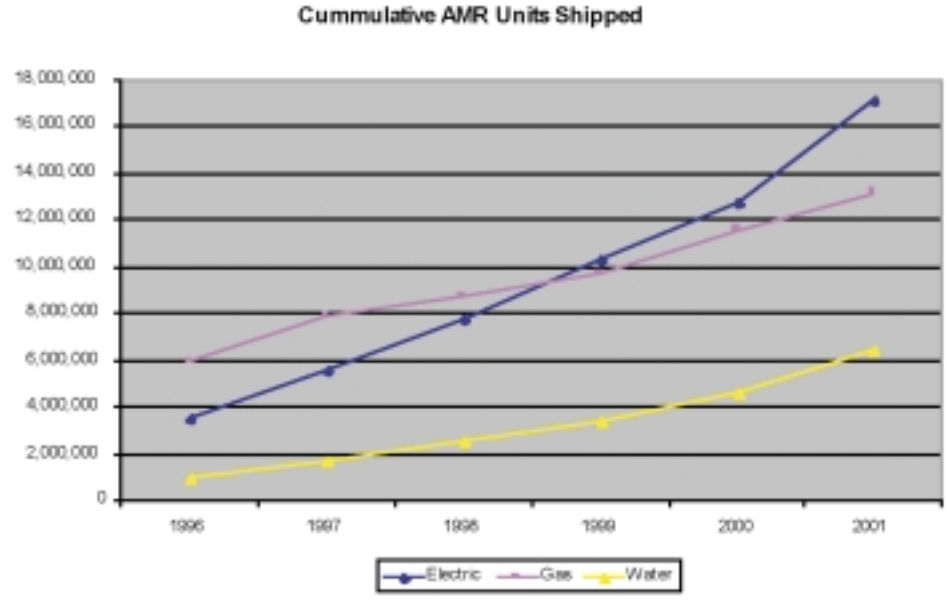
– A New Age for Automatic Meter Reading

While the concept of Automatic Meter Reading (AMR) is not new, many factors have created a double-digit growth rate among electric utilities. Tracing the roots of the mass scale AMR systems, however electric utilities were not the initial adopters of this technology. The initial efforts and the creation of this industry was lead by water utilities, with the Hackensack Water Utility being the first to deploy technology system-wide to read meters. Likewise, it was a handful of passionate people involved with this effort, guided by Donald Schlenger of Cognyst Consulting, who shared the vision of promoting standards and education that lead to the formation of the Automatic Meter Reading Association (AMRA).

After nearly two decades of existence, the AMRA is the only not-for-profit membership association dedicated to promoting advanced metering, data management and communications technologies worldwide. It serves as an information resource to enable users and suppliers to stay informed about emerging technologies and products, equipment compatibility, industry standards, relevant legislation and regulatory initiatives, AMR trials and deployments.

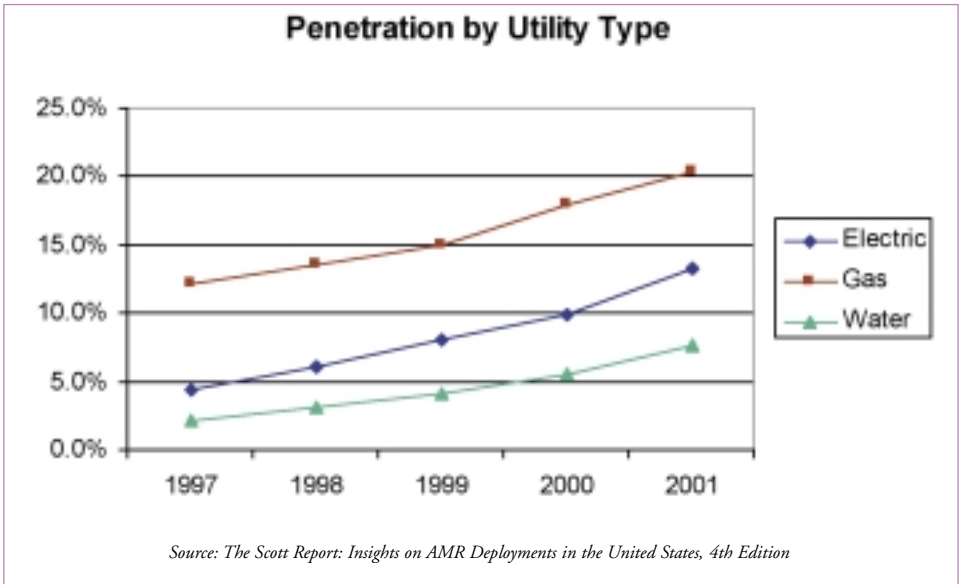
Within the business model for justification of AMR, there are common drivers, such as the reduction of estimated readings, increasing the accuracy of readings, labor and other cost reductions that AMR brings that form the core baseline economic factors. Yet, some unique need areas within the electric utility have created a focused effort to incorporate AMR as a critical element of a business redefinition process.

According to the Scott Report on AMR Deployments in North America, the total number of AMR annual shipments to electric utilities rose significantly in 2001. **This is shown graphically in Figure 1.**



Source: The Scott Report on AMR Deployments in North America, 6th Edition

Figure 1. In 1999 there were more units shipped to electric utilities than to either gas or water utilities.



Source: The Scott Report: Insights on AMR Deployments in the United States, 4th Edition

Figure 2. The penetration of AMR by the various utilities indicates strong growth rates in all sectors.

While the absolute number of units indicate more shipments to electric utilities, there is a higher percentage of the gas population that has AMR. **See Figure 2.**

What are some of the key drivers that are creating this growing interest and acceptance of AMR in electric utilities? Some of these value added features beyond monthly revenue reading include a renewed interest in Demand Side Management (DSM), new tariff structures for residential time of use, web presentment of energy information, and a focus on Customer Relationship Management (CRM)

Demand Side Management

Historically, in the height of the oil-embargo during the 1980's, there was a significant effort to develop energy conservation. Public utility commissions, government and utilities alike collaborated on initiatives to manage power production and distribution to reduce our dependence on foreign oil.

Yet the DSM days of two decades ago have not totally waned, according to the EIA: "In 2000, 962 electric utilities report having demand-side management (DSM) programs. Of these, 516 are classified as large, and 446 are classified as small utilities. This is an increase of 114 utilities from 1999. DSM costs increased to 1.6 billion dollars from 1.4 billion dollars in 1999. Energy Savings for the 516 large electric utilities increased to 53.7 billion kilowatthours (kWh), 3.1 billion kWh more than in 1999. These energy savings represent 1.6 percent of annual electric sales of 3,413 billion kWh of reported sales to ultimate consumers in 2000. Actual peak load reductions for large utilities decreased in 2000 to 22,901 megawatts. Potential peak load reductions of 41,369 megawatts were a decrease of 2,201 from 1999. In 2000, incremental energy savings for large utilities were 3.3 billion kWh, incremental actual peak load reductions were 1,640 megawatts, and incremental potential peak load reductions were 3,162 megawatts."

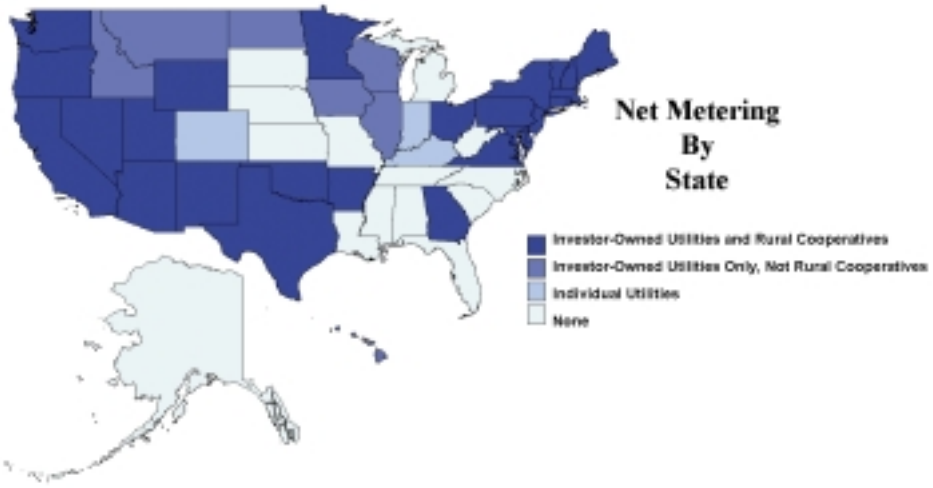
This renewed focus on DSM (Load Reduction, Peak Shaving, or Load Shifting) is not just to reduce our demand on oil but to help maintain a balance between supply and demand. While each of the initiatives had roots in the energy crisis, many of their results have direct applicability today.

Load Reduction – these initiatives drive the load curve down, lowering the overall consumption. Some of the results of this effort included the evolution of energy efficient appliances, improved lighting units, such as compact fluorescent and insulation/window programs. In 1992 the US Environmental Protection Agency (EPA) introduced ENERGY STAR as a voluntary labeling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions. Later, in 1996, the EPA partnered with the US Department of Energy for particular product categories, such as computers, copiers, electronics and other consuming devices. Recently the EPA has extended the ENERGY STAR branding to commercial, industrial and residential properties.

According to information from ENERGY STAR, homes that bear the logo have been designed to achieve a 30% savings for heating, cooling and water heating when compared to standard construction practices. This equates to an annual energy savings of between $200 to $400 annually. According to the National Energy Policy Act of 2001, 4.8% of disposable family income is spent on energy

Peak Shaving – Since mass storage of electricity has not yet been perfected, capacity must be provided to support peak consumption and demand. With the advent of distributed generation capabilities, many large users are beginning to use these reserves to offset peak demand charges. To achieve accurate measurement of the utility supplied energy and self provided energy use, a majority of states in the US have rules that govern the use and permission of Net Metering.

According to US Department of Energy Office of Energy Efficiency and Renewable Energy, "Net Metering allows the electric meters of customers with generating facilities to turn backwards when the generators are producing energy in excess of the customers' demand, it enables customers to use their own generation to offset their consumption over a billing period. This offset means that customers receive retail prices for the excess electricity they generate. Without net metering, a second meter is usually installed to measure the electricity that flows back to the provider, with the provider purchasing the power at a rate much lower than the retail rate.



Source: US Department of Energy Office of Energy Efficiency and Renewable Energy

Figure 3. Net Metering status shows that a majority of states have policies in place.

Net metering is a low-cost, easily-administered method to encourage customer investment in renewable energy technologies. It increases the value of the electricity produced by renewable generation and allows customers to "bank" their energy and use it a different time than it is produced giving customers more flexibility and allowing them to maximize the value of their production. Providers may also benefit from net metering programs because when customers are producing electricity during peak periods, the system load factor is improved."

As of late summer 2002, thirty six (36) states had policies in place to deal with the concept of net metering. **This is shown in Figure 3.**

Load Shifting – While the concept of net metering allows the use of exisiting meters,it is expected that the impact of this initiative will be a need to upgrade meters and the communications between the utility and end user.

New tariff structures and services for residential customers

So much of our behavior is driven by time. From the morning alarm clock to the 6:18 am train, our life is oriented around time-based activities. There are many programs that have successful linked an economic benefits with a shift in time of use. For example:

On the New Jersey Transit northeast rail line serving New York City, the off-peak transit rail rate is 25% less if travel does not take place during the peak commuter period between 5:45 am and 10:00 am inbound and 4:00 pm to 8:00 pm outbound.

Travelers who pay cash at the tollbooths on the New Jersey Turnpike have a flat, time insensitive rate, based on distance traveled. E-Z Pass transponder travelers automatically participate in a time of use plan. Using this electronic tag, the toll rate is 12% less than the cash rate during the peak times of 7:00 am to 9:00 am and 4:30 pm to 6:30 pm weekdays. Users during the off peak period and realize a 20% discount.

On a typical cellular calling plan, calls placed from 9:00PM to 6:00 am Monday through Friday and from 9:00 pm Friday to 6:00 am Monday during the "Weekend and Evening" rate pay and are less than 50% less than the on-peak rates.

The overall consumer acceptance of a time of use incentive/penalty approach appears to be growing, especially when the ability to modify behavior can result in a tangible financial benefit. Yet, there has been little penetration of Electric Residential Time of Use in the United States.

In a recent study performed for a Fortune 100 firm, RJC-Consulting, LLC surveyed over 100 electric utilities covering the top 50 utilities that are investor owned (IOU's) and at least one utility from each state to determine their current residential Time of Use (RTOU) program and the number of participants in these programs. Except for a few major initiatives, the percentage of customers currently participating in these programs, was less than 1%. A number of reasons for this lack of acceptance was cited in the report. They included: a lack of promotion of these on the part of the utility; the structure of the program itself, including the start-up costs, and cost spread between peak and off peak rates and the incremental cost of the TOU meter itself that was passed on directly to the consumer. All these factors contributed to the lack of incentive for consumers to justify a change from a flat rate to a TOU rate. Virtually all the programs evaluated did not give the customer any real-time indication or tangible dollar amount one could save by shifting load to an off peak time.

Energy efficiency comes into play often when individuals are making decisions about certain products. However, the energy consumption savings projected over the life of the product can confuse many consumers. This is especially true when they are forced to evaluate the future value of an investment they must make today with little information about their historical usage. Saving $15 a month on a new refrigerator must be compared to what is being spent today on the same appliance, and that information on an individual element is at best estimated or projected. The energy consumption sheets on products have a value that is similar to the estimated miles per gallon displayed on the specification sheet of a new vehicle. Actual results may vary based on individual consumer use habits.

Obviously, when the cost of energy is high, the trend would be that consumers would buy more efficient products. In a stable energy cost environment, unless there is a way to inform customers about the actual cost of the energy used by the device, the weight of the a higher efficiency choice argument may be minimal. In a volatile energy cost market, consumers need receive current electricity costs in order to make efficiency decisions or to make adjustments to their energy use to take advantage of any time of use service that is available.

Further, there are few devices that automatically modify their operational characteristics based on the actual time of day. When non time responsive loads are operated in a TOU environment, the load is averaged across the off-peak and on-peak rates. Often the higher cost of on-peak electricity masks any savings that may be realized during the off peak period. Therefore, consumers may not recognize the benefits of investing in technologies that operate or shift load to off-peak consumption periods or to ensure that the clock within the device is kept accurate.

The advanced services provided by more sophisticated metering systems can bridge this gap by providing both time sensitive energy use information to consumers and by being the gateway to network devices that measure, calculate and display energy costs. Often this is an element of an AMR system that is difficult to quantify in an economic model.

Information grade metering can complement revenue grade metering

While the growth of AMR for revenue metering is apparent, an underserved area of AMR in the information grade or submetering arena. Although once perceived as a threat to the metering department, these element monitoring devices and units are now gaining new respect.

Figure 4. A number of new services can be offered with AMR

Just as 15 minute energy interval data allows facilities to use energy information systems to profile aggregate usage, the use of submeters allow the display of actual energy profiles for departments, subsidiaries, divisions or even elements within these organizations. The new thrust of activity based costing initiatives will drive greater demand for intelligent, networked and disaggregated meter data.

Moving from meter or service locations to customers.

Metering has migrated from a revenue and billing activity to an holistic business enabler. The additional plane of services that an effective AMR system now brings permits utilities to provide additional value added services to their clients. By augmenting monthly revenue reading with interval reading and profiling, customer information systems can be updated to move toward Customer Relationship and Marketing systems. This new addition of depth of services is shown in Figure 4.

Conclusions and Predictions

Based on the trends and expectations of this industry, it is projected that the new initiatives will be instituted or existing processes will modified:

- AMR will continue to experience rapid growth and deployment as new services are provided to the mass market;
- Advancements will be made to make Time of Use more attractive and beneficial to residential consumers;
- Devices will migrate toward including next generation energy intelligence, including time of use responses, and individual kilowatt hour meters that will be networked within a premise;
- More intelligent communications between the utility and the end user will permit interaction among the utility, consumers and devices;
- Imbedded intelligence will grow enabling more holistic energy environments.

AMR may not be the primary driver for all of these, but will clearly be an integral enabler that permits these services. ■

About the Author

Ronald J. Chebra is the President of RJC Consulting, L.L.C., a Management Consulting Firm providing strategic advisory services to utilities, energy ventures, vendors and suppliers of services to the energy industry. He is the Chairman of the Strategic Leadership Council of the AMRA and is their immediate-past President.

By:

Marzio P. Pozzuoli
RuggedCom Inc.
Industrial Strength Networks

The Need for "Substation Hardened" Ethernet Switches

Introduction

Trends in electric utility automation, specifically substation automation, have converged upon a common communications architecture with the goal of having interoperability between a variety of Intelligent Electronic Devices (IEDs) found in the substation. This initiative was begun back in the late 1980s driven by the major North American utilities under the technical auspices of EPRI (Electric Power Research Institute). The resulting standard which emerged is known as the Utility Communications Architecture 2.0 (UCA2.0). This architecture, which is now being adopted worldwide by utilities and IED vendors alike, has as its underlying network technology - Ethernet.

1.0 Ethernet in the Substation

The proliferation of Ethernet capable IEDs used for substation automation has increased markedly in the past several years. There are currently nine vendors of protective relaying devices alone offering fiber optical Ethernet communications with their IEDs. Vendors of meters, RTUs and PLCs used for substation automation, mirror this trend. However, a key technological obstacle which hinders the full scale embrace of Ethernet by end users is the availability of "substation hardened" Ethernet Switches (i.e. Switched Hub) which are necessary to provide the Ethernet network backbone into which all networked IEDs connect.

2.0 What Does It Mean to be "Substation Hardened"?

"If you're going to connect your mission critical substation IEDs to a substation Ethernet LAN - shouldn't that LAN be as rugged as the IEDs connected to it?" This has been a common concern heard amongst engineers involved in substation automation.

2.1 Fiber Instead of Copper

Back in 1997, the Electric Power Research Institute (EPRI), commissioned a series of tests [1] conducted by engineers from American Electric Power to look at the viability of using Category-5 (CAT-5) unshielded and shielded twisted pair copper cable for connectivity in an Ethernet based substation network. The CAT-5 cabling was subjected to fast electrical transients in accordance with IEC 1000-4-4, the precursor to IEC 61000-4-4. This was done since it represented likely conditions in a substation during a fault (i.e. a power system short circuit) condition when the substation network would be required to perform at its "real-time, mission critical" best. The results of this testing clearly showed that copper cables, shielded or unshielded, were unsuitable for performing real-time control over the substation LAN. To quote the summary conclusions of the report:

"These tests clearly demonstrate that shielded and unshielded twisted pair cables are not suitable as LAN media UCA substation automation. The results clearly show that fast electrical transients have an adverse impact on ethernet communications using these cables. While protocols at various layers can mitigate the adverse effects, these cables does not exhibit the immunity to fast electrical transients required to support protective "tripping" over the LAN. It is recommended that a fiber optic media be used to connect all Intelligent Electronic Devices engaged in protection in a UCA substation." [1]

Fiber optical media is the only reliable media for networking IEDs in a substation.

2.2 Too hot, too cold...and no fans allowed!

The environmental conditions found in substations can straddle the extremes of the surrounding climatic conditions. As is often the case, the substation control room or IED kiosk may be sheltered from the elements (i.e. wind, rain and snow) but there are often no climatic controls with respect to temperature or humidity. Thus IEDs within these environments must be capable of operating reliably across a wide range of temperatures and humidity. To add further to the challenge; using cooling fans is undesirable because of the low reliability of rotating mechanical parts. While fans may be acceptable in an office LAN they are most definitely unacceptable in a substation LAN that is the backbone of a mission critical protection and control system. Substation IEDs, such as protective relaying devices have operating temperature ranges:

1. -25 to 55°C in accordance with IEC 60255-6 (1988) or
2. -40 to 85°C in accordance with IEC 60068-2-1&2.

Typical commercial grade Ethernet switches have operating temperatures from 0 to 45°C with the aid of cooling fans. This is more than acceptable for the office environment but a far cry for what is required in the substation environment.

Ethernet switches for the substation need to operate in the same temperature range as protective relaying IEDs.

2.3 Enough EMI to fry an egg!

Substation IEDs are required to withstand a variety of electromagnetic interference phenomena. ANSI/IEEE C37.90.1&2 and IEC 60255 define a variety of type withstands tests designed to simulate EMI phenomena such as inductive load switching, lightning strikes, electrostatic discharges from human contact, radio frequency interference due to personnel using portable radio handsets, ground potential rise resulting from high current fault conditions within the substation and a variety of other EMI phenomena potentially encountered in the substation by protective relaying IEDs. These devices have to be able to withstand continuous EMI fields of 35 V/m without "misoperation". Compare this to the IEC 61000-4-6 standard for radiated EMI immunity for devices in "industrial" environments which is only 10 V/m! Commercial Ethernet switches don't even comply with the industrial requirement let alone the substation.

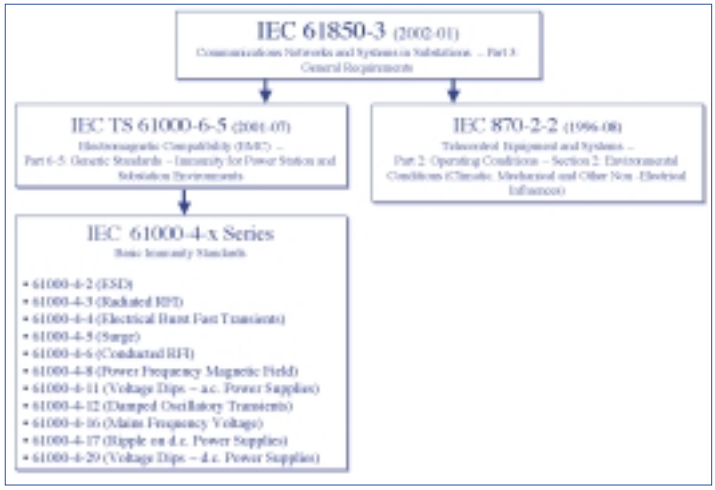
Ethernet switches for the substation need to pass the same EMI type withstands tests as protective relaying IEDs.

3.0 The Arrival of the IEC 61850-3 Standard

In January 2002, the International Electrotechnical Commission (IEC) released a new standard entitled *IEC 61850-3* "Communications networks and systems in substations" to specifically address the general environmental and electromagnetic interference (EMI) immunity requirements for network equipment used in substations. In particular, section *5.7 EMI Immunity states that "The general immunity requirements for the industrial environment are considered not sufficient for substations. Therefore, dedicated requirements are defined in IEC 61000-6-5…" [2]*

3.1 A Closer Look at IEC 61850-3

The IEC 61000-6-5: "Generic Standards – Immunity for power station and substation environments" outlines the EMI immunity requirements. The details of these requirements and test procedures are given in the parts of the IEC 61000-4-x series. Figure 1 shows the relationship between IEC 61850-3, IEC 61000-6-5 the IEC 61000-4-x series and other referenced standards.



IEC 61000-6-5 defines port categories and the corresponding applicable standards. A "port" is defined as a "*particular interface of the specified equipment with the external electromagnetic environment".[2]* There are five port categories defined:

1. Enclosure Port
2. Signal Port
3. Low Voltage a.c. Input Power and Output Power Ports
4. Low Voltage d.c. Input Power and Output Power Ports
5. Functional Earth Port

Each port type has a corresponding list of IEC 61000-4-x EMI Immunity standards which must be met. Table 1 lists the required test standards and levels for each port type.

Table 1: IEC 61000-6-5 EMI Test Levels

Referenced Standards	IEC-61000-6-5 LEVELS				
	Signal Port Types				
	Enclosure Ports	Signal Ports (In field)	a.c. Input Power Ports	d.c. Input Power Ports	Earth Port
IEC-61000-4-2 ESD	3 (8kV Air, 6kV Contact)				
IEC-61000-4-3 Radiated RFI	3 (10 V/m)				
IEC-61000-4-4 Fast Transients		4 (2kV/1kv)	4 (2kV/1kv)	4 (2kV/1kv)	4 (2kV/1kv)
IEC-61000-4-5 Surge		3 (2kV/1kv)	4 (4kV/2kv)	3 (2kV/1kv)	
IEC-61000-4-6 Induced RFI		3 (10 V)	3 (10 V)	3 (10 V)	3 (10 V)
IEC-61000-4-8 Magnetic Field	2 (3 A/m)				
IEC-61000-4-11 Voltage Dips a.c. Power			30% for 1 cycle		
IEC-61000-4-12 Damped Oscillatory		2 (1kV/0.5kv)	3 (2.5kV/1kv)	3 (2.5kV/1kv)	
IEC-61000-4-16 Mains Freq.		4 30V Cont. 300V for 1s		4 30V Cont. 300V for 1s	
IEC-61000-4-17 a.c. Ripple				10%	
IEC-61000-4-29 Voltage Dips d.c. Power				30% & 60% for 100ms	

IEC 870-2-2 *"Telecontrol equipment and systems – Part 2: Operating conditions – Section 2: Environmental conditions (climatic, mechanical and other non-electrical influences)"* addresses the atmospheric environment which defines four classes of locations:

1. Class A: air-conditioned locations (indoor)
2. Class B: heated and/or cooled enclosed conditions
3. Class C: sheltered locations
4. Class D: outdoor locations

The majority of IEDs in substations will be in "Class C" locations. Class C locations are further sub-divided into four classes: C1, C2, C3 and Cx. Operating temperature ranges for each of the classes are as follows:

1. Class C1: -5 to 45ºC
2. Class C2: -25 to 55ºC
3. Class C3: -40 to 70ºC
4. Class Cx: Special

For IEDs in substations classes C2, C3 or Cx (-40 to 85ºC) will be required.

4.0 Conclusions

Ethernet equipment for the substation should be as 'rugged' as the substation IEDs connecting to it. The substation Ethernet LAN will be an integral part of a mission critical protection and control system that must perform reliably in real-time when a fault condition occurs. In order to ensure reliable performance Ethernet switches should have the following characteristics:

1. Fiber Optical media for immune connectivity and security
2. –40 to 85ºC operating temperature for climatic extremes
3. Compliance with the following type test standards to ensure "ruggedness":

a. IEC 61850-3 or
b. ANSI/IEEE C37.90.1&2 and IEC 60255 ■

About the Author:

Marzio Pozzuoli is the founder and president of RuggedCom Inc. Prior to founding RuggedCom Mr. Pozzuoli was the Technology Manager at GE Power Management in Markham, Ontario (1994 – 2001) where he developed protective relaying systems and substation automation technology. Mr. Pozzuoli graduated from Ryerson Polytechnical Institute, Toronto, Ontario in 1986 with a Bachelor of Electrical Engineering Technology. He holds multiple patents and has published several technical papers and articles on technology and substation automation. He is also an active member of the IEEE.

References:

[1] "UCA Substation Integrated Protection, Control and Data Acquisition - Electro-Magnetic Immunity Tests of Shielded Twisted Pair Copper Cable for 100 Mbps Ethernet" (Final Report - January 31, 1997)

[2] "IEC 61850-3: Communications networks and systems in substations – Part 3: General Requirements" (Section 5.7 EMI Immunity)

New Texas Utility Offers *All* Customers a Web-Based Demand

Side Management Tool That Helps Them Lower Their Electric Bills

By:

Vance Hall
President
Utility Data Resources, Inc.

In three years, Sharyland Utilities went from start-up to being the first utility in the U.S. to offer all C&I and residential consumers the ability to view their daily energy use via the Internet to make informed energy conservation decisions.

Anyone who's motored across Texas knows how those wide-open spaces just go for days. But if you talk to Mark Caskey, General Manager of Sharyland Utilities, L.P. (www.su-power.com), it's also a land of big ideas—and even bigger opportunities. There's just no other way to explain how a start-up utility with a vision to "spoil its customers rotten" could succeed in becoming one of the country's most progressive wires service providers after only three years in the utility business.

The Plantation takes off

Sharyland Utilities' service territory is Sharyland Plantation, a former 6,000-acre agricultural property that, today, serves upwards of 650 customers, 90% of whom are residential. The property is strategically located in the heart of the Rio Grande Valley, just across the border from Reynosa, Mexico. Development of Sharyland Plantation began in earnest in 1997 with the rise of the maquila industry on the Mexican side, spurred by the development of 16,000 acres immediately adjacent to Sharyland in Reynosa.

Envisioned as the epicenter of light industrial manufacturing, distribution, commercial and residential development for northeastern Mexico and a vibrant port of entry, the combined Mexican and U.S. development will comprise some 22,000 acres when fully built out over the next ten years. Michael Landgraf, Marketing Manager for Dallas-based Hunt Power, L.P., predicts "it'll be the largest integrated master-planned international community anywhere."

As the third fastest-growing city in the country, McAllen was named by Forbes as one of the top five places in America to do business. As expected, the population projected for the Sharyland/Reynosa economic zone has fueled tremendous growth on the U.S. side. Construction of nine separate subdivisions in Sharyland—ranging in price from $80,000 to almost one million dollars per home—is well underway, with growth expected to top 10-12,000 residents by the end of the decade (**Figure 1**).

So far, only about 25% of the 6000-acre parcel has been developed. Michael Landgraf says that a sustained effort to draw high-tech companies to the area has already borne fruit. Symbol Technology, Bissel and Panasonic, to name a few, were recently joined by Black & Decker. Recognized names in the call center/data center/back office business will soon occupy space in CentraTek's new 75,000 square foot Sustainable Technology Business Center. Nearing completion now, this first STBC will provide a state-of-the-art, computer-intensive environment for up to 500 people, and a template for future area technology centers.

More infrastructure needed

Anticipating the demand that will be placed on the increasingly burdened grid, Sharyland Utilities has spent considerable time and effort developing a master plan that will support the community's growing infrastructure needs. At this time, the long-range plan calls for a total of four 100MVA substations at key locations, redundant transformers, a loop transmission system, and a host of other implementations. "Being a totally planned development works out really well for the utility," says Mark Caskey. "It lets us design and build our infrastructure, systematically and efficiently, block by block—without some developer wanting to put service in two miles from our existing lines."

As a wires company, Sharyland doesn't sell power but charges the customer's energy service provider a transmission and distribution fee based, respectively, on that customer's contribution to Sharyland's four coincident summer peaks and on the customer's own monthly non-coincident demand. To the utility, demand reduction means avoided costs that would have otherwise been incurred and passed along to the consumer. "Any amount of demand reduction potentially reduces Sharyland Utilities' investment in infrastructure and the amount they have to charge for their services," says Dan Price, Senior VP of Dallas-based MeterSmart, L.P., a Hunt Power subsidiary.

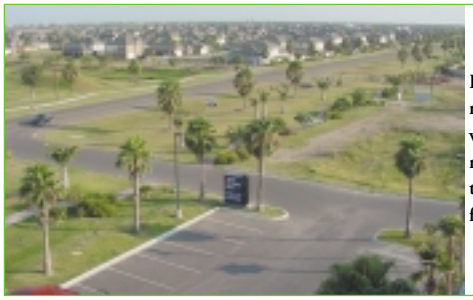


Figure 1: Every unit in the nine Sharyland subdivisions will be fitted with automated metering capabilities to identify and reduce demand peaks for energy savings.

Figure 2: The AMR module shown at left is mounted under the meter disk and provides auto dial capability to send interval load data to UDRI/MeterSmart, the outside data services provider under contract to Sharyland Utilities.

Deregulation spurs demand reduction

On January 1, 2002, deregulation started for most customers in Texas and, as part of that, most wires companies implemented new tariffs that included a demand component for billing their customers. "We're the only utility," Mark Caskey claims, "that has the ability to bill all of its customers on actual demand because of our automated meter reading capabilities."

"Sharyland has a demand rate for all classes of customers," notes Mark Caskey. "Therefore, any customer who can identify demand reduction can potentially save on his electric bill." For this reason, Sharyland Utilities is aggressively implementing demand side management (DSM) tools that can supply 100% of its customers with energy monitoring capability viewed through the Internet. Using these tools will give all Sharyland customers equal access to their interval load data upon which their demand, and therefore rate structure, is based. Although the type of interval data is essentially the same for all customers, the collection process differs, at least at this time, for residential vs. commercial/industrial users.

AMR-ready metering for the housing market

The utility provides each house with a standard Form 2S residential kWh meter that also includes an under-the-glass AMR (automatic meter reading) module (**Figure 2**). The AMR module connects to the utility side of the meter and draws power from the meter's 240V supply. The module reads the meter disk and provides a corresponding pulse output. The device's modem board has a built-in telephone interface that connects to the customer's phone system at the service entrance. Common trenching of all utilities at the residential site makes for quick meter installation and hook up, which typically runs only 7-10 minutes per unit (**Figure 3**). "We put in 500 meters in one month," says Billy Echols, who supervised the hook-ups and did many himself. Echols works for MeterSmart but hangs his hat in Sharyland, where he leads the crew that Sharyland Utilities uses for meter installations, connections and repairs.

Mass-storage metering for the business sector

Commercial and industrial facilities also employ common trenches for utilities. But the electrical service entrance, where the meter is located, is outside and some distance from the telephone switch room, which is typically inside the building somewhere. This being the case, a modem-based AMR solution would incur the added expense of running a phone line out to the meter, making it impractical in many cases. Sharyland is currently evaluating wireless interfaces, submetering, and other remedies. In the meantime, solid-state meters with onboard mass memory are used to log the data in 15-minute intervals, and then store it onboard for subsequent download (**Figure 4**).

Interval data collection

Sharyland contracts with Arlington, Texas-based UDRI/MeterSmart for a number of fee-based services including, where appropriate to the class of customer: automatic meter reading, data validation and editing, real-time pricing and billing, load research, data archiving, turnkey load control solutions, on-site technical support, Internet presentation and more. Headquartered some 500 miles to the north, UDRI/MeterSmart was key to Sharyland Utilities' success from the beginning. (Note: MeterSmart acquired UDRI in June 2001.)

"We've provided meter installation and hook-up, disconnections and testing services to Sharyland Utilities since its inception," says MeterSmart's Dan Price. "We originally approached Sharyland with the concept of empowering their customers with tools to make informed energy decisions. It was a natural progression for them," he says, "since interval data is collected for billing purposes."

In residential applications, the load data is collected at 60-minute intervals and automatically uploaded every 24 hours to UDRI/MeterSmart, who applies proven validation, editing and estimation (VEE) techniques to ensure a high level of integrity in the data collection process. This process is similar for commercial and industrial customers, except that the load data is downloaded into the meter reader's laptop computer, converted to hand-held file (HHF) format and then e-mailed to UDRI/MeterSmart for processing.

The metered interval data obtained from each residential and commercial/industrial customer is then used to calculate the customer's demand profile. The same information is also used by the customer's energy service provider for billing, and by Sharyland Utilities to compute a portion of the wires charge it levies on each customer's energy service provider in the form of a Transmission/Distribution Service Provider (TDSP) fee.

Web-based presentation

Mid-February 2002 saw the roll out of a new, non-fee based service for all Sharyland Utilities customers—the ability to view their energy usage information, in both numerical and graphic format, on the Internet. To access it, users simply log on to www.udri.com and click on the "registered users" button, which takes them to a secure data portal requiring their I.D. and password for entry. Requiring neither dedicated workstation, proprietary software nor programming, the information is easily accessible via any Windows-compatible browser (**Figure 5**).

Additional on-line services will soon join Sharyland's repertoire on a subscription basis. These include direct-to-the-customer e-mail reports detailing daily, weekly or monthly energy usage; and an energy alarm service that will notify residential and business customers when user-defined maximum energy thresholds have been exceeded. Additional capability, via the Internet, will allow users to update their energy usage "on demand" to the current time of day.

Richard Guerra, Technical Marketing Specialist for MeterSmart, sees interest building among commercial/industrial customers, as well as residential, for web-based information. Driven in part by deregulation, rising energy costs

Figure 3: Common utility trenching simplifies installation of phone-based AMR solutions. The AMR module is installed under the meter glass and connected to the phone line at this Sharyland residence.

Figure 4: MeterSmart Technician Billy Echols prepares to download 30 days of interval data from the mass storage meter mounted on the side of the padmount transformer outside a Sharyland commercial facility. The data will be e-mailed in HHF format to UDRI/MeterSmart for input into the data processing software system.

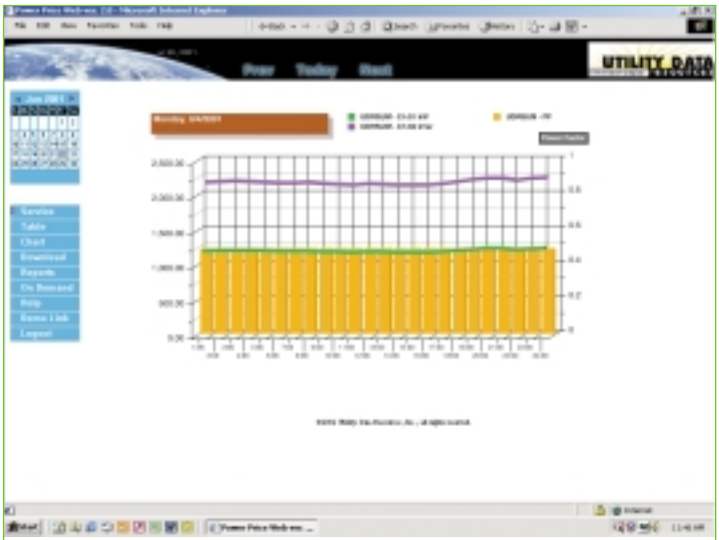


Figure 5: UDRI/MeterSmart operates a password-protected web site where Sharyland residential and commercial/industrial customers can access load profile information.

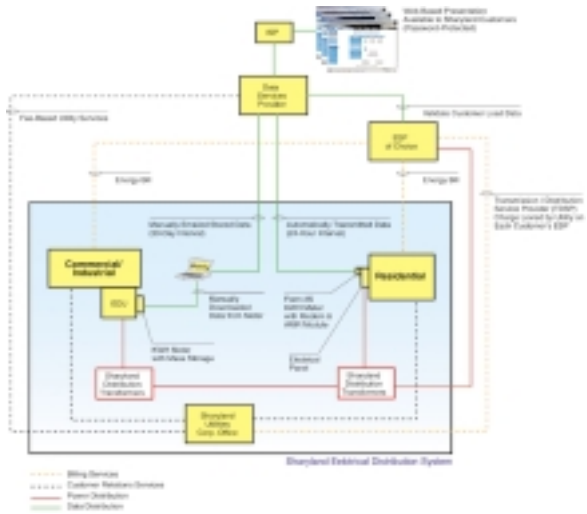


Figure 6: A systemic overview of the various customer/ supplier relationships in play at Sharyland Utilities in McAllen, Texas.

are starting to get everyone's attention—making the value of the load information that UDRI/MeterSmart provides to the Sharyland Utilities customer even more obvious as time goes on. For the customer who already sees its value, frequent updates, viewed via the Internet, allow problem areas to be identified more quickly and corrective measures applied with minimal delay.

"The goal of all this," Mark Caskey points out, "is to inform customers as much as possible regarding their energy usage so that they'll understand their electric bill better, and be motivated to implement energy conservation measures."

Building energy awareness, one customer at a time

Despite many similarities in the way that load data is processed and presented to the different classes of customers, there is a big difference in how effectively the information is used to shave costs. Many companies, particularly larger energy users, are already onboard with technically sophisticated energy management and conservation programs, made that much more effective by the level of information that Sharyland provides via its outside service partners.

But on the residential side, the current low-awareness level is due mostly to a lack of knowledge, information, opportunity, and often, desire, to alter comfortable energy consumption patterns. "It's a matter of educating the customer," says Richard Guerra, "but once they see the value of the information they're getting, they tend to be more proactive in cutting energy usage in any reasonable way they can."

Not everyone is interested in studying their energy usage on a daily basis, Guerra maintains. "I mean, let's face it," he laughs, "residential load shapes just aren't that exciting." Even so, there's much that can be done to save energy around the house. Customer demand charges are based on the highest hourly usage peak of the month, even if it only occurred once during that billing period. Knowing this should incentivize the concerned consumer to rethink his energy consumption habits.

One solution might be to utilize programmable thermostats to control air conditioning, water heaters as well as other appliances in the home. Not running the clothes dryer, kitchen appliances and other high-energy users at the same time can reduce peak demand considerably. As a result of education and increased awareness, fueled by information access, some users have extended their conservation efforts to installing programmable controls to run sprinklers, swimming pool pumps, outdoor lighting, etc.—as a way to spend their energy dollars "smarter."

Conclusion

This summer, Sharyland celebrated its third birthday as an electric utility in the state of Texas (**Figure 6**). In contemplating the road well-traveled, Mark Caskey waxes nostalgic: "I look back at the many challenges we faced along the way, and it seems like it's been forever. It's not like working for a 'traditional' utility where you have a specific job that you do," he says. "It's been a much bigger, more encompassing thing."

Good old-fashioned hard work in both the front office and in the field has put Sharyland Utilities where it is today. The key supplier relationships that Mark Caskey and his small crew have relied on—UDRI/MeterSmart, outsourcing T&D construction, Hunt Power, and others—are as much a part of the Sharyland success story as anything. Few customers realize how lean an operation Sharyland Utilities is running down there in McAllen. In addition to the GM, there is only a T&D Engineer, an accountant, receptionist and office manager. "That's really our whole staff," Mark Caskey admits. "We're as close to a 'virtual' utility as you'll ever run across, but our reliability, service and customer satisfaction are just what you'd expect from a 'real' utility—maybe even better." ■

By:
Dan Tobin

"How to Succeed In Networking"

I am sure that everyone was expecting the rest of that line to be, "without really trying." Well, we all know that won't happen. However, it is true that as we look at our options for deploying a high quality, broadband network that satisfies the national or international scope of our business, we are faced with certain dilemmas. How do we find a single vendor to satisfy our entire network needs? Is there a single technology out there today that fits all of our locations and is where we need it to be? Can we get the bandwidth we need and still stay within our budgets? And finally, can we find a way to keep it simple, easy to manage and quick to deploy? The answers to these questions have been the cause of more than a few migraines over the past couple of decades.

With the passage of time, and the improvements in technology, it still comes down to the one basic premise, "Can I get what I need, where I need it, when I need it?" The answer to that all to often has been a resounding "NO!" So what are your options? Fundamentally, the fact is that no technology is the 100% best solution for everyone, everywhere. As we progress, it is more obvious that a hybrid solution is probably the best solution for most network environments. We are all aware of the vast deployment of Frame Relay and DSL as a high-speed solution to our networking needs. But, even at their best, they fall short of providing a full service solution. Today, there are still many, many gaps in the national availability of these products. That is where an old friend, a proven technology that has been more in the background and not as prominent as those other technologies comes into play. We have all seen it, we probably have all used it in one form or another yet, it has always been the Cinderella, or unwanted stepchild of the technology spectrum.

If we recall the story of Cinderella, she was the hardest working and most abused, yet, at the end of the day, she was the true winner. That is how I view satellite communications. For years it has provided the highest levels of reliability and availability as compared to most competitive technologies. It has always worked hardest, providing high quality digital communications to the remotest of our corporate outposts. Yet for some reason, the technology has yet to reach the prominence of a DSL or Frame Relay. In many cases, I have seen organizations look for ISDN solutions before they considered satellite networking.

The reality is that satellite communications, or as we have learned to refer to it as VSAT (very small aperture terminal) communications, is now a major solution source to many Fortune 1000 organizations. And it has not stopped there. With the advent of the many consumer and small business products for both Internet access and business applications this technology is now enjoying more of the limelight that it has deserved for so many years. Why is this all happening now? Many IT professionals are looking for simple ubiquitous solutions and VSAT gives them what they are looking for. Historically, satellite communications has always been there when you needed it. So, what makes this "Old" technology "New" to us today?

New technology, and improvements in the launch and deployment of the satellites themselves has helped to make us all more confident that this is a long-term solution. The newer satellites are still geosynchronous (stationary) and equatorial (located above the equator) but they have larger transponder capacity, longer life expectancy and are much more powerful than their previous generation counterparts. Add to this the fact that this is the single technology that can be either a full network solution, a backup solution to other technologies, or just used to fill the gaps between where your existing technology and your remote locations are really located. You will find in research and vendor discussions that VSAT availability is measured in the range of five 9's and the cost, in most cases, is competitive with or below what you would pay for DSL or Frame Relay.

So, why doesn't everyone use this technology? Good question. Fact is, as with all technologies, it is not the solution for all situations. It is great for broadcasts such as video for TV or distance education, but it not the best solution for implementation in major inner city metro areas. This is because it requires direct line of sight from the ground antenna to the satellite. In the concrete corridors of major downtown areas, the line of sight often is into the building across the street. Another pitfall has always been the latency or delay associated with the distance that your information must travel to get from source to destination. This issue has been lessened, but not eliminated. Through numerous software developments and technology migrations, we see high-speed data transfer using protocols such as TCP/IP at speeds comparable to that of either DSL or Frame Relay. High speed Internet access has come to the masses in rural America through the implementation of this medium. It is not uncommon to see Internet download speed in excess of 600Kbps on a consistent basis. Furthermore, satellite technology offers the best of many worlds to the IT professional looking to migrate from legacy to current technology protocols. VSAT is capable of concurrently processing both legacy and Ethernet or Token Ring protocols. This provides a simple migration path with a built in fall back capability that negates the need to flash cut any changes in the networking environment.

Has Cinderella finally made it to the ball? Time will tell. But one thing is sure -satellite technology is a technology of today. It can help you solve problems in your networking environment and has the potential of reducing the cost and wait associated with deploying a full service wide area network. One final thing:you will also minimize the migraines and add a lot more "peace-of-mind" to your already stressful environment. ■

The AMRA 2002 International Symposium

In the increasingly competitive utility marketplace, innovative leaders must know who their customers are and what they want. Successful electric, water and gas companies will use consumption-based information to deliver services that exceed customers' expectations, increase revenue and streamline utility operations.

The AMRA 2002 International Symposium will showcase the strategies and technologies that allow companies to collect detailed customer data, then transform those zeroes and ones into meaningful information that can lead to improved customer relations and loyalty. Advanced metering combined with data management is a critical tool for success.

Let AMRA — the world's largest nonprofit association dedicated to AMR and related technologies — teach you how AMR can be your Foundation for Business Success. Plan now to attend the International AMRA Symposium, September 29–October 2 in San Antonio, Texas.

The symposium will feature industry leaders from the Americas, Europe and Asia who will discuss:

- Using AMR to enhance core business and build new revenue
- Modifying outlooks and operations for the global market
- Lessons learned during the deployment of automation technologies
- New technologies and applications for efficient customer-focused operations
- Business strategies for existing and emerging utility-service companies
- Regulatory and legislative activity and its effect on technology adoption
- Maximizing the value of customer data

In-depth presymposium courses will cover topics from AMR building blocks to value-added services. Presenters, all of whom are well-known leaders in the AMR community, will discuss new communications and data management technologies and how to use detailed customer data to build business.

Meanwhile, the symposium exhibit hall — filled to capacity with the world's leading equipment and service providers — will feature metering, billing, communications and CIS breakthroughs. Technologies typically on display include public radio-frequency wide-area networks, low-Earth orbit satellite communications, submetering devices, cellular fixed networks, Internet-based customer-service packages and an array of supporting products and services.

Past attendees offer the best description of the value of AMRA's annual symposium. And this year's program is packed with even more outstanding opportunities to expand your knowledge and have fun.

Invest in your future: Be sure to attend the AMRA International Symposium — the one educational forum you can't afford to miss in 2002.

Highlights

Educational tracks that focus on topics critical to the evolving utility-service environment:

- Customer Care
- Resource Delivery
- Case Studies
- Business Solutions
- Technology/Metering
- New Market Requirements
- Enterprise Systems Integration

Enhanced sessions on Wednesday, Oct. 2:

- Financial Considerations in Planning AMR Projects
- Guidelines for Successful AMR Implementation
- Technology Evolution — Options for Today and Tomorrow
- Cashing in on C&I Service Opportunities
- Metering Requirements in the Open Market
- Wireless Communications for 21st Century Customers

Seven intensive presymposium courses:

- AMR Systems — Just the Facts: Full-Scale Residential Deployment
- Telecommunications Solutions, Part 1: Fundamentals and Building Blocks
- A Guide to Creating a Successful AMR Business Case
- AMR Strategies for C&I
- Telecommunications Solutions, Part 2: Applications and Examples
- Making Sense of AMR Data: Programming and Retrieving Information With ANSI C12.19/IEEE 1377
- Project Management — Key to Success in AMR

Delegates who attend presymposium courses and complete post-course assessments are eligible to receive official AMRA CEUs. Details will be provided to course registrants.

Keynote presentations on Monday, Sept. 30, and Wednesday, Oct. 2, including:

- Fidel Marquez, Vice President of Transmission and Distribution for City Public Service of San Antonio
- Michael Bray, President of PPL Electric Utilities
- Nieves López, Chief Policy Analyst, Public Utility Commission of Texas
- Craig Goodman, President and CEO of National Energy Marketers Association
- Steve Carrico, Director of Communications Business Development for Wisconsin Public Service Co.
- James Rodier, Energy Industry Attorney and Consultant Sanders & McDermott PLLC
- Connie Podesta, nationally acclaimed speaker, author and counselor

Exhibits

The exhibit hall is your best source of information about the products and services necessary for AMR and other automation projects. All the suppliers you need to meet will be in one place to answer your questions and give on-the-spot demonstrations. More than 100 vendors will display their products and services during the 2002 symposium — come see what they have to offer.

Attention vendors: The exhibit hall is selling out quickly; act now to reserve your booth space at the 2002 Symposium. Contact AMRA Exhibits Manager Madhuri Carson at mcarson@amra-intl.org or 847/480-9628 for details.

Outstanding Business Opportunities

The AMRA symposium allows you to conduct business in an efficient and cost-effective manner. One trip to San Antonio will bring you in contact with the utilities, suppliers and other colleagues you need to know. Register now to receive the early discount price, call the symposium hotels to reserve your room before the discounted room blocks are filled and contact Bannockburn Travel Inc. to learn about airfare savings.

Symposium Schedule

Saturday, September 28

1 p.m.–9 p.m.	Exhibit Setup (20' X 20' and larger booths only)
3 p.m.–6 p.m.	Registration

Sunday, September 29

7 a.m.–7 p.m.	Registration
8 a.m. 4 p.m.	Exhibit Setup
8 a.m.–Noon	**Course 1.** AMR Systems — Just the Facts: Full-Scale Residential Deployment
8 a.m.–Noon	**Course 2.** Telecommunications Solutions, Part 1: Fundamentals and Building Blocks
8 a.m.–Noon	**Course 3.** A Guide to Creating a Successful AMR Business Case
1 p.m.–5 p.m.	**Course 4.** AMR Strategies for C&I
1 p.m.–5 p.m.	**Course 5.** Telecommunications Solutions, Part 2: Applications and Examples

Sunday, September 29 (Continued)

1 p.m.–5 p.m.	**Course 6.** Making Sense of AMR Data: Programming and Retrieving Information With ANSI C12.19/IEEE 1377
1 p.m.–5 p.m.	**Course 7.** Project Management — Key to Success in AMR
5 p.m.–7 p.m.	Exhibits Open — Reception in Exhibit Hall
7 p.m.–8:30 p.m.	Speaker Reception

Monday, September 30

7 a.m.–6 p.m.	Registration
8 a.m.–10:30 a.m.	Opening General Session
8:a.m.	Fidel Marquez, Vice President of Transmission and Distribution for City Public Service of San Antonio
8:30 a.m.	Craig Goodman, President and CEO of National Energy Marketers Association

Monday, September 30 (Continued)

9 a.m.	Mike Bray, President of PPL Electric Utilities
9:30 a.m.	Featured Speaker Connie Podesta
10:30 a.m.–6 p.m.	Exhibits Open
1:30–3 p.m.	Concurrent Sessions 1
3:30–5 p.m.	Concurrent Sessions 2
5–6 p.m.	Happy Hour in Exhibit Hall
6 p.m.–11 p.m.	Exhibit Breakdown (continues on Wednesday until 11 a.m.)

Tuesday, October 1

8 a.m.–5 p.m.	Registration
10 a.m.–6 p.m.	Exhibits Open
9–10:30 a.m.	Concurrent Sessions 3
1:30–3 p.m.	Concurrent Sessions 4
3:30–5 p.m.	Concurrent Sessions 5

Wednesday, October 2

8 a.m.–Noon	Registration
8 a.m.–10 a.m.	General Session
8–8:30 a.m.	Business Meeting
8:30–9 a.m.	Steve Carrico, WPS, discussing UTC issues in the AMR arena
9–9:30 a.m.	Nieves López, Chief Policy Analyst, Public Utility Commission of Texas
9:30–10 a.m.	James Rodier, Energy Industry Attorney and Consultant, Sanders & McDermott PLLC
10:15 a.m.–Noon	Enhanced Panel Session and Interactive Workshops (see excel doc called concurrent sessions.xls)

Concurrent Session

Monday September 30, 2002

1:30-3:00 p.m.

A. Customer Care

• A Meter Data Management System for Bonneville Power Administration
Gordon Matthews, Bonneville Power Administration
Steven Gerde, Oracle Corp.

• Development of a Financial Tool to Illustrate the Benefits of Interval Metering and Real-Time Pricing
Steven Braithwait, Christensen & Assoc.

Chair: *Mike Wilkinson*

B. Water Case Studies

• Better Way to do Business: AMR Deployments at Long Island Water Corp.
John Mirando, Long Island Water Corp.

• Successful Implementation of AMR in a Water Utility
Johnny Kemp, City of Plano

• Cost Justification of an AMR System
Earl Smith, City of Evans, Colo.

Chair: *Bruce Lackey*

C. C & I Applications

• 10 Top Reasons for C&I AMR – Incorporating Logic and Money Into Your Business Plan
Carolyn Kinsman, Automated Communication Links Inc.

• C&I Metering Using Public Network
Bob Singh, Florida Power Corp.

Chair: *Dick Preston*

D. Technology Metering

• Technology Overview
Steve Clegg, Transdata
Bob Richardson, TWACS by DCSI
Bruce Scrapier, Starcom

Chair: *Don Block*

E. Business Solutions

• Beyond Billing: Instrumenting the Revenue Meter Benefits
Nevins Wilburn, Rappahannock Electric Cooperative

• Implementing Full Scale PLC technology to drive Customer Satisfaction through AMR
Sue Thompson, Minnesota Power — Mark Kodet, Hunt Technologies Inc.

Chair: *Dave Herchko*

F. What's New in AMR

• AMR Front & Center: A Regulatory and Legislative Update
Emmett Kelly, Itron — Chris King, eMeter
Greg Lizak, Invensys —Brett Kilbourne, UTC

Chair: *Jim Andrus*

3:30-5:00 p.m.

A. Customer Care

• Managing the Energy Crisis Through Education, Time-Of-Use Billing and Change
Brian Pollom, Puget Sound Energy
Craig Boice, Boice Dunham Group

• Customer Service Improvement Opportunities through AMR - Much More Than Meter Readings
Gwen Thomas, East Central Energy

Chair: *Kendall Smith*

B. Water Case Studies

• Acquiring a Fixed Radio AMR System: The Boston Experience
Boston Water representative TBA — Don Schlenger, Cognyst Consulting LLC

• AMR Experiences at St. John Water
Bob Pharazyn, Town of St John, Ind.

• Practicality of a Mobil AMR System in a Large Utility
Brian Jensen, Southern California Water Co.

Chair: *Mike Koutelis*

C. C & I Applications

• Competitive Advantage: Advanced C&I Metering in the Texas Market
Anthony Hawkins, Austin Energy

• An Economical AMR Solution for Demand Metered C&I Accounts
Thomas E. Converse, NSTAR Electric & Gas Corp.
Jim Cunningham, ABB Inc.

Chair: *David Jones*

D. Technology Metering

• RS-485 for Networked Meter Applications
Clark Kinnaird, Texas Instruments

• Business Benefits of Data Validation, Editing, and Estimation
Kathryn Smith, ABB Inc.

Chair: *Becky Lorentz*

E. Business Solutions

• AMR Two or More Years Later: Was it a Good Idea?
Paul Shaeffer, South Central Power
Robert Sirkle, MichCon

Chair: *Carolyn Kinsman*

F. What's New in AMR

• North American AMR Deployments
Howard Scott, Cognyst Consulting

• AMR & Time-of-Use in Residential Applications
Ron Chebra

Chair: *Dave Herchko*

Concurrent Session

Tuesday October 1, 2002

9:00 a.m. - 10:30 a.m.

A. Customer Care

• Fulfilling the Promise of Retail Choice
Jim Rodier, Sanders & McDermott PLLC
• Good Cents Select;
Price Responsive Demand Control with Remote Metering
Brian White, Gulf Power Co.
Chair: *Norma Archer*

B. Gas/Electric Case Studies

• AMR Applications at Kansas Gas Service
David Arnold, Kansas Gas Service
• Optimizing AMR Value and Results at Missouri Gas Energy
George Deibert, Missouri Gas Energy
• A Novel AMR Technology: MultiCarrier Modulation System Using Acoustic Wave Transmission in the Gas Pipes
Hirohisa Sukama, Tokyo Gas
Chair: *David Jones*

C. Electric Case Studies

• Bidirectional PLC Communication to Every Home Becomes Reality for Rural U.S.
Gregory Wolven, WIN Energy REMC
• AMR at Hydro-Quebec: Yesterday and Today
Serge Pettitpas, Hydro Quebec — Jean Joly, Hydro Quebec
• AMR Success at Clark Public Utilities
Richard Dyer, Clark Public Utilities
Chair: *Tim Wolf*

D. Technology Metering

• Energy Management at the MIT Home of the Future
Kenneth Wacks, Home Systems Design
• A Utility's Perspective on the Home of the Future
Donald Pelley, Salt River Project
Chair: *Rob McEver*

E. Business Solutions

• Developing a Business Case for Asset Management and Meter Reading Systems
Wayne Green, City of Toronto
• AMR at the City of Houston:
Lessons Leanred and Results Achieved
Karen Philippi, City of Houston
Chair: *Bruce Lackey*

F. Enterprise Systems Integration

• Integrating Enterprise Data in Small Utilities, NRECA's MultiSpeak Initiative
Gary McNaughton, Cornice Engineering, Inc.
Chris Kelly, Power Delivery Associates — John Abrams, Porche Systems
Chair: *Peggy Richmond*

1:30-3:00 p.m.

A. Customer Care

• Energy Information Services Overview
Lynn Fryer, E Source
• PGE's Return on Information
Bruce Carpenter, Portland General Electric Co.
• Implementing CIS and Metering Systems for Competitive Markets
Martyn Whattaker, Hansen Technologies
Chair: *David Jones*

B. Gas/Electric Case Studies

• Web Based Profiling -Staying With the Curve
Mark Gallagher, Enbridge IBT
Marc St. Jean, Management & Energy Profiling
• Commitment to AMR - A Success Story
Sandra Goodwin, PECO Energy
Mark Strutz, PECO Energy
Chair: *Becky Lorentz*

C. Electric Case Studies

• How PPL is Successfully Managing the Largest Single All Electric AMR Contract
John Yanek, PPL Electric Utilities
Michael Wiebe, MW Consulting
Chair: *Dick Preston*

D. Technology Metering

• NU's Flex-AMR Strategies Beyond kWh Readings
Dave Scott, Northeast Utilities
• Pre-Assessing Technologies to Meet the Needs of the Future
Sioe Mak, independent consultant
Chair: *Sandy Fernstrom*

E. Business Solutions

• Building the Case for AMR
Mark Hoffman, Deloitte Consulting
• Romancing the AMR Business Case
Don Schlenger, Cognyst Consulting LLC
Chair: *Howard Scott*

F. Enterprise Systems Integration

• Enabling Voluntary Demand Reduction Programs With Advanced Metering Data
Harlan Coomes, Sacramento Municipal Utility District — Eric Watson, Apogee Interactive Inc.
• Enterprisewide Meter Data Management at Southern Company
Kevin McDonald, Georgia Power Co. —Derl Rhoades, Alabama Power Co.
Bryan Seal, Mississippi Power Co.
Chair: Mike Wilkinson"

Concurrent Session

Tuesday October 1, 2002

3:30-5:00 p.m.

A. Customer Care

• Advances and Applications in Prepay Metering
Panelists TBA

• High Frequency Mains Communication Services for the Residential Customer
John Newbury, Open University

Chair: *Mike Wilkinson*

B. Gas/Electric Case Studies

• Home Networks – Getting There
Sunil Sharon, Echelon Corporation
Enel Distribuzione SpA representative TBA

• Governor Davis' Metering Program Implementation
John VanderLinde, San Diego Gas and Electric Co.

Chair: *Bob Westfall*

C. Electric Case Studies

• AMRA Value: A Case Study
Steve Hadden, Plexus Research Inc.

• LADWP's Real-Time Electric Metering System
George Chen, Los Angeles Department of Water & Power

Chair: *Kendall Smith*

D. Technology Metering

• C&I Load Control at FP&L - 10 Years of Customer Satisfaction
Ed Malemezian, Ed Malemezian Consulting Inc.

• Gateway to the Future: Internet Meter Reading, Demand Response and Residential Energy Management
Rudy Perez, Grant County Public Utility District

Chair: *Ron Chebra*

E. Business Solutions

• What Utilities Need to Know About Meter Data Management
Andrew Glassberg, Accenture
Thierry Godart, ABB Automation Inc.
Eric Miller, Silicon Energy
Robert Tucker, Itron Inc.
Tony Summerlin, Invensys/IMServ

Chair: *Jim Andrus*

F. Enterprise Systems Integration

• AMR And OMS: A Partnership for Improved Customer Service
John Bruns, White River Valley Electric Cooperative
David Haynes, TWACS by DCSI

• Integrating AMR Data With Software to Meet Business Needs
Gary Drake, Excelsior EMC
Becky Lorentz, Hunt Technologies Inc.

Chair: *Norma Archer*

Wednesday October 2, 2002

Enhanced Panels and Workshops
10:15 a.m. - 12:00 p.m.

A. Finance

• Alternative Approaches to AMR System Purchases and Financing
Sal Agnello, IMServ North America — Deloris Duquette, Itron Inc.
Bruce Block, Koch Financial Corp.

• This workshop provides different perspectives about traditional funding options. Panelists will discuss the benefits and drawbacks of several methodologies, from buying outright to lease purchase and everything in between. Project managers from utilities of all sizes exploring targeted or wide-scale AMR deployment can find a payment or purchase plan that works for them. The session will conclude with a 15-minute question-and-answer period.

Chair: *Mike Koutelis*

B. Implementation

• Guidelines for Successful AMR Implementation
Steve Smith, Honeywell — Kevin Meagher, ImServ North America
Bruce Sisson, Sargeant Electric

• This workshop will review critical factors in start-up, roll-out and completion of AMR projects for various customer types and purposes. Panel members — who represent utilities that use AMR in daily operations — will share their first-hand knowledge of successful AMR implementation plans. And attendees will be able to ask targeted questions during a 15-minute question-and-answer period at the end of the session.

Chair: *Sandy Fernstrom*

C. Technology

• Technology Evolution — Options for Today and Tomorrow
Bob Richardson, TWACS by DCSI — John Rossi, Comverge Technologies Inc.
Doug Staker, Itron Inc.

• Panelists will provide an overview of where communications technologies and the AMR industry have come from and where they are today. Then, they will share their visions of the future. The panel includes representatives from three major communication system providers who will discuss how their products have evolved, what their technologies could support in the future and how the utility-service industry needs to change. Attendees should come prepared to discuss their utilities' future objectives and the technologies required to achieve those goals.

Chair: *Don Block*

Concurrent Session

Wednesday October 2, 2002
10:15 a.m. - 12:00 p.m. (continued)

D. C&I Metering

• Cashing in on C&I Service Opportunities

George Chen, Los Angeles Department of Water and Power

David Scott, Northeast Utilities — Joe Bunch, Baltimore Gas & Electric Co.

• Utility leaders who realize the value of customer usage information are focusing more than ever on commercial and industrial customers. Panelists are AMR project managers who will discuss installation tactics and why their companies invested in solid-state meters, communication links, and data collection and warehousing software. These utilities use applications that not only improve operations and forecasting methods, but also offer customers pricing options and time-of-use information. The result is reduced costs for utilities and their customers. Utility managers who are building business cases or assessing new communications options can gain significant insight from panelists' experiences. **Chair:** *Carolyn Kinsman*

E. Wireless

• Wireless Technology — The Future of the Spectrum

Lucinda Seigel, Seigel Management Consulting

Bill Kirby, Blue Span Communications Corp. — Guy Lemieux, Nertec Inc.

John Brett, Tantalus Systems Corp. —Tony Thomas, Stratos

• The explosion of available wireless technologies has far-reaching implications for the AMR marketplace. Panelists will begin with an overview of the wireless space, then provide details about various technologies, current implementation rates and projects that are being financed. They also will discuss developing technologies, such as Bluetooth, global packet radio service (GPRS), and the implications of 802.11a and b. Other topics include technology selection and implementation, migrating to new technologies, and how satellite and other special applications could fit into the broad implementation scheme. This workshop, which concludes with interactive discussion, is designed to provide meaningful knowledge to professionals who are just beginning to explore the wireless space as well as those with advanced technical knowledge.

Chair: *Peggy Richmond*

F. Industry Restructuring

• Metering Requirements for the Open Market

James Cohea, Electric Reliability Council of Texas

Terry Bates, Oncor — Ken Swift, Oncor

• Market settlement in Texas' $16 billion electric industry requires an accurate method for determining where and when power flows into and out of the distribution grid. To ensure fair transactions, the Electric Reliability Council of Texas Inc. uses revenue quality metering at all generators, tie points and numerous other locations where operational data reliability is critical. Though independent generators typically have revenue quality metering systems, investor owned utility generators might not have revenue quality instrument transformers at all locations. Oncor, Dallas-based TXU Corp.'s regulated energy delivery business, deployed a new metering system to interface with ERCOT's network. In only one year, Oncor installed a system for 70 generating units scattered over a third of Texas that produce more than 23,000 megawatts. Panelists will review ERCOT technical specifications and discuss operating guidelines for metering in the open market.

Chair: *Jim Andrus*

Exhibitor List

Company Name	Booth #
ABB Inc.	125
AMCO Automated Systems	301
AMRA	361
Armorcast Products Co.	525
Badger Meter Inc.	319
BLP Components	308
Cannon Technologies Inc.	212, 214
Caprock Mfg. Inc.	413
Chartwell Inc.	104
Comverge Technologies Inc.	261
Crews & Associates Inc.	505
CX2 Technologies	545
Datamatic	169
dataVoice International	156
Dialout.Net	543
Electric Energy T&D magazine	108
Energration	541
Energy Markets magazine	549
Envenergy	507
Global Data Inc.	415, 514
Hersey Meters Co. Inc.	537, 539
Hexagram Inc.	315
Hunt Technologies Inc.	349
Internet-Metering.net	100
Interwave Inc.	140, 142
Invensys	249
Itron Inc.	325
KG Technologies Inc.	124
Locate Technologies Inc.	531
Marwell Corp.	512
Mass Installation	150
Master Meter Inc.	403
Maxell Corp. of America	209
Metering Technology Corp.	527, 529
MeterSmart	128, 130
Metretek Inc.	144
Mid-South Synergy	551
Motorola Inc.	113, 115
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NDS Inc.	110, 112
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NERTEC Inc.	219
NexusData Inc.	215
Northrop Grumman Information Technology	109
NRECA	515
Positron Inc.	107,206
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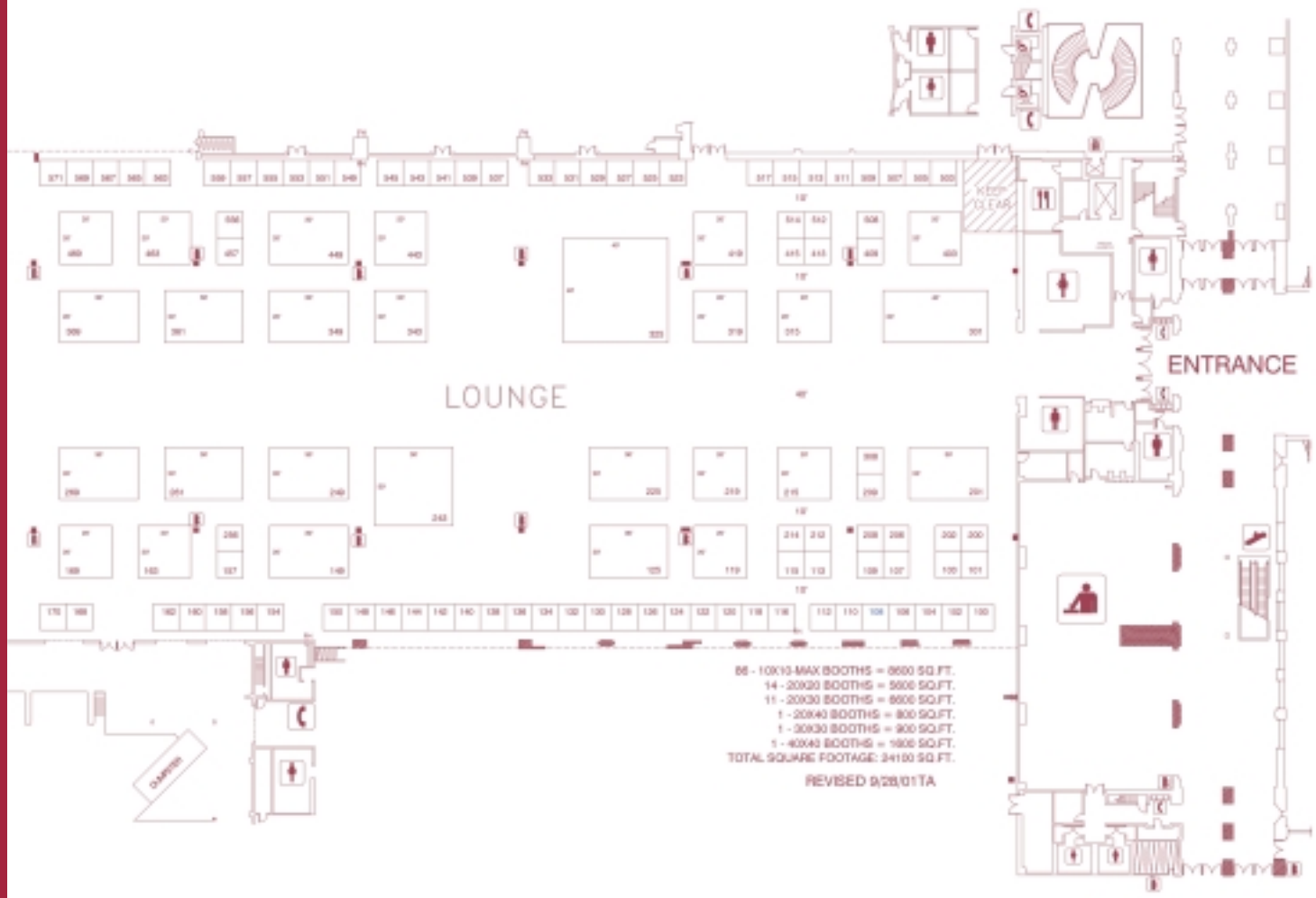
Radix Corp.	511, 513
RAMAR	343
RIO Tronics Corp.	138
Saft America Inc.	146
SchlumbergerSema Energy & Utilities-Electricity Products	119
Siemens Metering Inc.	201
Silicon Energy	132, 134, 136
Silver Spring Networks	225
SkyTel Telemetry Services	208
Specialized Technical Services	457, 556
SpeedRead Technologies	126
Spintelligent (Pty) Ltd.	102
StarCom Wireless Inc.	503
Stark North America Inc.	533
StatSignal/StatLinc	443
Systems & Software Inc.	158, 160
Tadiran Batteries	120
Tantalus Systems Corp.	157, 256
Telemetrix Inc.	116, 118
Texas Meter & Device Co.	122
Tru-Check Inc.	523
TWACS by DCSI	243
United Telecom Council	148
Utility Automation-PennWell	559
VSI Group Inc./InfraSource Metering Services	409, 508
World Wireless Communications Inc.	106

AMRA 2002

September 29th - October 1st, 2002
Henry B. Gonzalez Convention Center
Exhibit Hall A



By:
Anthony Haines
President
Enlogix Inc.

How to Outsource to an Application Service Provider

Look for extensive experience, established processes and long-term customers

Energy companies are beginning to look at outsourcing as a way to generate operational efficiencies while gaining access to current technologies and scarce expertise. The provision of software solutions and services by an application service provider (ASP) can generate significant benefits by offering best-in-class technology and cost predictability in support of business goals and the conservation of capital.

Choosing the appropriate vendor is essential to the success of any outsourcing initiative. In order to do so, a company must first understand its specific business needs and must also have the ability to communicate strategic organizational goals to a potential vendor. Because outsourcing arrangements require synergies between vendor and outsourcer to be effective, lines of communication must always be open. Companies must be prepared to ask the right questions of potential vendors from the outset, as well as being prepared to effectively manage the outsourcing relationship.

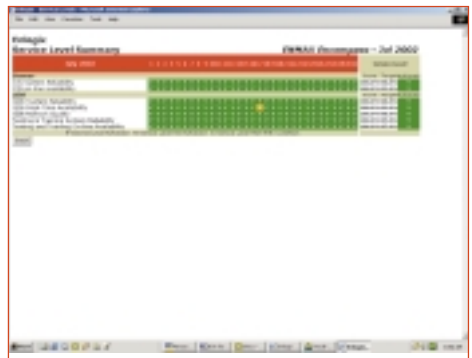
Finding a Vendor: Asking the Right Questions

Companies can ensure that they find an ASP solution that will work for them by asking pertinent questions early in the evaluation process. Key questions include:

Company and Customer History

- How long has the ASP been in business?
- How long has it offered its current services? How many client installations are currently active, and are they happy?
- What was the reason past customers terminated the agreement?

When searching for an ASP, it is vital to look for a service provider with extensive experience, established processes and long-term customers. These providers will have a better understanding of the industry and will have addressed many of the challenges facing companies in today's energy markets. Ask for customer references (both current and former), and visit as many client sites as possible to obtain information on how the solution works in a real-world setting. It is important to ask existing clients about their satisfaction with the ASP's performance including their plans to renew their contract at the end of its term. This will provide critical information on the ASP's ability to provide reliable, long-term solutions.



Some outsourcing companies provide clients with annual, monthly and daily view Service Level Agreement Scorecards that allow for the tracking of performance. Clients can drill down to the monthly summary view to review and analyze the monthly view feature of their scorecard. This view allows them to track their daily progress and identify above/below average days and days of the week at a single glance.

Industry Experience and Knowledge

- Is the ASP knowledgeable and experienced in the utility industry?
- Is it involved in energy industry organizations?
- Is it in touch with key decision makers?

The ongoing evolution of the energy industry requires continual commitment by ASPs to help customers by anticipating new technology and service requirements in response to market changes. By choosing an outsourcer who specializes in the industry, customers can take advantage of in-depth industry knowledge in addition to the many benefits offered by the ASP model.

Technology

- How long has the software been available?
- What hardware does the ASP use?
- What operating system?
- Does the ASP have servers at its own facility?
- What are the system's weaknesses and strengths?
- What modules are included in the ASP's solution?
- What version is available?

Research shows that customers seldom use more than 50 percent of a system's features and functionality. As a result, customers in the process of evaluating a new system may find it useful to speak with a client who is using the features and modules that are most relevant to their business. The will help the buyer to gain an understanding of the system's fit with the company's own business needs. Look for an ASP who is committed to evaluating and implementing new technologies to reduce future system expenses and to meet future technology demands. It is also a good idea to ask the potential vendor to provide information and diagrams on the system's infrastructure – both current and future plans. Technical analysis of the provider's infrastructure will ensure that the ASP can deliver services in a secure, reliable manner.

People and Partners

- Does the ASP employ people with the necessary skills?
- What level of customer support do they provide?
- Are the ASP's partners well established?
- What are the details of their partnership agreements?

When evaluating any new system, it is important to meet the team who will implement and manage the outsourcing initiative. The customer and ASP need to operate as a team, making communication essential. By meeting the key players, companies ensure that the ASP is committed to using high quality, dedicated professionals and that their partners are reputable.

Service Level Agreements (SLAs)

- Does the ASP provide guarantees, in the form of Service Level Agreements, for system performance and the reliability, quality, and security of its services?

A Service Level Agreement is the contract between an ASP and its customer specifying services and service levels. According to META

Group, only 20 to 25 percent of its IT clients actively use Service Level Agreements. Choosing an ASP that employs Service Level Agreements to manage the quality of its services allows management to minimize the risk of service level disputes, to obtain invaluable metrics to judge the services being provided and to ensure protection from a potential service lapse. Service Level Agreements guarantee that a company gets what it is paying for.

Customer Service

- Does the ASP provide a dedicated contact to manage the outsourcing relationship?
- Does the ASP provide customer support 24 hours a day seven days a week?
- What support services does it offer?

An established ASP will provide clients with a single contact – typically a Customer Relationship Manager - who is instrumental in managing the outsourcing relationship. They will also offer a 24-hour technical support help desk to deal with issues such as system availability and system response time concerns. It is important to look for outsourcers who have gone beyond traditional methods of support to offer online support services – typically in the form of a Web-based client center. Online tools allow customers to request technical infrastructure changes, obtain information and communicate with their dedicated ASP team, all with the click of a mouse. An online support center allows clients to report on and track the progress of customer service issues, from a centralized place, at any given time. It must be easy for customers to obtain help for the outsourcing arrangement to be successful.

Security

- What type of security solutions does the ASP provide?
- What provisions has it made for disaster recovery?
- Is the environment continually monitored and updated?

Prior to making a purchasing decision, a company must ensure that the ASP has appropriate safeguards in place to protect against unauthorized modification, destruction or fraudulent use of the system. The ASP's infrastructure should provide redundancy to minimize impacts due to loss-of-availability from hardware failure, and backups should be created and stored off-site to ensure swift recovery if necessary. Make sure to ask the provider to present a detailed overview of their data recovery planning and testing.

Ensuring a Successful Transition

The key to successful outsourcing is to have the delivery of services aligned with a customer's business strategy. Once system functionality requirements are determined, the ASP and the customer must establish service level requirements.

Using a Proven Methodology

After finding an ASP with a mix of services and support that meet a buyer's business needs, their next step is to ensure that the provider is able to successfully implement the new system.

In order to reduce the risks associated with implementation, it is wise to choose an ASP that uses a proven implementation methodology, preferably one that is based on previous client experience. The implementation methodology should cover the entire project spectrum from initial gap analysis and business process analysis to custom modifications and post-implementation support. Real-time project tracking is a helpful tool that enables project status to be analyzed at various levels of detail, with issues documented, escalated and resolved in a timely manner.

Complete a Gap Analysis

An essential component of any technology implementation, the Gap analysis process determines the presence of 'gaps' in function between a client's business processes and the functionality offered by the solution. Because this phase is critical in making the transition from the legacy system, it is important that buyers ensure that the ASP has a proven methodology to identify gaps in functionality. At a minimum, the analysis should include job function mapping, test script planning and execution - for assessment of gap impacts on business processes and resulting modifications - implementation team training, and technical specifications for implementation.

This phase ensures a smooth transition by listing deliverables produced from the gap analysis, and by laying the foundation for project, conversion and interface planning. It also feeds into the design of business processes and workflows that will ultimately dictate the configuration of the new system. Successful implementations always contain a thorough Gap analysis.

Post-Implementation Support

Traditionally ASP contracts have a term of three to five years. Throughout that term, the ongoing success of the outsourcing relationship is evaluated using a number of different tools.

Setting Service Levels

The work doesn't stop once the Service Level Agreement is in place. A company must have a thorough understanding of its business requirements in order to set service levels and determine the investment costs for the new system. Areas to consider when determining service level requirements include performance, availability, opening times, incident handling, security, continuity and change management.

The agreement requires constant discussion and renegotiation as the energy industry evolves. The Service Level Agreement should be tracked, reported and analyzed regularly. It is therefore essential to examine the ASP's processes and review systems and how they track quality results. One way ASPs do this is through a series of reports that are combined into a single scorecard and made available to clients online. Reporting should address key areas including online availability and help desk service, and should be detailed enough to identify areas for potential improvements.

Penalties

It is possible that the ASP may fail to meet a specified service level during the length of the term. When examining a potential vendor's agreement, companies should be sure to examine the liability section of the agreement. It should state how disputes will be handled, and any legal exemptions or repercussions for the ASP if service levels are not consistently met. Nonperformance penalties may include a rebate in maintenance fees or mandatory management meetings. If the ASP uses partners or third party vendors, any liability must be clearly detailed in the agreement in the event that either fails to deliver on their agreement with the ASP. This provides a uniform way for all disputes to be handled and protects the customer from poor service.

Training

It is essential that employees understand the technology and services provided and how to use them effectively. A qualified ASP will offer comprehensive training programs for the client's implementation team, and to a group of employees who will be responsible for training other users. Some ASPs may also offer end-user training. Training programs should be instructor-led, should offer content specific to the company's business processes, and should include manuals, handouts, assessments and course evaluations. An efficient training program will enable a company to get their new system up and running quickly.

Conclusion

Outsourcing agreements are not simple one-off deals. They are long-term partnerships. A project roll-out schedule must be finalized before signing a contract, and should include details on the implementation timeline, a communication plan, and procedures for dealing with deviations from the schedule Due to the evolving nature of the energy market, an ASP should provide flexible Service Level Agreements to support integration and customization, and should specify how changes in the agreement will be managed. To outsource successfully, it is essential that a company has a clear understanding of its business strategies, and is able to communicate them clearly to their new partner – the ASP. Setting design reviews, milestones and regularly scheduled meetings will help ensure the ongoing success of the outsourcing relationship. ■

About the Author

Anthony Haines is president of Enlogix Inc., which has offices in the U.S. and Canada and is the World's largest outsourcer of energy industry customer information systems and associated services. Enlogix provides billing services to over three million North Americans in the energy industry. For more information, please visit www.enlogix.com or email enlogix_info@enlogix.com.


Information Technology
Showcase Section

OmniSTAR, Inc. is at the forefront of DGPS technology.

Over the last 20 years the development and introduction of the satellite based Global Positioning System (GPS) has revolutionized navigation and positioning practices worldwide. Differential GPS (DGPS) techniques can provide worldwide real time sub-meter horizontal positioning relatively easily and inexpensively. OmniSTAR, Inc. is at the forefront of DGPS technology.

Part of the Fugro Group, one of the world's foremost survey service companies, OmniSTAR's involvement in precise positioning goes back over 20 years. In the mid-1980's, before GPS was fully operational, the pre-cursor of OmniSTAR provided North America with the World's first round-the-clock satellite positioning service.

With the availability of a fully operational GPS constellation, OmniSTAR, Inc. has built on this expertise in satellite technology and precise geo-location to develop a world-wide Differential GPS service incorporating proprietary "Virtual Base Station" (VBS) wide area differential solution techniques which provide unequaled accuracy.

The removal of Selective Availability (SA) by the US Department of Defense in May 2001 resulted in unaided GPS becoming far more accurate and stable than before. However, a differential correction is still required for applications where horizontal accuracies of better than +/- 8 meter (25 feet) are required.

The foundation of OmniSTAR's service in each area of operations is a network of precisely located reference stations. The range correction data for all satellites in view at all these stations is compressed and broadcast over very large areas from dedicated transponders on geo-stationary satellites. The user's receiver takes this data, makes local corrections for atmospheric effects, and generates an RTCM-SC104 correction "tailor made" for its location.

Using satellite re-broadcast overcomes the range limitations associated with ground-based differential transmissions such as Coastguard 'beacon' and fm sideband, and OmniSTAR's wide area solution corrects for errors, such as multi-path and long baseline offsets, that are commonly associated with these single reference station solutions. The result is consistent, high quality differential corrections that are available anywhere over most of the world's major landmasses.

As a well-established commercial system, OmniSTAR's corrections are of consistently higher accuracy and reliability than the various 'free' tax-payer funded systems. Furthermore, its coverage is not constrained in the same manner as government run systems and it is available virtually world-wide.

The introduction of a global 'L' Band service has meant that a growing number of DGPS manufacturers are implementing OmniSTAR capability into their products. The list of OmniSTAR capable receivers includes: the Trimble Pro-XRS, AgGPS 132 and AgGPS 114, the CSI LGBX and LGBX Pro, the Starlink Invicta 210S, the Satloc SLX, and the Sokkia Axis3. These receivers, which are small, lightweight and require very little power, can easily be mounted in a back-pack or vehicle.

OmniSTAR applications include: agriculture (yield monitoring, variable rate chemical application, soil sampling, field mapping, vehicle guidance, agricultural aviation), forestry, 911 Emergency Services, utilities mapping, microwave path analysis, power distribution mapping, aerial photogrammetry, airborne geophysics, missile tracking, autonomous vehicle guidance both terrestrial and airborne (eg: Globalhawk), EPA activities, etc

New for 2002

The latest development from OmniSTAR, being introduced in the 3rd quarter of 2002, is the revolutionary OmniSTAR HP (High Performance) service. Having reached the current technical accuracy limits of real time L1 only DGPS operations (<+/- 1 meter) OmniSTAR has perfected a unique Wide Area High Precision System. Using a suitably configured dual frequency receiver, the new OmniSTAR HP system should provide accuracies of better than +/- 15cm (horizontal) over entire continents.

This will allow the user to achieve near 'RTK' levels of accuracy without the cost and logistic difficulties associated with operating a standard RTK system. Rather than having to use two dual frequency receivers and a high speed data link almost equivalent results will be achievable with a single dual frequency receiver and access to the OmniSTAR HP broadcast. A typical 24 hour plot of OmniSTAR HP shows 1 sigma horizontal values at the 2 – 3 cm level and 1 sigma vertical error at the 7 cm level (see figure 1.below).

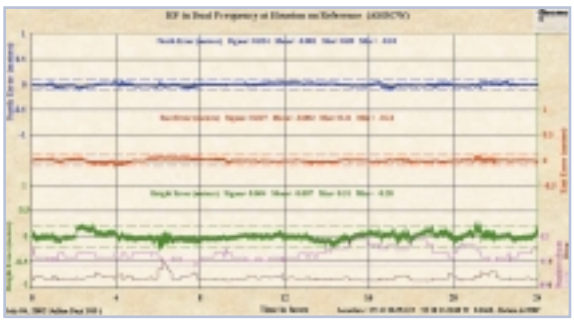


Figure 1.

By providing this level of accuracy with reduced hardware expenses and logistic requirements, the OmniSTAR HP service has the potential to revolutionize GPS usage in GIS and survey applications. Many projects, which require better than sub-meter accuracy and are currently being undertaken using RTK techniques, will be completed in less time at reduced cost by using this new service.

OmniSTAR operates world-wide with main offices located in the United States, the Netherlands and Australia. OmniSTAR VBS is available virtually world-wide and the new OmniSTAR HP service is being introduced initially in North America, Europe and Australia.

OmniSTAR
The Global Positioning System

For more information please visit our website www.omnistar.com or contact us direct on

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The National Rural Telecommunications Cooperative

The National Rural Telecommunications Cooperative (NRTC) helps more than 1,000 rural utilities create opportunity for their members through telecommunications and information technology solutions. These NRTC members serve more than 20 million customers in rural areas of the country that have been un-served or under-served by traditional utilities and other businesses. NRTC supports its members with comprehensive technology solutions that include product research and development, technical support, marketing assistance, regional support and an industry voice.

Satellite Technologies

Since 1986, NRTC has paved the way for its members to offer their customers access to news, entertainment and information through our satellite technology services. Today, NRTC's satellite technology services include:

- DIRECTV®: NRTC's members deliver America's leading direct broadcast satellite television service to more than 1.7 million rural customers. The service provides hundreds of channels of digital video and audio programming through a small, affordable dish and receiver.
- High-speed satellite Internet service: NRTC's TrueBand℠ two-way, satellite high-speed Internet service allows members to offer customers one of the fastest forms of Internet service available, no matter where they live.
- Rural TV: NRTC's first satellite service was created to assist rural customers living outside the reach of cable and broadcast network services. Through Rural TV, C-band satellite subscribers are able to receive programming like their urban neighbors. NRTC's members still serve thousands of rural C-band satellite subscribers.

Power Management Solutions

NRTC's Power Management Solutions give you the information you need to enhance your operations, customer service and productivity. NRTC's power management program includes:

- SmartSCADA: A low-risk approach for co-ops to implement SCADA — at half the cost of a traditional system.
- Residential & Commercial AMR: Advanced Automated Meter Reading systems that provide real-time data for making smarter power management decisions.
- Power Quality Plus: A complete package of residential and commercial surge protection products and support.
- MDS Radios: Wireless communication system solutions using channels in the 220-222 MHz band.

Internet Services

Use NRTC's TrueBand℠ Internet Services to connect your customers to the Web — and position your business as the local technology leader. NRTC's TrueBand℠ Internet Services include:

- Internet access packages: Competitive packages that feature bandwidth, hosted e-mail, authentication solutions and Web services.
- High-speed satellite Internet service: Our state-of-the-art TrueBand℠ two-way satellite high-speed Internet service through Ku-band is one of the fastest forms of Internet access available.
- Prepaid Internet packages: Prepaid Internet offers your mobile customers the convenience of staying connected without the worries of adding another monthly bill, limited access numbers or contractual obligations.
- Branded 24/7 member support: Around-the-clock subscriber and member technical support is available with every Internet package we offer.
- Internetworking equipment: Take advantage of deep discounts on the latest Cisco and fixed-wireless equipment.

Voice and Data Services

NRTC offers a number of voice and data products to help you serve your members better.

- Cooperative long distance plan: More than 300 members take advantage of this plan for significant savings on long distance rates! Offered through AT&T, the plan includes voice, data and frame relay.
- Wholesale long distance: We offer a range of customizable programs that allow you to resell long distance to your members.
- Prepaid Calling Cards: These handy, affordable cards provide your members with prepaid long distance minutes. They're available in 30- or 60-minute time increments.
- Broadband IP Backbone: This tier 1 provider partnership offers secure and reliable backbone bandwidth from 45 Mbps to 9.9 Gbps.
- Cooperative teleconferencing: We provide nationwide voice conferencing at aggressive prices.

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Create opportunities for your co-op through the strength and expertise of NRTC and your fellow members.

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- Get early access to dotcoop, the new Internet domain name for cooperatives, through Founder NRTC.
- Strengthen your organization's image with marketing and community relations resources.

For more information on how NRTC can create opportunity for your utility and its members, visit www.nrtc.org or call us at 866-672-6782.

NRTC

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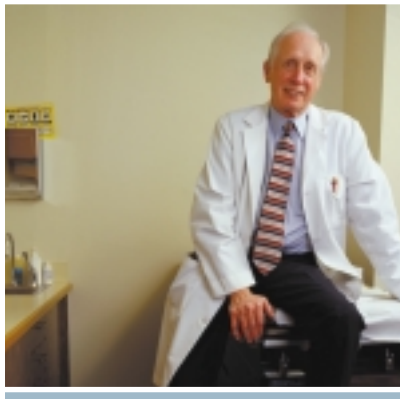


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MiniMax Corporate Profile

The Mission of MiniMax Software Corporation is to be the premier provider of innovative automation solutions and to improve our customer's efficiency through a company environment that encourages employee creativity and guided growth.

MiniMax Software Corporation serves the electric utility industry with a variety of automation solutions. The company's primary focus is providing its customers with technology that brings information from the field and automates processes back in the office. MiniMax offers an innovative work order automation suite used by electric utilities to automate field data collection and processing. Electric utilities across North America rely on MiniMax Software for mobile and stationary field technology and data manipulation.

Products

MiniMax Software currently offers three major systems: StakeOut®, EaseOut™ and ScadaCam™.

StakeOut is MiniMax's innovative work order automation system used by electric utilities to coordinate, layout, design and engineer electric distribution systems. StakeOut automates the work order process from the initial design, using imported digitized maps, to the final procedures of printing staking sheets and updating customer and geographic information systems. Electric utilities and engineering consultants across North America are using StakeOut to automate their work order processes. StakeOut was the very first product to be certified MultiSpeak Compliant. Through MultiSpeak – among other interfaces – StakeOut tightly integrates with other systems, such as mapping/GIS, accounting and CIS. Work order automation through StakeOut keeps these systems up to date, reduces data re-entry and mistakes, and streamlines the entire staking and work order process.

EaseOut is a legal easement software package capable of collecting GPS (global positioning system) readings, then uses that data to generate legal easement descriptions. Available for field workers who routinely write easements, the software is sold as a package along with mobile, pen-based computers, local monument-referenced background maps and high accuracy GPS receivers.

ScadaCam is a system designed to remotely monitor substation activity and ensure security. The system brings together MiniMax's rugged, industrial outdoor video camera technology and remotely accessible Internet controls to create a web cam specialized for monitoring and gauging substation activity. The ScadaCam camera itself is custom engineered for rugged, unsheltered, industrial outdoor use, uses high quality optics, and is equipped with infrared night vision capabilities. Typically mounted strategically along the perimeter of a substation, ScadaCam uses the Internet (any public or private TCP/IP connection) to collect instant snapshots or live, streaming video of a variety of substation activities. These include gauge readings, remote visual inspections of lightning arrestors and fuses, and safety checks for utility staff working within the substation. ScadaCam can also be used to verify visual opens for the SCADA switching operations for dual source supply and loop sectionalizing schemes. In short, ScadaCam provides a visual picture of substation activities not provided by a traditional SCADA system.

Services

MiniMax Software offers a wide variety of services that complement its products. As a total solution provider, MiniMax provides initial and ongoing training and support for each system implemented. Also, because each system is customizable, MiniMax works closely with the customer to tailor its systems to fit the utility's workflow process. In addition, MiniMax Software provides:

- Joint Application Design (JAD) Studies. These in depth studies examine various utility workflow processes, such as the work order process, to improve efficiency and streamline operations.
- GIS configuration services
- Report customization
- System Integration Services
- Custom application development

Total Solution Provider

MiniMax Software is a total solution provider that works closely with utilities to deliver all the components necessary for a successful system implementation. MiniMax provides software, hardware, customization services, training and on-going technical support. Working as a consultant and service provider to its customers, MiniMax delivers flexible solutions that mold to fit the customer's unique workflow processes. For example, StakeOut is a scalable and customizable solution that can mimic each unique step of the utility's work order process. By tailoring the system configuration to meet the customer's exact needs, MiniMax is able to deliver the most customized solution on the market. With additional expertise in related field hardware, MiniMax provides a complete package that includes everything needed for a turnkey solution at the time of implementation.

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StakeOut: staking and work order automation | EaseOut: automated legal easement writing | ScadaCam: substation security & monitoring

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Learn more about StakeOut, the staking and work order automation system that helps you do more than just stake jobs. From our integration with peripherals like GPS, laser rangefinders and wireless Internet, to being the first in the industry to become MultiSpeak compliant, we are committed to providing the best solution available.

We've also been busy developing other automation tools like EaseOut and ScadaCam, adding to our popular suite of automation solutions. These products, along with our commitment to quality, allow MiniMax Software to provide you the most automated tools available today.

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About OSIsoft

OSIsoft – The Leading Supplier of Software Products for Enterprise-Wide Real-Time Information Management Systems

OSIsoft is a ***highly successful*** privately held software products company with headquarters in San Leandro, California. Founded in 1980 by the current President and Owner, Dr. J. Patrick Kennedy, OSIsoft has maintained consistent profitability and growth for over 20 years building software products for large-scale manufacturing operations and the global energy industry.

OSIsoft's flagship product, the out-of-the-box PI System (PI), captures real-time operations data and transforms it into real-time intelligence. Executives, engineers, operations management and knowledge workers use this real-time intelligence to more efficiently plan their business strategies and manage their plant operations.

With more than 6000 PI Systems installed in more than 80 countries, OSIsoft is the leading supplier of real-time information management systems across a number of industries.

OSIsoft's leadership position in the energy generation includes using PI to monitor operations in over 80% of the nuclear power stations and 45 of the top 50 power companies in the USA. More than 1,000 generating plants use PI to lower production & fuel costs, reduce unscheduled outages and do pro-active condition based equipment monitoring and analysis. Power traders, transmission operations personnel, fuel and accounting people, distribution (substation) personnel, independent system operators (ISOs) and power pools use the PI System. PI is heavily used for corporate monitoring of power plants, fleet-wide optimization, tying economic data to plant data, and pro-active condition based maintenance of the generating plant assets.

The PI System installs quickly with standard interfaces for most power plant control systems. OSIsoft's field service team can install and configure most PI Systems in less than two weeks allowing immediately substantial returns on your investment. In addition to control system interfaces, OSIsoft also provides PI interfaces to a wide variety of PLCs, SCADA systems, HMI systems, meters, etc. PI also supports ICCP, DNP 3, OPC, Modbus and other industry standard protocols used throughout the power industry.

PI easily scales to enterprise-wide usage and is widely used in power plants and transmission/distribution for real-time information management across an entire utility company. Many of these systems monitor 40,000 to 100,000 data points. Regardless of data source, all data points are stored in PI for enterprise-wide access in a standard, uniform manner via a web browser, on the desktop or by importing into spreadsheets.

OSIsoft is also a leader in real-time collaboration software for manufacturing processes in oil and gas production and distribution, chemical plants, mining operations, aluminum and steel mills, pulp and paper mills, food and beverage manufacturing, semiconductors and pharmaceuticals. OSIsoft products are used to collect real-time plant floor data and transform it into real-time intelligence, for integration of supply chain management and ERP systems to the manufacturing floor, for vendor-managed inventory and for product lifecycle management.

RLINK, another OSIsoft product, was developed as a gateway to ERP systems such as SAP R/3, to provide real-time intelligence from operations up to the enterprise supply chain. RLINK is a proven mature product with over 35 systems installed in chemicals, pulp and paper, mining, power generation and refining for sending real-time operations data to SAP.

A core technology of the PI System is OSIsoft's high performance temporal database that, unlike relational databases, is specifically designed to store vast amounts of long data-streams for later retrieval. For example, monitoring a machine and capturing 10,000 data points per second for one year would use 0.8 GB of data storage with a temporal database but would requires 8.5 GB of storage with a relational database. For energy industry, PI represents a means to capture in real time all of the data coming off a generation turbine or transformer.

OSIsoft maintains an aggressive ongoing commitment to software research and development spending approximately 30% of total revenues on R&D. Using standard software tools from Microsoft new products are developed and introduced annually. New products introduced by OSIsoft in the last year include PI ICE - an industrial strength server for web access, PI ACE – an advanced calculation engine and PI Module DataBase – a structured hierarchical database for modeling plant processes and equipment.

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About ABB

ABB is a global leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impacts.

ABB offers Industrial IT for Utilities with an integrated suite of metering solutions including advanced, high-accuracy ANSI and IEC electricity meters, communications software solutions, and automated meter reading systems.

ABB provides cost-efficient alternatives for residential and industrial metering applications in regulated and deregulated markets. ABB also offers meters specifically designed for remote communications with a variety of metering systems.

Industrial IT is ABB's advanced information platform designed to link industrial equipment, systems and processes together seamlessly for use in real time.

www.abb.com/metering

About Itron

Itron is a leading technology provider and critical source of knowledge to the global energy and water industries. More than 2,000 utilities worldwide rely on Itron technology to deliver the knowledge they require to optimize the delivery and use of energy and water.

Itron clients use this knowledge to run their businesses more efficiently, reliably and profitably, to strengthen connectivity to their customers, and to meet the new business requirements of deregulated energy markets.

Itron's solution portfolio includes automatic meter reading systems to meet the requirements of all customer classes and service environments; web-enabled workforce management solutions; as well as transmission and distribution system design solutions and services.

Itron also provides advanced software solutions for collection, analysis and application of load profile data, including enterprise-wide data access, data warehousing, load research, complex billing and settlement, and web-based data access and exchange.

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- Requires no code modification to your CIS system
- Eliminates the need to visually read or probe the meter
- Extends the value of Itron AMR systems

Visit ABB and Itron at AMRA 2002

For more information, contact your ABB or Itron representative; call ABB at 1-919-212-4800 or US Toll Free 1-800-338-5251; e-mail: cust.support@us.abb.com; or visit ABB and Itron's web sites:

www.abb.com/metering
www.itron.com

ABB

Datamatic FIREFLY: Low Cost – High Value AMR

"Moving targets are harder to hit" goes the saying. It certainly holds true when your target is a strong business case in today's ever-changing economic climate. Beneficial changes have also been taking place in the Automatic Meter Reading industry. Worldwide deployment of increasingly robust and economical technologies are helping utilities compete by cutting costs, increasing operational efficiency and giving access to large amounts of new and useful data.

Let the Games Begin

Deregulation has raised a number of new business issues. Among the most important to a utility's bottom line is Customer Retention. Deregulation has made it necessary for energy companies to not only provide reliable services at competitive prices but also to add additional value and differentiate their offering from that of their competition. Certainly lower costs enable utilities to offer more competitive pricing. But in addition to staying price competitive, what can a utility do to raise the perceived value of its services? This is where the FIREFLY Automatic Meter Reading System comes in.

"AMR Plus"

The FIREFLY makes use of unlicensed RF communications and low-cost mobile/handheld data acquisition. This approach to AMR is proven, economical and effective, but it is not new. FIREFLY, however, has added some exciting features that raise this proven concept to new levels of sophistication. No longer a just a reading tool, FIREFLY adds broad-based value that transcends the meter shop.

All FIREFLY Meter Interface Units archive usage data at user-definable intervals; a capability called ProfilePLUS. Setting the profile interval to 60 minutes allows the FIREFLY MIU to store the previous 165 days of hourly consumption patterns. Data can be retrieved quickly by field service personnel or meter readers with a handheld or laptop computer. Once it is downloaded, ProfilePLUS data can be displayed on a graph, spreadsheet or other meaningful format. Graphs can be printed, emailed or posted to a secure portion of the corporate website. A picture is worth a thousand words and being able to show a customer when they used the power they did adds credibility to your operation and can often jog a memory or two. For example, the additional power used during a brief and unexpected heat wave can easily be forgotten. ProfilePLUS data can be a helpful reminder to a puzzled customer.

Infrastructure Optimization

Tighter competition drives the need for tighter controls and optimizing the efficiency of operational infrastructure. FIREFLY Electric AMR can be used as a tool to support these efforts as well. For example, over/undersized transformers can lead cost utilities money; either through outages or waste. ProfilePLUS data can be used to determine if transformers are of the proper size for a given location:

1. Extract ProfilePLUS data from all services using a given transformer.
2. Combine the data from all services over the same period of time, creating a master graph showing total transformer load at each interval.
3. Compare total loads on the master graph to the rated capacity of the transformer and "right-size" equipment accordingly

Peak Demand and Time-of-Use Billing

FIREFLY MIU's transform standard residential meters into demand/time-of-use meters. Each single-phase meter transmits the peak demand intervals for the current and previous 30-day periods in every radio message. And ProfilePLUS data can provide the necessary data for certain types of time-of-use billing. This opens new options for incentivizing customers to adjust consumption and help utilities balance demand.

Pulling Double (or Triple) Duty

So now you're reading your electric meters with the FIREFLY AMR System. Routes are optimized. Your people are experienced. Your cost-per-read is a tiny fraction of what it used to be. You've done it all, right? Nope. It's time to use your FIREFLY AMR infrastructure (AMR reading vehicle, software, handhelds, experienced AMR readers) to read the water and gas meters on your existing routes. FIREFLY Meter Interface Units are available to fit virtually all sizes, makes and models of water and gas meters. And your FIREFLY reading equipment can pick up three reads per location as easily as it picks up one. A partnership with the local water and gas providers can generate new streams of revenue with almost no increase in reading labor costs. It's not rocket science, just the next logical step.

Automatic meter reading is revolutionizing many aspects utility operations. No longer regarded as high-tech black magic, AMR has moved into the mainstream. The problem child has grown into a responsible, productive adult. But now the choices become more complex. Can your utility afford to invest in a "one-trick pony", an AMR system that just reads meters? The escalation of competition in the energy market necessitates a business case with a maximum of available options. More and more utilities are finding that the robust, multi-value technology of the FIREFLY AMR System forms the foundation of their strongest business case.

Datamatic TAKE CONTROL

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Meter Reading Manager's Wish List

- ☐ Robust EMR & client/server Route Management
- ☐ High-performance handhelds that take a beating
- ☐ Vendor support until I decide to upgrade
- ☐ AMR compatible with my existing meters
- ☐ AMR with integrated Load Profiling
- ☐ AMR that transmits Peak Demand over RF
- ☐ AMR Collection Vehicle: ~~Econoline Van~~ ~~½ Ton Pickup~~ Hummer

Datamatic at AMRA San Antonio, TX -Booth 169-

. . . can't help you with the last one.

Datamatic TAKE CONTROL

But if it's a proven suite of meter reading technologies you're after, Datamatic has you covered. 25 years experience as a premier utility technology provider are behind every system we install and support. Visit us on the web or at an industry trade show and find out how a Datamatic solution might complete **your** wishlist.

Datamatic 800/880-2878 www.datamatic.com

Miner & Miner is an industry leader in GIS

Miner & Miner is an industry leader in GIS enterprise solution technology, and is proud to supply superior software solutions to utilities and municipalities around the world. Miner & Miner's state-of-the-art solutions and services assist electric, gas, and water/wastewater utilities with effective management of spatial information. Miner & Miner services include implementation, configuration, and if needed, customization of software to fit the needs of individual utilities.

Miner & Miner has provided engineering services for the utility industry since 1946, and has been an ArcInfo, AM/FM/GIS implementer since 1986 when they formed a business partnership with ESRI. This partnership enables the Miner & Miner and ESRI team to provide utility clients with well-planned, reliable, and cost-effective solutions to their business needs.

The ArcFM 8 Solution allows integration and data accessibility throughout the utility. Thus, utilities can make use of a single integrated environment, managing and mapping multiple assets. The ArcFM Solution has been designed to create a single system-of-record for spatial data improving access to land information, consolidating datasets, and reducing redundancy of data storage and maintenance. It allows the integration of all design, work management, and mapping functions to facilitate quick turn-around time of designs.

Miner & Miner's award-winning solution has been designed and built to provide tangible benefits in every area of the utility business to drive down costs, enhance productivity, and provide better and faster service to customers. Miner & Miner's products provide a more productive environment for design and asset management. The products help increase efficiency in building and maintaining network models and allow for greater access to spatial data for improved customer service and dispatch. The solution also allows improved records and asset management and in-plant service. As an off-the-shelf solution for electric, gas, and water/wastewater utilities, the ArcFM solution includes several components:

ArcFM™ is a complete GIS utility solution for modeling, editing, maintaining, and managing facility asset data. It serves as a powerful extension to ESRI's ArcGIS for electric, gas, and water/wastewater utilities. ArcFM includes tracing tasks to automate utility operations, an extensive set of editing tools such as automated symbol rotation, complex feature and user favorite creation, and tools to quickly define and recall map sheet collections for map production.

ArcFM Viewer™, based on ESRI's ArcView 8.1, provides a high-performance, robust query and display component without the expense of a full editing package. Utility executives, managers, customer service representatives, and contractors all need the ability to analyze the asset data maintained by ArcFM. With ArcFM Viewer, utility personnel can view, trace, and query data to help optimize the investment in maintenance and construction to get the most from the facility network.

Designer™ improves the ability of a utility to design and track distribution projects and maintain GIS data. Designer supports cost estimating, work flow management, structural and network analysis, automated layouts, and much more. Designer's open architecture and full integration support with Work Management or Enterprise Resource Planning systems allows for easy implementation to support the life cycle of a job.

Conduit Manager is an extension to the ArcFM Solution to support underground facilities management. It is an integrated set of tools and dialogs to add, annotate, and maintain the underground infrastructure of the utility network system. It provides the functionality for defining an underground system with duct banks, trenches, conduits, cross-sections, underground cables, and underground access structures, as well as support for duct availability tracing.

Responder is a GIS-hosted OMS that leverages .NET and ASP technology to enable trouble call and outage incident management in a web-based, scalable, and configurable desktop environment. The Responder 8 Trouble Call Analysis (TCA) Engine uses a sophisticated and iterative prediction algorithm to determine which interruptible network device caused an outage. High performance GIS display capabilities allow utility personnel to have a spatial view of the locations of trouble calls enabling analysis of outages and immediate dispatch of crews. The application also supports historical archiving and performance indices reporting.

Network Adapter is an ArcFM-based interface to third party interactive network analysis vendors such as CYME, Milsoft, PTI, and Advantica Stoner. It provides tools to extract a model and pass the associated features and load data to an analysis engine using XML. The analysis results can also be viewed directly within the ArcFM Solution. Network Adapter allows integration of multiple calculations and measurements such as voltage drop, load flow, fault current, motor-starting, transformer load management, and many more.

MINER&MINER

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ArcFM™ SOLUTION

- Recording As-built Information
- Facility Query & Reporting
- Automated Design & Cost Estimating
- Outage Management
- Network Analysis

In today's highly competitive environment, utility companies require a more cost effective use of distribution assets through targeted investment for maintenance and growth. Utilities also face tighter information technology (IT) budgets, reduced in-house development staff, and the need to quickly deliver business benefits through applications.

The ArcFM Solution is designed to meet the needs of the utility business for facilities management, design, outage management, and network analysis. The ArcFM Solution offers proven software tools and strategic opportunities to leverage GIS by providing improvements to all critical business areas including operations, engineering, customer service, marketing, and sales. Having the tools to access up-to-date information on assets and customers across the enterprise provides a major competitive advantage in today's market.

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NIC Products Profile

NIC Products, Inc. is a recognized leader in the security seal industry, with a line of seals that combines high security with maximum versatility and cost effectiveness. NIC's seals are used all over the world by leading utilities, government agencies and laboratories. NIC is headquartered in Walnut Creek, California, USA, with state-of-the-art manufacturing facilities in the United States and Mexico.

History

NIC Products Inc. was founded in 1994 with the mission to develop the world's best tamper-evident security seals.

In 1997, after three years of intensive design, development, and testing, NIC produced the **QUICKSEAL XLP.** These one-piece wire (or "loop") seals were a breakthrough due to their material quality, ergonomics, ease-of-use, and permanent identification system.

NIC's seals were first put to the test by the United States Postal Service (USPS) - a high profile customer with a demanding application: to guarantee the security of its postage meters. For this, a smaller version of the **QUICKSEAL** was created–the **QUICKSEAL LP.**

At the USPS, the outstanding performance of the QUICKSEAL LP caught the attention of the United States Department of Defense. Subsequently, QUICKSEAL LP and XLP seals were tested by the Los Alamos National Laboratory Vulnerability Assessment Team (LANLVAT), a world-renowned authority in the assessment of security seals. Besides being judged as the most effective wire seal available, the QUICKSEAL received the highest form of endorsement-the lab began to use the QUICKSEAL for its own applica tions! Subsequently, many other national labs began to use the QUICKSEAL for their own sensitive materials safeguards programs.

NIC then turned its focus to providing solutions for revenue protection in the utility industry. The **QUICKSEAL LP** and **QUICKSEAL XLP** were enthusiastically adopted as highly effective means of preventing theft and tampering. To date, they have been applied in various ways to secure electric meters, panels, transformers, demand meters, etc., as well as water and gas meters.

Looking Forward

Today, NIC is developing products to solve additional problems within the government sector, the utility industry, and additional industries.

This year, for example, NIC introduced **QUICKTAPE**, a highly secure tamper-evident and anti-counterfeit tape seal. It is useful for securing devices or equipment to which a wire seal can't be applied.

In addition, NIC is developing a seal to provide previously unavailable protection for demand meters and a seal that will solve major theft problems in the petroleum industry.

Finally, NIC realizes that effective security does not end with the application of a seal. To achieve the highest level of security, an overall security program is required. NIC enables such a program via its QUICKTRACK Software, which combines a secure but easy-to-use seal tracking system which employs the latest technology in bar code scanning and fingerprint authentication. Using this system, seals can be linked to employees. The result is drastic reductions in revenue loss due to increased employee accountability and the ability to pinpoint causes of loss.

NIC Products

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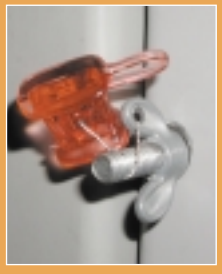
WIRE SEALS • SECURITY TAPE • SEAL TRACKING SOFTWARE

QUICKSEALS – The world's best wire seal

XLP

XLP



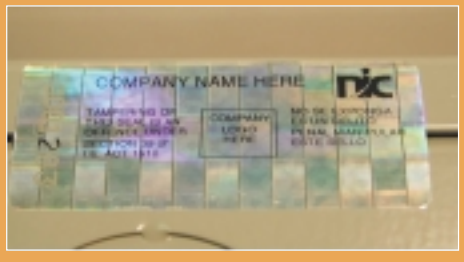
LP

Meter locking hardware **Versatility**

Why are the QUICKSEAL XLP and LP the best wire seals available?

- **Identification:** Permanent laser marking
- **Tamper verification:** Transparent, custom-colored plastic
- **One-piece design:** Can't be cannibalized
- **Superior materials:** UV resistant polycarbonate and high-grade stainless steel wire. 15+ yrs. life expectancy
- **Ergonomics:** Closes with one hand, no tools required!

QUICKTAPE – Tamper evident, anti-counterfeit security tape for a multitude of applications



Commercial panel

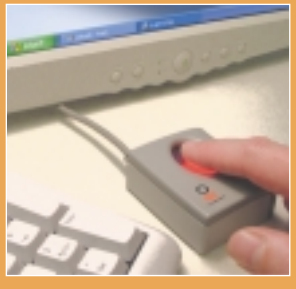
Visible evidence of tampering

QUICKTAPE is a highly tamper-evident metallized tape seal. Used in situations where wire seals cannot be applied.

- **Tamper verification:** Attempts to remove seal leave evidence of tampering
- **Authenticity:** Guaranteed by encrypted image and patented sub-surface marking for unique, permanent identification
- **Durability:** Highly resistant to abrasion, temperature extremes, moisture, chemicals, and UV radiation
- **Versability:** Ideal for glass, plastic, and metal surfaces
- **Market leadership:** Used by top government agencies and utilities worldwide

QUICKTRACK SOFTWARE – Provides seal tracking and chain-of-custody

Employee accountability



Quick fingerprint authentication

NIC realizes an effective revenue protection program must link a utility's seals to its employees. Here are a few of the benefits which NIC QUICKTRACK software provides.

- **Efficient:** Quick and easy method for linking seals to employees via the latest bar code scanning and user authentication technology
- **Chain of custody**
  - Tracks subcontractors' seals
  - Prevents unauthorized access to seals
  - Increases employee accountability
  - Tracks employee productivity
- **Increased revenue:** Drastic reductions in revenue loss through identification and elimination of causes of loss
- **Inventory control:** Accurate, up-to-the minute inventory control

To find out more about NIC Products' complete security solution, visit us at www.nicproducts.com or email us at info@nicproducts.com

SECURITY SEALS FOR THE 21ST CENTURY

3100 Oak Rd. Suite 210 Walnut Creek, CA 94597 USA Tel. 925-930-2883 Fax. 925-930-2885

RuggedCom
Corporate Profile:

RuggedCom Inc. is a leading developer and manufacturer of industrially hardened communications and networking equipment designed to operate reliably in harsh utility and industrial environments. RuggedCom's corporate headquarters is based in Concord Ontario Canada. RuggedCom currently employs over 30 people in Canada and the US with sales representatives and distributors in over 25 countries around the world.

Markets Served

Utilities – RuggedCom's communications products have been specifically designed to meet the demanding environmental conditions found in electric power utility substations. RuggedCom's RuggedSwitch‰ family of fiber optical Ethernet switches is designed to meet the EMI Immunity requirements of the newly issued IEC 61850-3 "Communications networks and systems in substations" standard. RuggedCom has a strong background in protection and control systems as well as substation automation. RuggedCom's communications and networking products have been designed with a strong first hand knowledge and appreciation of the critical nature of utility applications.

Industrial - RuggedCom is a leading proponent of Industrial Ethernet for use in industrial automation applications. RuggedCom's product line has been tailored for use on the factory and plant floor. Special consideration has been given for applications involving real-time process control via Ethernet requiring high levels of reliability, availability and performance.

Transportation Systems - RuggedCom is a leading proponent of Industrial Ethernet for use in traffic and train control systems. RuggedCom is able to leverage its knowledge and expertise in developing communications networks and systems for mission critical applications in the utilities market and apply that domain expertise in the transportation sector where reliability, availability and real-time performance are also critical requirements.

RuggedCom in Canada

RuggedCom is based in Canada (Concord, Ontario) with the following activities residing in Canada:

- ❑ Research and Product Development
- ❑ Product Manufacturing
- ❑ Sales and Marketing
- ❑ Customer Support and Services

Collaboration with Canadian Utilities

RuggedCom has been collaborating closely with leading Canadian electric power utilities since its inception. Paramount in this collaboration has been RuggedCom's adoption and promotion of the Utility Communications Architecture (UCA2.0) for use in utility automation applications. RuggedCom is also actively engaged with Canadian utilities in conducting field trials of its new products and harvesting feedback on the needs and problems faced by Canadian utilities in order to better tailor our future products and services.

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RuggedCom

Industrial Strength Networks

RuggedSwitch™

Family of Substation Hardened Fiber Optical Ethernet Switches

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- *Zero - Packet - Loss*™ technology under EMI Stress!
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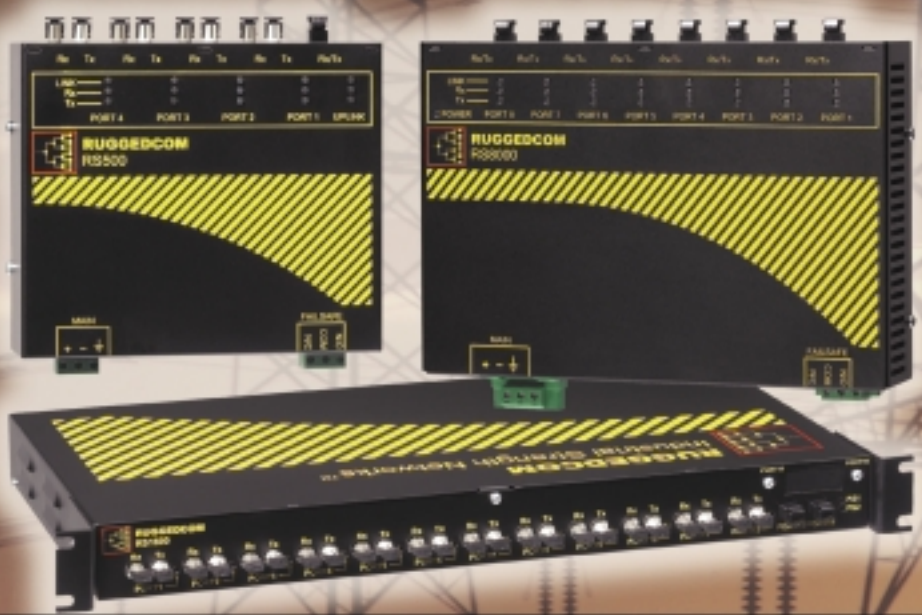

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Teaming up to Solve Problems for Utilities

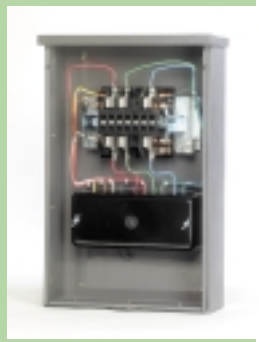
How a vendor's quality, engineering and purchasing teams work together to help utilities remain competitive.

By:

Steven Rios
Utility Products
Marketing Manager
E.J. Brooks Company

Opti-Lock secures meter optical-data transfer ports.

Long-term acrylic meter seal withstands harsh environments.



Lexan prewired meter-socket endures severe environments.

Leadership teams at the E.J. Brooks Family of Companies understand that creating effective solutions demands inter-departmental, and sometimes inter-company, synergy.

To that end, quality, engineering and purchasing managers from five Brooks Family companies attended a four-day June conference devoted to meeting the highest standards of electric utility customers worldwide. Attending were managers from E.J. Brooks Company, Meter Devices Company, Ekstrom Industries, Trans-Guard Industries and Zappa Plastics.

Topics at the Canton, Ohio, symposium ranged from product design and development to supply chain management to ISO implementation and other quality issues. The interdepartmental meeting—combining the expertise of 32 engineering, quality and purchasing professionals—was convened to meet electric utilities' demands for the highest quality and most innovative products at the best prices.

To help electric utilities most effectively requires that our companies deliver products that have attractive features, high quality, and reasonable pricing. To meet these requirements involves tapping into the expertise of engineering, quality and purchasing professionals.

Competitive Edge

By working together, we can create products that provide a competitive edge for our customers. By working together, we discover value-added steps that can result in higher quality, an improved manufacturing process, better functional design or lower cost of producing products. We incorporate design ideas that will reduce cycle time and improve customer satisfaction.

In our company's 129-year history, we have seen and survived myriad changes in the economic/ business/political landscape—including wars, recessions, depressions, a changing global marketplace and copycat competitors. Through it all, we have worked together to anticipate and meet our customers' needs.

As changes in our marketplace continue to demand the most from us, we recognize that now more than ever, cooperation is a must. We must work together to do whatever it takes to help our customers do business more safely, effectively, efficiently and profitably.

Every Brooks Family product has been designed and manufactured to meet the needs of customers; three exemplify particular benefits of interdepartmental cooperation and responsiveness to utility customers.

Enduro Seals

The E.J. Brooks Enduro Seal was developed to provide utilities with a durable, long-term meter seal that can withstand harsh environments. Over the years, product design and re-development has involved Brooks team members from nearly every department, strategizing to create the most effective possible seal. Today, Enduro Seals are available to meet a range of requirements. They are available with a solid body and a contrasting color insert, or a transparent body and solid color insert. Enduro Seal with Bar Code Label is available with bar code symbologies: Interleaved 2 of 5, Code 39 or Code 128. Enduro Tamper Guard features a clear acrylic body with an oval shaped thin-walled cavity in insert for greater tamper evidence. Enduro IdentaSeal is available with your custom message and is an ideal long-term identification tag.

Opti-Lock

Ekstrom Industries, Inc. was hearing the need for a product to protect data transfer ports on new electronic meters. In response, Ekstrom purchasing, engineering and quality teams joined together to create a simple, ultra-efficient product, the new Opti-Lock. Ekstrom Opti-Lock protects optical data transfer ports, preventing unauthorized access to metering data and safeguarding products from the environment. Easy to install and seal with long-term, demand or cable lock seals, the product can be identified with company name and/or logo.

Lexan Prewired Meter Socket

"Many of our customers were looking for a corrosion-free alternative to the standard steel and aluminum meter socket," said Meter Devices Manager of Marketing John Gagnon. "We designed the Lexan Non-Corrosive Prewired Meter Socket to meet their needs," he added.

The new product will endure harsh conditions in coastal areas, refineries, chemical plants, fertilizer plants and other caustic environments that can be damaging to steel and aluminum enclosures. Lexan offers a product life of 30-45 years. The Lexan Non-Corrosive Prewired Meter Socket interior is equipped with Meter Devices' standard 13-terminal meter block and test switch, prewired to customer specifications. Enclosure construction is NEMA 4X, and the meter opening is fully gasketed. Connectors are supplied on the meter block mounting bridge for service grounding. For security, a cover interlock is designed to prevent the cover from being opened unintentionally.

About Brooks, Meter Devices & Ekstrom Industries

Founded in 1873, E.J. Brooks Company designs and manufactures a full line of security seals and locking devices. The world's oldest and largest manufacturer of security seals, the company is based in Livingston, N.J., and has 13 operating units worldwide. Meter Devices Company, a member of the Brooks Family of Companies, serves electric utilities internationally and electrical contractors nationally with metal enclosures, meter warm-up boards and meter/relay test switches and accessories. Ekstrom Industries, Inc. is the leading manufacturer of meter socket adapters and metering test equipment. All companies are registered to ISO 9001.

About the Author

Steven Rios, a 20-year marketing veteran for several product groups at E.J. Brooks Company, Livingston, N.J., was named Utility Products Marketing Manager in 2000. He earned a B.S. degree in Marketing at Kean University, Union, N.J. Contact: steven.rios@ejbrooks.com.

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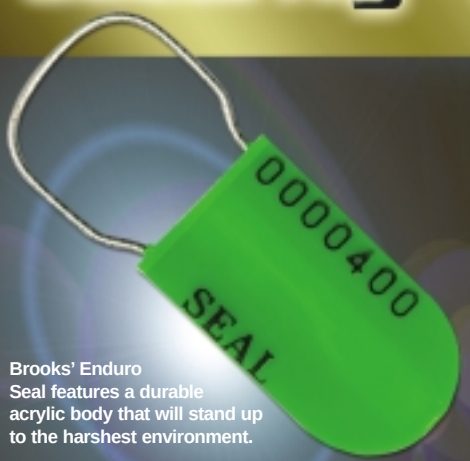
Enhance Security

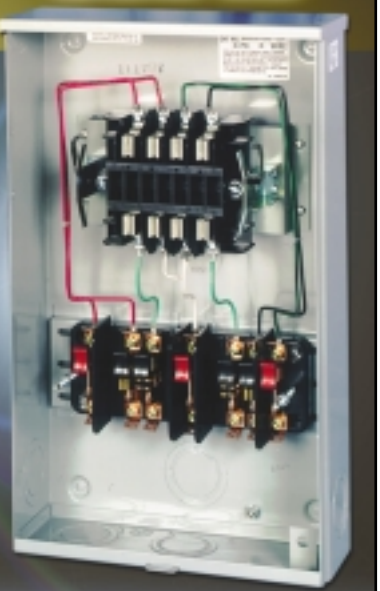
Solve Problems

Reduce Costs



Brooks' Enduro Seal features a durable acrylic body that will stand up to the harshest environment.

The profile of Ekstrom's LP Series extender adapter is only 1.2"; 4-8 jaw models; accepts phone lines for direct access, MOVs for surge protection, relays for load controls.



Meter Devices transformer-rated meter sockets are prewired to specs with provisions for test switch and wiring harness.

Brooks' Multi-Lok Cable Seal provides cost-effective meter security. Cable is available in 3 diameters. Has dozens of electric-utility applications.

EK Disconnect Device ensures safety, disconnects single-phase and polyphase lever-bypass sockets under load.

Meter Devices designs and manufactures the finest quality and most complete line of test switches in the industry.

BROOKS

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MDI Meter Devices Company, Inc.

The electricity meter stands at the core of your business, marking the place where investment turns into return. Our Utility Products Group is dedicated to creating security, safety and cost-effective solutions at the metering point. Please visit our web sites for 1,001 more solutions.

Utility Products Group

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Innovation... in applied research and development.

The Manitoba HVDC Research Centre performs innovative research and development into advanced power system technologies, power electronics, and power system simulation. We offer specialized engineering services and develop leading-edge technology products for the power systems community. Founded in 1981, we are part of the Manitoba Hydro family, Canada's fourth largest utility.

PSCAD™ – Setting the Standard

Through the introduction of the PSCAD™ simulation software, now used in over 60 countries, the Centre has helped revolutionize power system simulation.

RTDS™ – World's First

RTDS™, the world's first real time digital simulator of power systems was developed at the Centre.

RTP™ – Making Waves

Our RTP™ (Real Time Playback) power system waveform generator offers portable, low cost, high fidelity transient testing capability.

Successful Partnerships

Longstanding strategic technology alliances with organizations such as ABB and Siemens, and a technology advisory board with representation from research organizations, universities, and electrical equipment manufacturers have fostered our success – we continue to seek new technology initiatives and research partnerships.

Power of Positive Thinkers

It is thanks to the extraordinary efforts of our researchers that the Centre has become a world leader in power systems simulation technologies, power systems analysis, and related technologies.

With our large worldwide base of technology users and research partners, we have our finger on the pulse of the electric energy industry – around the globe.

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SPL Products: Advanced Customer Management Technology

SPL's customer management products—including its flagship CorDaptix™ customer billing and management solution—deliver high levels of functionality, robustness, flexibility, and ease-of-use to facilitate best-practice processes and truly personal customer service. They offer a full breadth of functionality and can be easily adapted to meet the changing needs of customer-focused organizations, regardless of their size or scope of operation.

SPL's customer management application software serves companies in a wide range of service arenas, including:

• Regulated industries and utilities, including those that provide services like electricity, gas, solid waste, water, recycling, wastewater, sewer, storm drain, meter charges, traffic signals, street lighting, security/area lighting, poles, pole attachments, and phone booths.

• Unregulated industries like retail energy services, time switches, control equipment, appliance servicing/warranties, energy-efficiency services, fire detection, land leasing, loans, security monitoring, charitable contributions, cable TV, cable ISP subscriptions, insurance, and credit cards.

• Changing markets. In a number of countries, the transportation and distribution of electricity and gas are in some form of transition, undergoing privatization, deregulation, or re-regulation. In these and in fully regulated markets, services companies are finding themselves challenged to change by meeting customer needs for increases and improvements in the quality and quantity of products and services. Companies facing these challenges increasingly need the capabilities offered through a partnership with SPL WorldGroup that can help them, for instance, bill multiple products and services on one bill or respond to rate and product changes virtually overnight.

CorDaptix™

CorDaptix is the best-of-breed flexible core of a company's customer management software solution. It provides a product platform that can adapt and evolve with changing business models and support innovation and rapid customer response. At the same time, CorDaptix is a standard software product that can be easily upgraded as new versions become available.

CorDaptix posts all transactions in real-time. It is intuitive to use, enhancing a company's customer service capabilities. The product's sophisticated workflow guides users through all necessary steps to complete important activities accurately and rapidly. It features a well designed, browser-based interface with rapid "drill-down" functionality and hierarchical, tree-like views while also providing multiple methods to explore data. The system is always in balance and includes both accrual and cash-accounting capabilities.

Partners

SPL WorldGroup has established strategic alliances with many of the world's leading hardware and software suppliers to ensure its product offerings are fully compatible and incorporate the very latest technology advances.

• Software partners include BEA, Group 1, Oracle, PeopleSoft, and Siebel Systems.

• Hardware partners include HP, IBM, and Sun.

• Systems integration partners include Accenture, AMS, CGEY, Deloitte & Touche, KPMG, Logica, and PWC.

Implementation Services

SPL WorldGroup maintains a 100% track record for successful customer implementations, applying its seasoned and experienced professionals to maximum effect in every project.

SPL consultants work closely with customers and system integration (SI) partners using proven tools and methodologies to deliver a solution that meets each client's needs—on time and within budget. They add value to any project team, providing expert project management skills along with systems design and integration expertise to deliver on customer requirements and ensure a high level of knowledge transfer.

Customer Service

SPL WorldGroup places a high priority on customer service, providing global support 24 hours per day, seven days a week, through its Customer Service Group (CSG). Staffed by qualified programmers who are fully equipped to ensure rapid resolution of technical issues, CSG operates from facilities in Australia, the Philippines, the United States, and France to provide toll-free support around the clock.

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- Avoid pricing deals based on bad data

What PricingExpert Can Do For You:

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- Market analysis & prospecting
- Campaign management
- Data loading & storage
- Validation & estimation
- Weather normalization
- Linking to procurement products

Other LODESTAR CCS™ Components:

- LODESTAR Transaction Management Hub™ manages business-to-business and application transaction requirements for trading partners
- BillingExpert™, a powerful and easy-to-use billing engine
- RateExpert™, a competitive rate analysis with an optional revenue forecasting module
- Financial Management Extension™ with collections, for billing and collections to provide your organization with data and reports
- LODESTAR Profile & Settlement System™ for cost-effective load estimation, reconciliation and settlement
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- Chris Hamilos, Chairman and CEO, LODESTAR Corporation

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Siemens Metering, Inc.

Nuon Integrates Fragmented IT Environment

With Converge "Meter-to-Bill" Enterprise System

In the spring of 2001, Nuon, the second largest utility in the Netherlands, was struggling to efficiently process meter data information within a highly splintered and complex information technology (IT) environment. The fragmented environment was a result of a merger of three large Dutch utilities—the original Nuon in Arnhem, ENW in Amsterdam and EWR in Leiden. Prior to the merger, each company owned its own data acquisition and billing applications and followed its own information processing and business rules. The newly formed company was faced with the overwhelming task of integrating these disparate applications into one streamlined and efficient enterprise system that spanned and supported the entire organization.

An additional complication in the efforts to bring cohesion to Nuon's IT environment was the earlier liberalization, or deregulation, of the Dutch energy market. Earlier restructuring had already forced vertically structured utilities to split into separate functional companies—the GENCO which was responsible for the generation of energy, the NETCO which was responsible for energy distribution, the ESCO which was responsible for supplying energy to the end customer and the METCO which was responsible for acquiring and processing meter data.

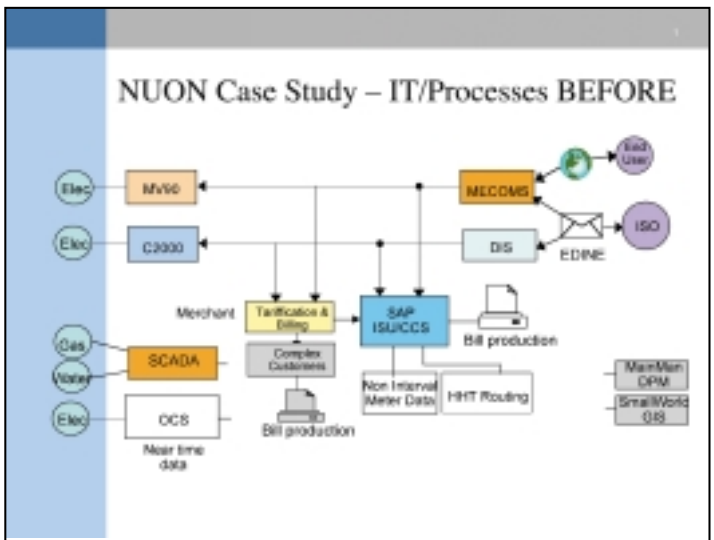
The result of these merger and deregulation activities on Nuon's IT environment was threefold. One, the company's "definition data", consisting of customer, meter and other system and logistic information was widely dispersed across multiple systems and locations. Secondly, in order to collect meter data and to bill customers, the company now owned and used a number of disparate proprietary systems that did not "talk" to each other. And, finally, the new business processes required by deregulation, such as sending meter data to the correct energy supplier or sending meter data to TenneT, the Dutch System Operator, were not supported.

Faced with these challenges and anticipating additional new market requirements, Nuon Monitoring, Nuon's METCO, partnered with Siemens to evaluate and improve the situation.

Evaluation Workshop

The first step that Nuon and Siemens undertook together was a one-week workshop during

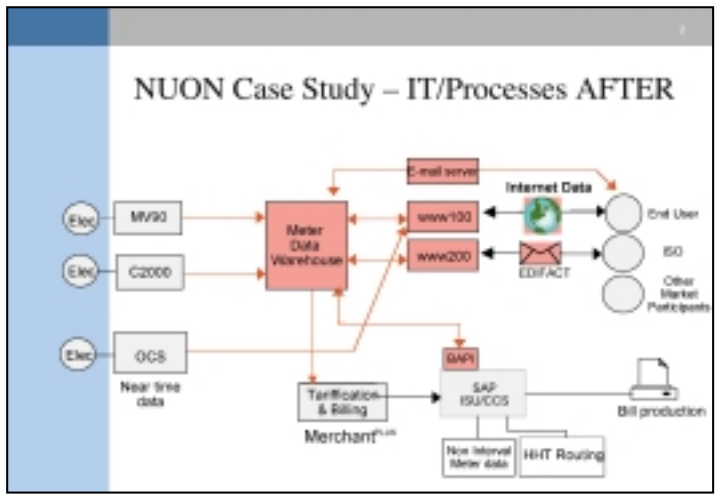
which they conducted a complete system evaluation of Nuon's existing IT infrastructure. Before any product or service recommendations were made, the project stakeholders identified which processes Nuon Monitoring would be required to support in the deregulated market. Secondly, the team reviewed the existing systems and defined which systems and interfaces, currently in place and not yet in existence, would be needed to supply a complete, integrated solution. The team determined that integration of two of the existing infrastructure systems, SCADA and GIS, would add no business value toward solving the market meter requirements goals defined for the project. For that reason, they were excluded from the scope of the recommended solution.



Nuon's initial I/T infrastructure was cobbled together from various disparate meter data collection and billing systems—the result of market requirements in the deregulated Dutch energy market and a series of company mergers. Nuon and Siemens partnered together to evaluate, recommend and implement a solution that would streamline processes and information sharing.

The Complete "Meter-to-Bill" Energy Information Solution

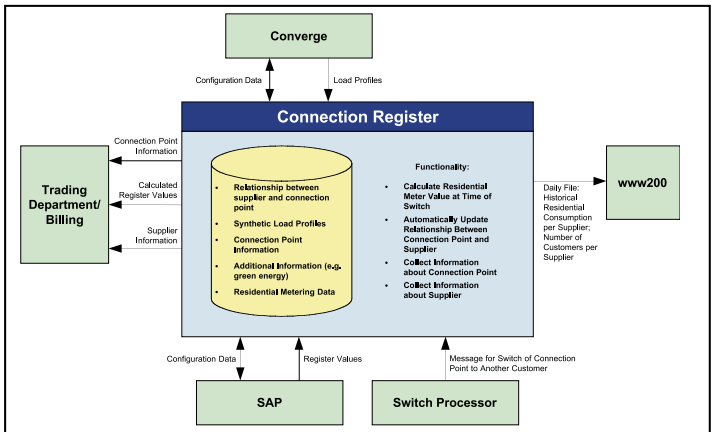
At the conclusion of the one-week system and process evaluation workshop, Siemens recommended its Converge Meter Data Warehouse to consolidate all of Nuon's meter data in one location. As the central data consolidation point, the Converge solution facilitated information management both during the intake or collection process as well as during the distribution or transfer process. Using fully automated system interfaces, Nuon was able to retain its investment in all of the company's existing data acquisition systems. Additionally, data from the Converge warehouse is distributed efficiently to interested outside market participants. For instance, data is delivered to the SAP billing system using a standardized BAPI interface. Tennet receives Settlement Process information via Siemens' www200 EDI Exchange product. And, energy consumers can access usage and profile data via the www100 Internet Information System. Each of the required deregulated processes identified in the collaborative, initial workshop evaluation is fully supported, automated and integrated into Nuon's existing IT landscape.



Requirement Changes Affect Project Scope

During the implementation of the Converge Meter Data Warehouse, Tennet imposed new rules upon information and energy providers. The new requirements mandated that the customer "switch" process, when energy consumers switched from one energy supplier to another, must be automated. They also mandated the automation of synthetic load profile calculation for groups of customers without interval meters. Although the Dutch System Operator carries out the "clearing and settlement" process, it depends on actual measured and synthetic load profiles that are provided daily by Nuon Monitoring. Together, Nuon and Siemens specified and described the complex business processes necessitated by the new market mandates.

To implement the jointly defined switch and profile processes, Nuon and Siemens established a system "connection register." The register contains all of the information related to or connected to a physical delivery point, such as the relationship between a supplier and a connection point and whether a supplier is a "green energy" company. When implemented with the Converge Meter Data Warehouse solution already being installed, the connection register would enable Nuon to automate both the customer "switch" and clearing and settlement processes required by the deregulated market.



Nuon's "connection register" allowed automation of the fragmented "meter-to-bill" process, the customer "switch" process and the System Operator "clearing and settlement" process.

Project Management, Commissioning and Installation

In order to fully comply with continuing Netherlands market deregulation, Nuon was bound to meet specific, fixed deadlines established by the legislature for various process implementations. One of the deadlines, for example, included the date by which data exchange with the System Operator would take place in a defined format (EDINE). Other processes, such as the automation of the customer "switch" process, also had to be supported by all market participants by certain dates. Additionally, the data migration requirements of the project were considerable. These milestones and time constraints increased the pressure on both Nuon and Siemens.

Before work commenced on the project, Nuon and Siemens wrote a detailed Statement of Work (SOW), building on the defined requirements initially identified in the joint one-week workshop. All delivery dates were outlined in the SOW, which became the governing document for the project acceptance. The document also clearly outlined the responsibilities for each of the respective companies. For example, Siemens was responsible for all integration and system interface activities and for the creation of specific import scripts used to migrate Nuon's existing data to the Meter Data Warehouse. This attention to detail and the up front investment of time and effort allowed Siemens to deliver the Converge system in record time.

ID	Task Name	Start	End	Duration
1	Workshop and Requirements Clarification	5/1/2001	5/7/2001	5d
2	Requirements Document	5/7/2001	5/7/2001	1d
3	Offer	5/7/2001	5/7/2001	1d
4	Customer Decision Process	5/8/2001	5/28/2001	15d
5	Order	5/28/2001	5/28/2001	1d
6	Detailed Statement of Work	5/29/2001	6/25/2001	20d
7	Statement of Work Ready	6/25/2001	6/25/2001	1d
8	Project Implementation	6/26/2001	9/17/2001	60d
9	Acceptance Testing	9/18/2001	9/18/2001	1d

Q2 01: May, Jun
Q3 01: Jul, Aug, Sep

A jointly drafted Statement of Work (SOW) with clearly defined project deliverables, delivery dates and roles and responsibilities, allowed Siemens to deliver the Converge Meter Data Warehouse solution in record time. The entire project, from needs analysis to system acceptance took less than five months as shown in the project schedule above.

Success and Customer Benefit

Every utility in the Netherlands was required to have complied with the new market regulations by January 2002, supplying interval data and correctly calculated synthetic load profiles for each energy consumer to the Dutch System Operator. Nuon was the first utility to send correct and complete values to the System Operator and other market participants, meeting the deadline with time to spare. Other utilities, unable to supply correct and complete date, forced the System Operator to extend the deadline.

Excellent cooperation between the Nuon and Siemens teams contributed greatly to the tremendous success of the project. Nuon now operates a more cohesive, robust IT environment and enjoys the following benefits from the streamlined systems.

- Metering data is consolidated in one open architecture environment
- Nuon was able to retain their existing, working data acquisition systems with no additional capital outlays or modifications
- Nuon was able to automatically migrate existing definition data into the Siemens systems
- Nuon now enjoys a fully automated interface to the SAP billing system
- Nuon now has fully flexible and automated data reporting and validation functionality
- Nuon can now fully support new business processes in the liberalized market (customer "switch" process and the "clearing and settlement" process)
- Nuon can now distribute data throughout the organization and to the energy consumer via the Internet
- Data Exchange (measured and aggregated metering data) with other market players and System Operator is now fully automated ■

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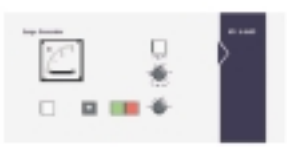

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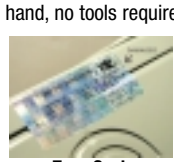
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T3000 System can be used for load-shedding, load management, hourly reads (or more frequent), instant-real-time reads, power outage detection, and other remote access services.

Telemetrix Inc.

Contact: Joe Schon – Chief Operating Officer
1225 Sage Street
Gering, Nebraska 69341 USA
Tel.: **(308) 436-3886** • Fax: **(308) 436-5165**
Web Site: www.tlxt.net
E-Mail: jschon@tlxt.net

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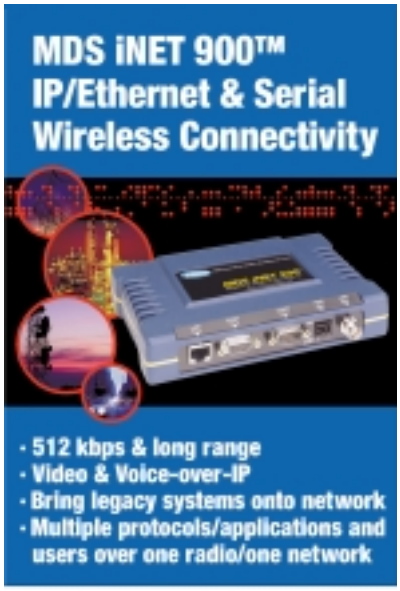

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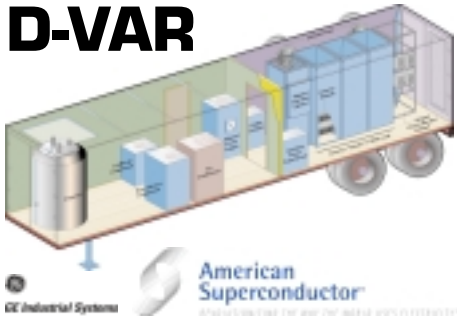
D-VAR



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PRODUCT SHOWCASE

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The Altimus Service Disconnect meter supports a variety of connect/disconnect and service-limiting applications.

Four different operational modes—manual, remote, service limiter and soft fuse—can help utilities mitigate costs and risks associated with service activation and deactivation.

Features of the Altimus Service Disconnect meter include 2S 240V Class 200 continuous operation, a two-piece modular design featuring a fully integrated 200A relay, ServiceSafe interface, base module-independent measuring element calibration, Switch Status LEDs, and remotely accessible switch status.

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Email: jbrett@tantalus-systems.com
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PRODUCT SHOWCASE

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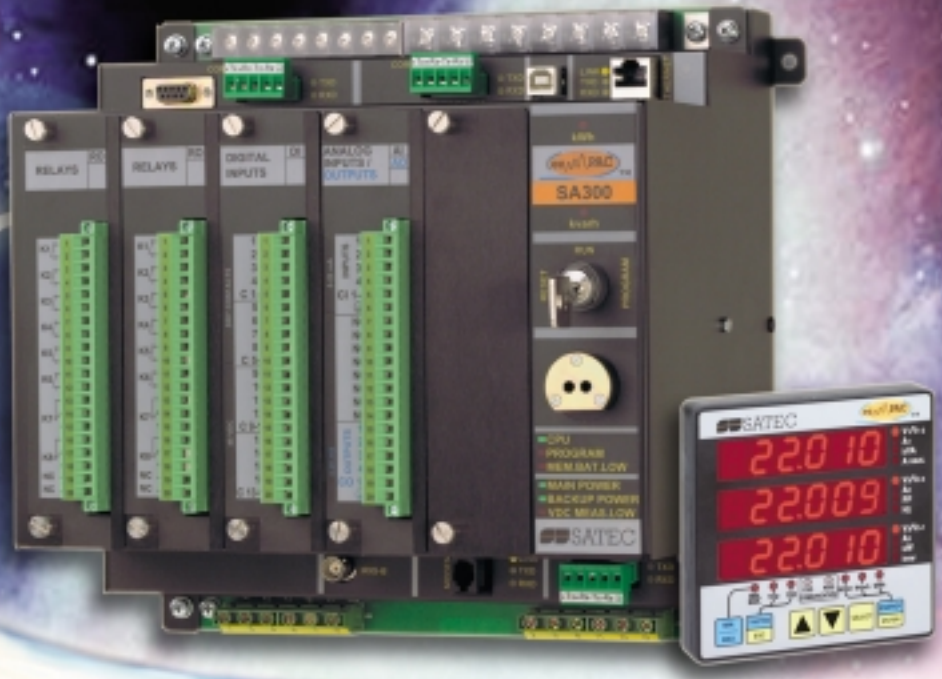

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