



market trends digest

NEWTON-EVANS
RESEARCH
COMPANY 

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Review of Second Quarter 2006 Activities

CIGRE study: During the spring of 2006, Newton-Evans completed a survey conducted on a pro bono basis for CIGRE, the international high voltage electric power association, on the topic of wireless Wi-Fi communications use for substation automation and protection. Electric power utility engineering staff in more than 40 countries participated in the research program. Highlights of the study findings are reported in this edition of Market Trends Digest, (pages 8 & 9) and will be presented at the 2006 CIGRE Conference in Paris on August 28, 2006.

Oil and Gas SCADA Study: In June, 2006, Newton-Evans released publication of a three volume study of the market for oil and gas pipeline SCADA technology. The study includes results of an international survey of pipeline operations officials regarding their use and plans for SCADA systems. A summary is included on pages 2 & 3.

Water and Wastewater SCADA Study: Two volumes of a study of the TOP 100 cities and mid-sized American water distribution and wastewater treatment operations were completed in June. Highlights of the study findings are reported on page 4.

Protective Relay Study Underway: Newton-Evans is well underway with its sixth international market study of the use of protective relaying technology by electric power utilities. New in this study is the inclusion of OEMs and industrial relay buyers as survey participants. The multi-volume study is planned for completion in September.

Preliminary findings are reported on page 7 inside.

Private Client Studies: In May, Newton-Evans completed a study of technical T&D and high voltage-related services market opportunities for one client and in June began two new studies. The first concerns purchase plans for a variety of substation equipment and related controllers, and the second study focuses on the future use of generator disconnect switches in light of advances being made with generator circuit breakers.

Additional News Items: The joint market briefings held this year are likely to continue in partnership with Energy Central's Sierra Research unit. Following on the completion of two successful early morning market briefings held in Tampa (in conjunction with DISTRIBUTECH 2006) and in Dallas (in conjunction with the IEEE T&D Conference). . . More than 75 industry marketing officials attended one or the other briefings. . . Newton-Evans' paper on substation communications has been accepted for presentation in September at the upcoming China International Conference on Electricity Distribution (CICED) Conference. . .

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New Three Volume Market Study Depicts the Global Outlook for Control Center Based Systems Used by Oil and Gas Pipelines

The Newton-Evans Research Company released highlights from its newly published three volume series of reports on the status and market outlook for supervisory control and data acquisition (SCADA) systems used in the oil and gas transmission pipeline industry and in natural gas utilities.

The study includes information gleaned from surveys and usage profiles of more than 100 transmission pipeline operations and gas utilities in 14 countries.

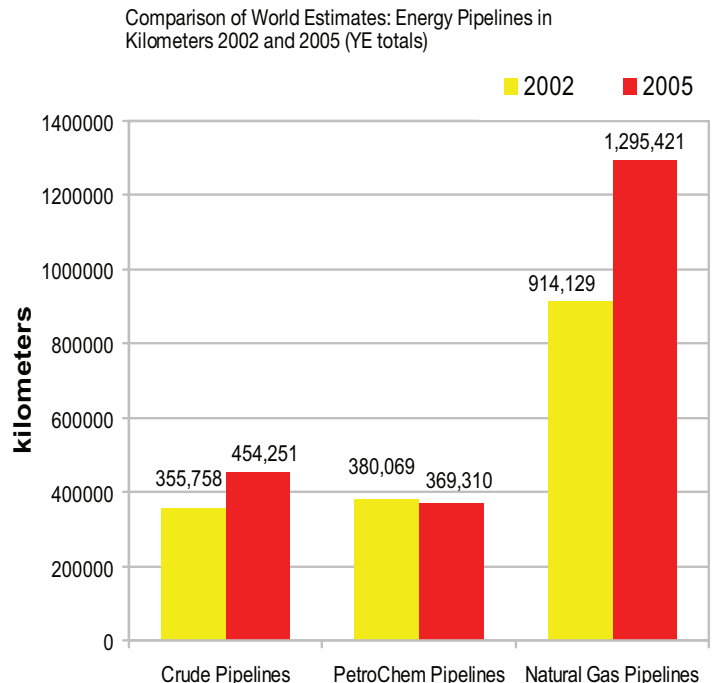
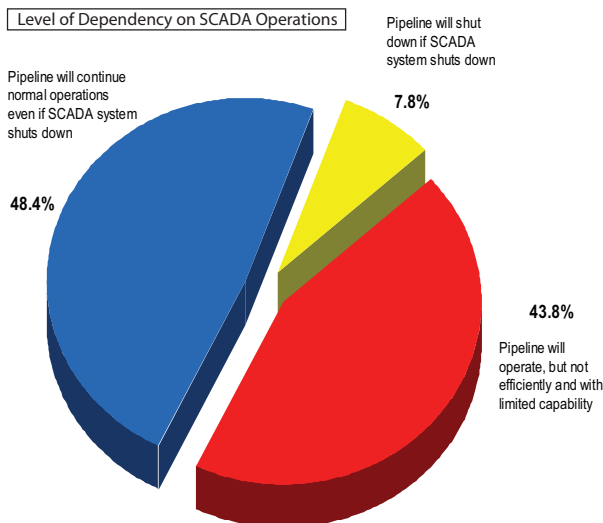
Volume 1, the Global Summary of Research Findings, found a continuing low-to-moderate growth market for pipeline control systems spending. The report suggests that many pipeline control center operations teams continue to do more with less, and are simply “making do” by adding required new applications and modifications to older, existing platforms. Pipeline operations centers are now running about the same as their counterparts in the electric utility industry when it comes to spending for cyber security safeguards.

The survey-based report includes findings on new SCADA purchase plans, RTU and PLC usage, suppliers likely to be considered, cyber security threat reduction approaches, pipeline operational dependency on SCADA, type of com-

pressors in use, and methods of billing for pipeline transportation services.

Volume 2, the Global Market Outlook, forecasts spending for pipeline control center-based systems and technology to increase at a four-to-seven percent average annual growth rate over the three year forecast period. Today’s global market for pipeline SCADA in the oil and gas industry is approaching \$250 million per year, exclusive of related spending on control center sites themselves, or on related GIS systems or recurring SCADA telemetry costs.

Volume 3 includes profiles of leading suppliers of SCADA and related control systems, software and related field equipment to the oil and gas pipeline industry. This year’s study contains profiles of more than 30 companies active in the pipeline SCADA market. These profiled firms account for the majority of industry sales worldwide



Newton-Evans Research 2006
 derived from information provided in the 2006 edition
 of the World Fact Book US Government (CIA)

Some of the highlights discussed in these Newton-Evans' reports are the following:

According to industry participants interviewed by Newton-Evans, the consensus is that about 85% or more of the world's operating pipelines of more than 25 kilometers in length are controlled by a computer-based SCADA system.

These few thousand systems worldwide include as many as 75,000-80,000 remote terminal units and plc's installed to provide local data acquisition.

Fewer than 200 pipeline-operating companies control the operations of more than 750 major long-haul energy pipelines used to transport large quantities of crude oil, refined products and natural gas. An additional 8,000-11,000 oil and gas pipelines are owned and operated by 3,000-4,000 smaller companies (separate corporate identities).

The trend in mid-2006 continues toward further integration among pipeline operations. Over the next several years, this will likely have a consolidating effect on the number and type of SCADA systems used to control energy pipelines.

SCADA systems penetration in the world's currently operating pipelines is significant. The market is "mature" at least to the extent of having basic controls, remote data acquisition, and centralized computer-based systems in place in the majority (e.g., 85%-95%) of larger, critical pipelines, and controlling and monitoring perhaps as much as 65-70% of smaller pipelines.

This trend to already be operating with SCADA is without regard to geographic location of the pipeline. Developing nations are as likely as industrialized states to be using modern SCADA technologies.

Pipeline SCADA systems utilize multiple communications techniques and methods. Radio and

telephony are among the communications technologies used. For larger pipelines microwave, satellite technologies and fiber are widely used in the pipeline industry today.

Internet- and intranet-based technologies are becoming more relevant each year as a critical "method of data acquisition and reporting."

Newton-Evans estimates that the world inventory of operating energy pipelines at year-end 2005 included about 355,000 kilometers of crude oil pipelines; 380,000 kilometers of petroleum pipelines, and nearly 1,300,000 kilometers of natural gas transmission pipelines. There are an additional 2.5-3 million kilometers of natural gas distribution pipelines operated by as many as 2,200 local gas distribution companies.

The accompanying chart suggests that total pipeline kilometers have grown over the last three years, with the addition of many new and expanded crude oil and natural gas pipelines into the world inventory, while refined products pipeline totals seem to have remained at about the same levels.

Many pipeline operators have continued to implement multiple approaches for reducing vulnerability on their control networks. Today's pipeline SCADA systems are likely to include a variety of cyber-security measures.

The three volume series of reports is available for purchase in print format as well as by e-mail PDF and on CD. The series is available for purchase from Newton-Evans Research Company for \$3,750.00. Individual volumes may be purchased separately.

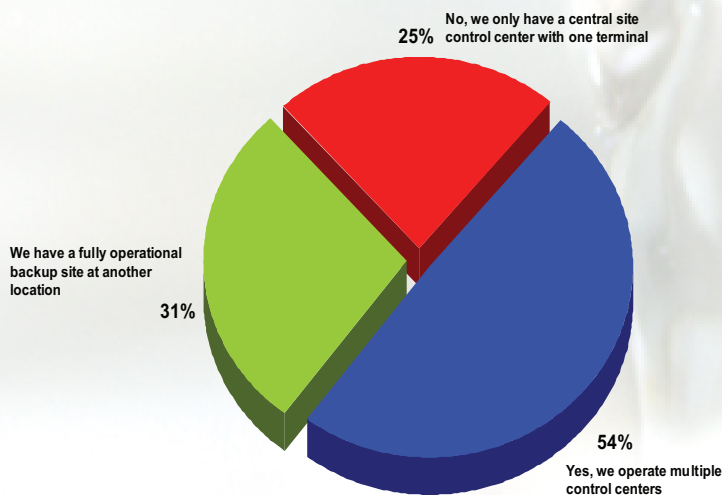
Further information on the series is available at the Newton-Evans Research Company website (www.newton-evans.com) or by e-mail to eleivo@newton-evans.com. The company can be reached by telephone at 1-800-222-2856 or 1-410-465-7316.

The North American Market for Supervisory Control and Data Acquisition Systems in Water and Waste Water Utilities: 2006-2007

In recent years, Newton-Evans Research Company has conducted several research programs providing a clear view of the international market for supervisory control and data acquisition (SCADA) systems among electric, water and gas utilities, and gas and oil pipeline companies. This study is Newton-Evans' sixth water industry study of SCADA usage patterns and trends, but the first in several years.

This new series will provide an in-depth appraisal of the central and remote site hardware, applications software, and communications services that water and waste water utilities are now using and will be requesting during their next round of procurements for SCADA systems.

Figure 10. Does the utility operate secondary control centers for its SCADA operations?



The research study is resulting in a comprehensive and informative series of reports on control systems usage patterns and plans of water utilities in more than 100 major and mid-size cities and water districts throughout North America. Volume one will contain a summary of research findings from the North American market. An analysis and forecast for the water industry IT and SCADA market will be the second volume in the series. The final volume profiles more than 20 suppliers of SCADA-related systems, software and services to the water utility marketplace.

Key Issues Addressed in the Study Series:

Current use of supervisory control and data acquisition systems.

Plans to upgrade/replace or install new SCADA systems by year-end 2007.

Budget considerations and contract award dates.

Approximate number of RTUs/PLCs currently installed and planned for installation in water SCADA systems, as well as protocol and communications requirements.

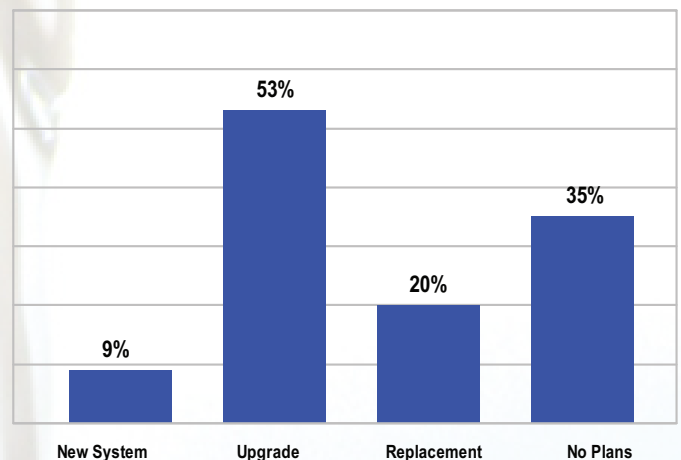
Specific water-related functions and applications now being performed on SCADA systems, and plans for additional applications.

Profiles of the leading suppliers of SCADA-related systems and services to the water and waste water utilities in North America.

Communications methods and protocols in use and planned at major and mid-size water and waste water utilities.

Follow our progress on this new research program on our website (www.Newton-Evans.com). Publication of the 3-volume series is planned for September.

Figure 2a. Plans to acquire new (additional or replacement) SCADA systems over the 2005-2008 period, as well as upgrades/retrofits (based on 98 respondents overall)



UPCOMING CONFERENCES, TRADE SHOWS AND EVENTS

IEEE Transmission and Distribution Conference & Exhibition

Latin America, August 15-18, 2006

Tamanaco Intercontinental Hotel, Caracas, Venezuela

Short courses will be given on the following:

- a) Scada and Substation Automation. John McDonald, 2006 IEEE PES President (Kema Consulting VP, USA). Simultaneous Translation Provided.
- b) Live Maintenance of HV Facilities: The Argentinian Experience. Eduardo Nitardi (Technical Director, Transener, Argentina). Simultaneous Translation Provided.
- c) An Introduction to Microprocessor-Based Protective Relays. Dr. Luis Pérez (SEL Inc., USA). Simultaneous Translation Provided.
- d) Power System Basics for Non-Engineering Professionals (IEEE PES Course). Dr. Ramon Villasana, USB (2005-2006 President Elect IEEE, Venezuela). Simultaneous Translation Provided.
- e) Distributed Generation: Applications and Emerging Technologies. Vicente Sánchez. (Venezuela).

International Telecommunications Energy Conference

This 2006 conference will be held in Providence, Rhode Island, and will feature manufacturer exhibitions, 10 half-day tutorial sessions, and presentations of technical papers.

INTELEC is an annual conference which examines and analyzes the latest developments in telecommunications energy systems and related power processing devices and circuits. Technical papers present research and new developments in power electronics and telecommunications power systems, including DC power plants, powering architectures, AC systems, DC-DC converters, batteries, prime power systems, grounding, physical and thermal design, alternative power (engines, fuel cells, etc) and building and equipment cooling systems. There are also tutorials and a technical exhibition of products and equipment. PELS is the sole sponsor of INTELEC when it is held in North America in even-numbered years and provides technical support when the conference is held outside North America.

CIGRE Session 2006

Representatives of Newton-Evans Research Company will attend the 2006 Session of CIGRE, scheduled to take place in Paris, France, from August 27 to September 01.

CIGRE (International Council on Large Electric Systems) is one of the leading worldwide Organizations on Electric Power Systems, covering their technical, economic, environmental, organisational and regulatory aspects.

This year's session will involve:

- 2298 delegates
- 92 universities delegates
- 700 professional visitors
- representatives of 72 countries
- 2000 sq.m of dedicated exhibition space
- 89 specialised exhibitors

The Exhibition will present

- Transmission equipment
- Monitoring, security and protection equipment
- Measurement, test and certification tools
- Knowhow and expertise of electricity companies and consultants
- Training tools and techniques
- Technical press and international associations.

For a directory of services, schedule of Technical Meetings, and a list of exhibiting manufacturers, go to <http://www.cigre.org/gb/events/sessionCIGRE.asp?vers=2002>

China International Conference on Electricity Distribution 2006 (CICED)

This Conference will be held September 17-20, in Beijing, China, and it will also be attended by members of Newton-Evans Research Company. CICED is the major international electricity distribution conference held in China under the support of CIREC Directing Committee, gathering the engineers, technical managers from the electric power distribution companies and the power supply department of the factories in China as well as from the R&D institutes and universities in China to exchange their ideas, achievements, problems and the developments in distribution network planning, design, operation, management and new technologies and equipments for urban distribution networks and under the electric market circumstances with the persons of the same occupation from domestic companies and from overseas. It will promote the further cooperation and contact between the worldwide participants to improve the electricity distribution technology and management level jointly.

The main topics for the CICED 2006 are to build a safety and reliable, clean and efficiently modern urban distribution network.

SIEPAC Transmission Line scheduled to be Operational in 2008

SIEPAC (Sistema de Interconexión Eléctrica de los Países de América Central) is an ongoing project to construct a 230 kV transmission line that interconnects 16 substations across six Central American countries: Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama. The \$320 million USD project was formally approved by all participating countries in 1996; since then it has drawn support from ENDESA Spain as well as the Inter-American Development Bank, which has approved more than \$240 million in loans. According to the U.S. Department of Energy, "Spain has agreed to provide an additional \$70 million of financing, and Spain's ENDESA will lead a consortium of national power companies in building the project."

The 300 MW capacity line is to run from Veladero, Panama through Guatemala to Cajon, Honduras for a total of roughly 1,800 kilometers. In addition to the new line, major upgrades and improvements to existing interconnections will take place. According to the IADB, "the bilateral interconnections that now exist between the countries of Central America and Panama are of poor quality, and limit firm transactions to 50 MW." The SIEPAC line will serve as a foundation for creating a regional electricity market in Central America.

The project's official website (www.eprsiepac.com) presents a time table which indicates that construction began in June of this year. The estimated completion date is 2008. The \$320 million budget includes \$160 million for construction of the line, \$40 million for 15 substations along the line, \$18 million for capacitors and reactors, with the remainder going to engineering studies and land purchases.



New Relay Study Finds Changes in Attitudes and Buying Plans among North American Protection and Control Teams

In late June, Newton-Evans staff began the field survey work associated with the conduct of the 2006 protective relay study. While the initial effort focuses on North American utility participation, to be followed in August with a strong effort on international survey work, there are some important findings that we can already report from this preliminary sample of more than 40 major utility protection and control managers and senior staff.

First, the plans for procurement of new relays remain strong through 2008. While smaller utilities typically have budgets for relay purchases of less than one quarter million dollars, significant budget increases appear to be in the works for mid-size and larger utilities.

Secondly, despite trends to migrate more and more purchases to the use of digital relay equipment, this trend is not exclusively one-directional. There remains some opportunity in what is still a sizable market for the producers of electro-mechanical units over the next few years.

Utilities are aware of, and have made plans to comply with, the loading requirements outlined in the North American Electric Reliability Council's "Blackout Recommendation 8A, including the provisions of BZ3 (Beyond Zone 3).

Securing remote access to protective relays has taken on even greater importance than reported in the last Newton-

Evans study, completed in 2004, with many utilities now adopting multiple approaches to enhancing security of remote access.

Importantly, despite the best arguments laid out by suppliers and consultants, many North American utilities are not moving to embrace IEC 61850 protocol in the near future. There are many reasons for this unwillingness to conform to this new standard, including satisfaction with DNP 3.0, and lack of significant advantages in making such a move.

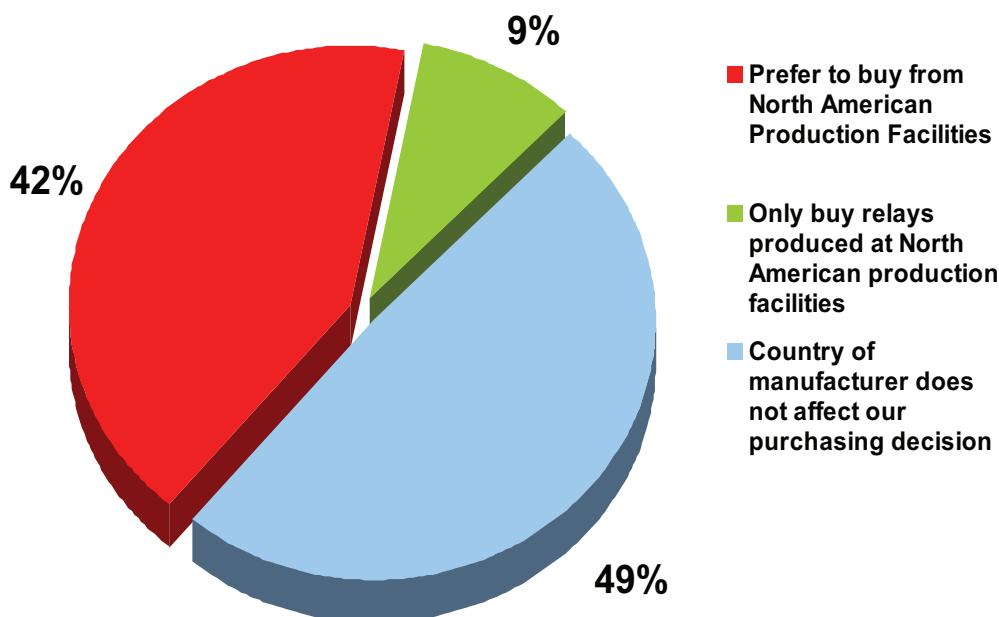
When it comes to relying more heavily on digital relays for taking over the role played by dedicated disturbance recorders and sequence of events recorders, it appears among this subgroup of large North American utilities that these specialized devices and equipment types will have an ongoing role for bulk power substations and transmission voltage applications. For distribution network applications, the digital relay is becoming more widely relied upon to provide this functionality.

The current research program is probing into relay testing, prioritizing utility challenges, packaging of distribution relays, importance of relay manufacturing location, time accuracy requirements for substations, preferences for solutions for high-impedance fault detection, and several more topics submitted by clients. Each survey contains responses to more than 35 topics and subtopics, amounting to more than 250 data points.

More information on the current research program and opportunities to participate in the study as a survey respondent or as a subscriber can be found on the Newton-Evans web site.

Interim news summaries on the progress of the study are being provided to subscribers until the publication of the final reports, planned for September availability for the North American and International markets, and for October for the world market assessment and summaries of the surveys of OEMs and industrial users of protective relays.

Country of Manufacturer as a Factor in Relay Purchasing Decisions



Highlights of International Research Study on the Use of Wi-Fi In Electric Power Substations for Protection and Automation

The research study on the use of Wi-Fi wireless communications in electric power substations was undertaken by the Newton-Evans Research Company on behalf of CIGRE during January to May, 2006. The survey was sent to leading electric power utilities around the world. More than 80 utilities from 32 countries participated in the research program. Findings indicate that only minimal use is being made of Wi-Fi technology in electric power utility communications. The reasons for not using Wi-Fi wireless communications on a broader scale center around issues related to data security, and lack of familiarity with evolving data encryption standards being developed for use by electric utilities.

The survey was designed and related field work and report preparation was conducted by Newton-Evans Research on a “pro-bono publico” basis for CIGRE. The survey was sent to approximately 400 electric power utilities serving at least 50,000 customers, and having at least 20 electric power distribution and/or transmission substations.

By May, 2006, more than 80 surveys had been received from 32 countries, and were validated and tabulated for inclusion in the final report, which is now a section of the draft B5 WG22 tutorial to be presented to CIGRE B5 conference sessions in Paris in August, 2006.

RESEARCH FINDINGS:

Across the world, there was little difference in current practices regarding the use of Wi-Fi wireless technology adop-

tion and use. That is to say, utility officials are not using Wi-Fi at the present time for sensitive applications, such as protection and automation activities in electric power substations.

Use of Wireless LAN Based on IEEE 802.11.

There were a few users of existing IEEE 802.11 protocols, but only three utilities indicated any plans to use IEEE 802.11i, the newest and most secure of the wireless-related encryption techniques. The majority (90%) of utilities indicated no plans to use wireless LANs in the substation. Most were already using some form of “wired” approach (fiber, copper, cable).

Security Issues Having an Effect on Communications In Substations:

Thirty-eight percent of the utilities indicated that security issues did have an effect on their decision not to use wireless communications in the substation, based on the company’s security policy. Twenty-two percent stated that published articles discussing the risks of wireless use affected their decisions, and ten percent said their own, or other utility experiences, justified their position not to use wireless communications in the substation. Twenty percent said security did not have an effect on their decision not to use wireless approaches. For these, most had just upgraded some type of wire line approach to substation communications. See Figures 2a and 2b.

Figure 2a. Do security issues have an effect on the decision not to use wireless communications in the substation?

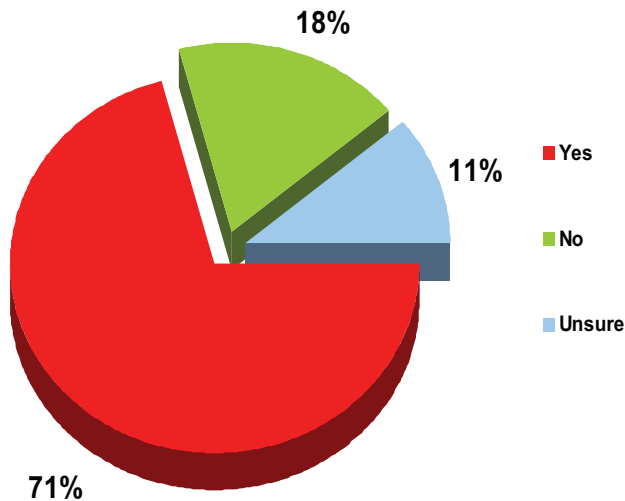
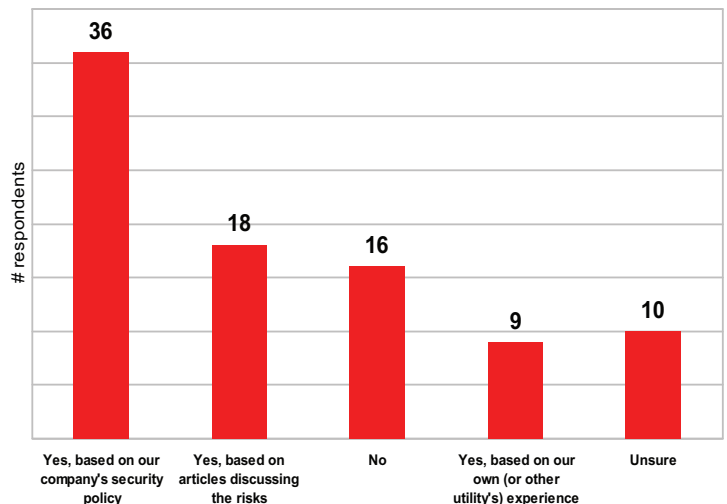


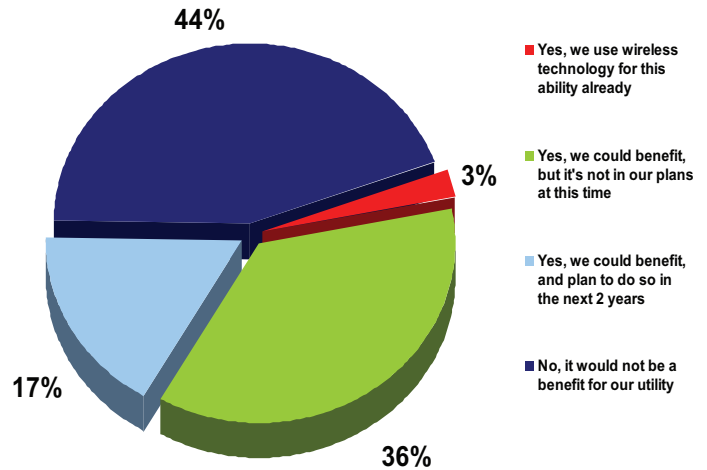
Figure 2b. Do security issues have an effect on the decision not to use wireless communications in the substation?



Requirement for Local Access to Substation IEDs without Entry into the Substation:

Forty-four percent of the respondents stated that they did not need local access to substation devices without entering the substation. One third stated that they could benefit from this capability, but had no plans to implement a solution. However, just about one in five officials stated that they could benefit from local access to substation IEDs without having to enter the substation and would implement a solution by the end of next year. See Figure 4.

Figure 4. Need for local access to substation IED's without entering the substation



and 7b.

Other Applications for Wireless Communications:

The majority of international utilities were already using wireless technologies for voice applications, and for paging. Plans were mentioned by several for new applications of wireless technologies for asset management and inventory control applications. The majority were not planning to use any wireless communications for operational applications such as energy management or distribution SCADA, power generation control or substation control. The most important use of wireless technologies for operations was centered on maintenance crew dispatch services.

Figure 7b. Results of the security assessment

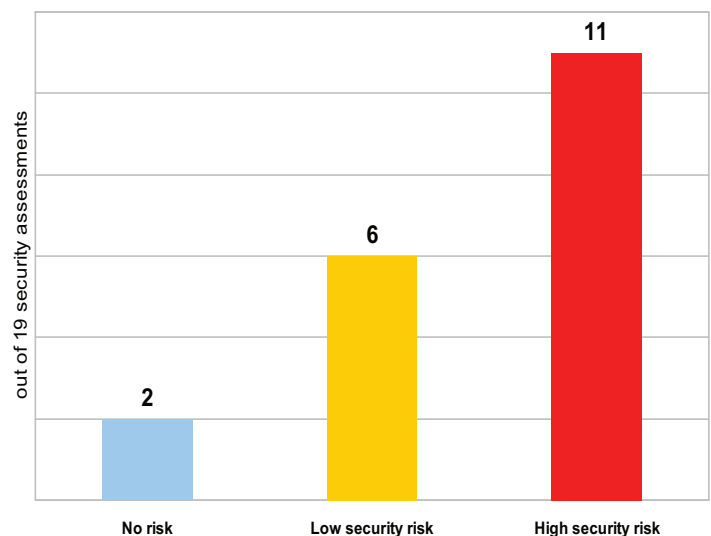
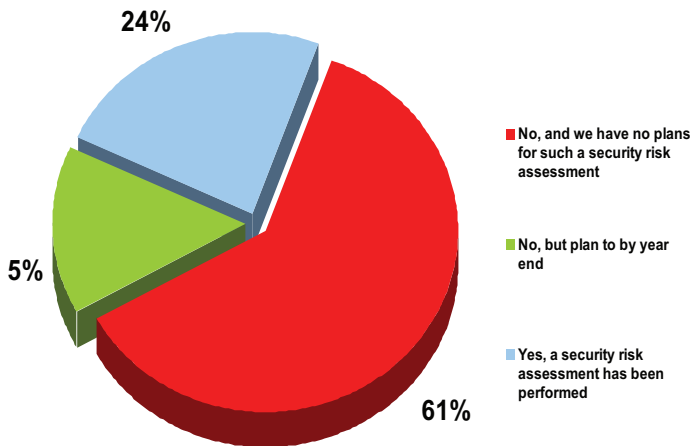


Figure 7a. Has a security risk assessment been performed at your utility that includes possible use of wireless communications for protection and automation?



Wireless Use for Mission Critical Tasks:

Most utility officials (more than 90%) are quite concerned about security risks related to using wireless communications for (a) setting of protection relays; (b) breaker control and (c) recloser control. However less than one half were concerned with security issues when it involved remote metering data capture using wireless communications.

Security Risk Assessment:

The majority of utilities around the world have not performed a security risk assessment as of mid-year 2006. However, one quarter have done this, and 16% had plans to perform a security risk assessment. The results of the security risk assessment indicated that more than one half of those utilities were reported to have a high security risk for one or more of their assets or activities. See Figures 7a