



Newton-Evans Research Company's

# Market Trends Digest

May 2017



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# Electric Power Control Systems Market

Excerpts from Newton-Evans' 2017 study of Control Systems in the world's electric power utilities.

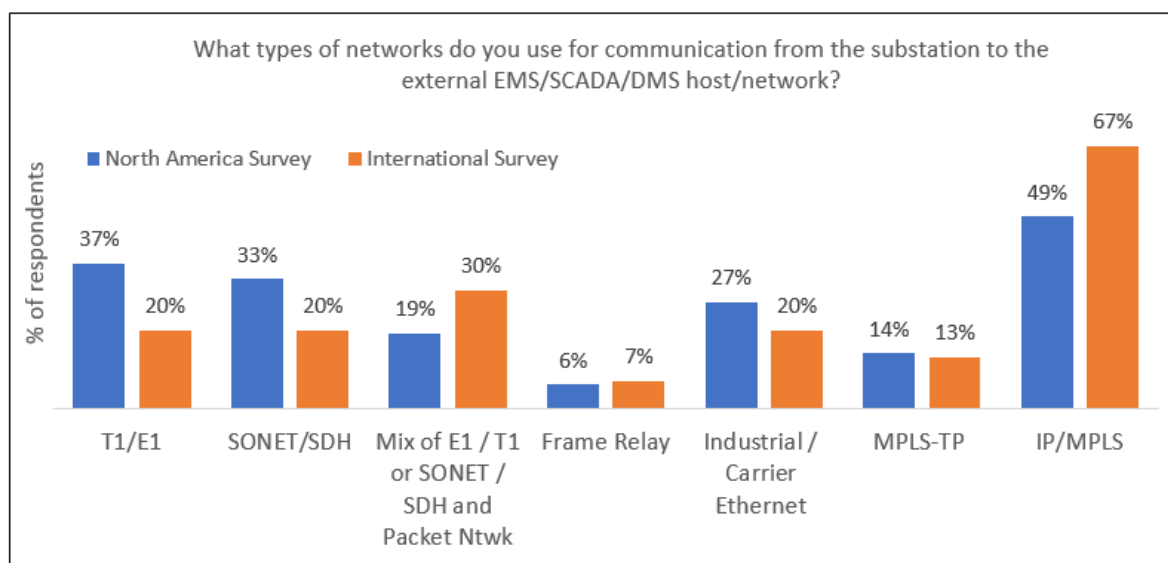
## Newton-Evans Study Finds Heavy Use of IP/MPLS and Continued Reliance on Utility-Operated Telecommunications Networks for EMS/SCADA and DMS Systems

The latest findings from the Newton-Evans Research Company study of control systems used in the electric power industry point to heavy reliance on IP/MPLS networks for wide area communications from substations and other field locations to central site control systems.

### Reliance on IP/MPLS Networks

Sixty-seven percent of international respondents use Internet Protocol/Multi-Protocol Label Switching (IP/MPLS) technology for communication from the substation to the external host/network. Thirty percent use a mix of T1/E1 and/or SONET/SDH and packet networks. It is likely that MPLS-TP (Transport Profile) will see increased use in the next Newton-Evans control systems study scheduled for 2019.

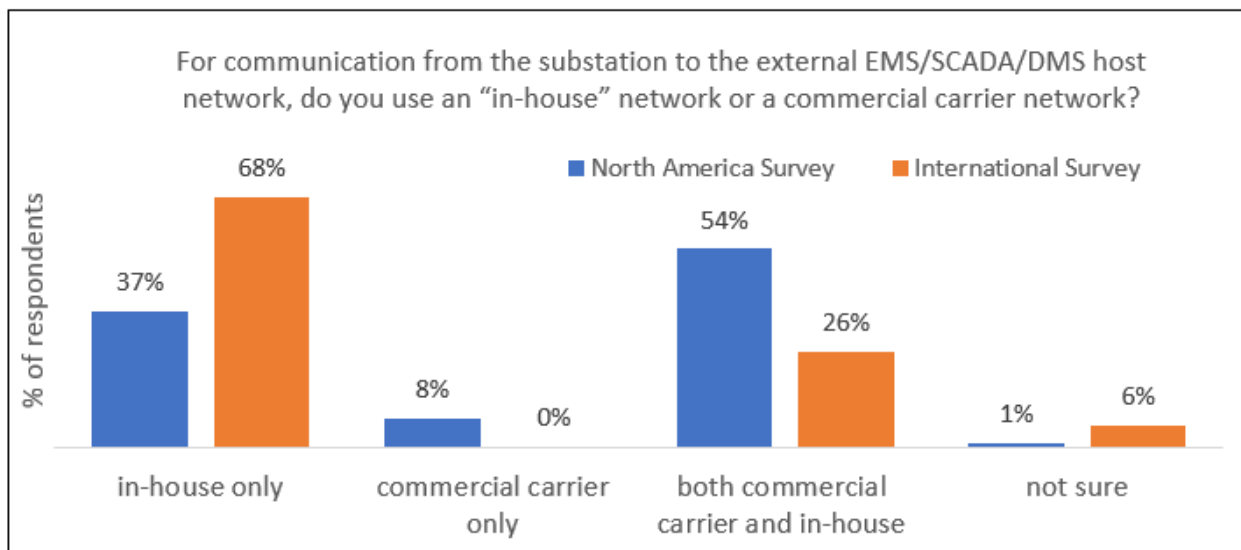
Forty-nine percent of North American respondents use IP/MPLS network technology for communication from the substation to the external host/network. Thirty-seven percent use T1/E1 and 33% use SONET/SDH, followed by 27% who use Carrier Ethernet. Often, more than one type of network is used. Half of North America's investor owned utilities in the survey continue to use T1/E1, and over half of them use IP/MPLS as well.



### Reliance on In-House Networks

Sixty-eight percent of international respondents rely on in-house networks for communication from the substation to EMS/SCADA/DMS. Twenty-six percent use a mix of in-house and commercial carrier, but none of the respondents indicated total reliance on commercial carrier networks.

Fifty-four percent of North American respondents use a combination of commercial carrier and in-house networks for communication from the substation to EMS/SCADA/DMS. Thirty-seven percent rely exclusively on in-house networks, and 8% use commercial carrier networks only.



Among large North American investor owned utilities, 83% use a combination of commercial carrier and in-house networks to reach each of their substation locations, which typically range from dozens to hundreds of sites over hundreds or thousands of miles of service area. Nearly two-thirds (62%) of public power utilities and 56% of small utilities (rural electric cooperatives and municipal utilities serving fewer than 50,000 customers) limit their operational telecommunications approaches to in-house managed networks.

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### **Newton-Evans Study Indicates Similarities in Plans for Full Digital Substations and Differences for Condition-Based Maintenance Programs Among Electric Utilities**

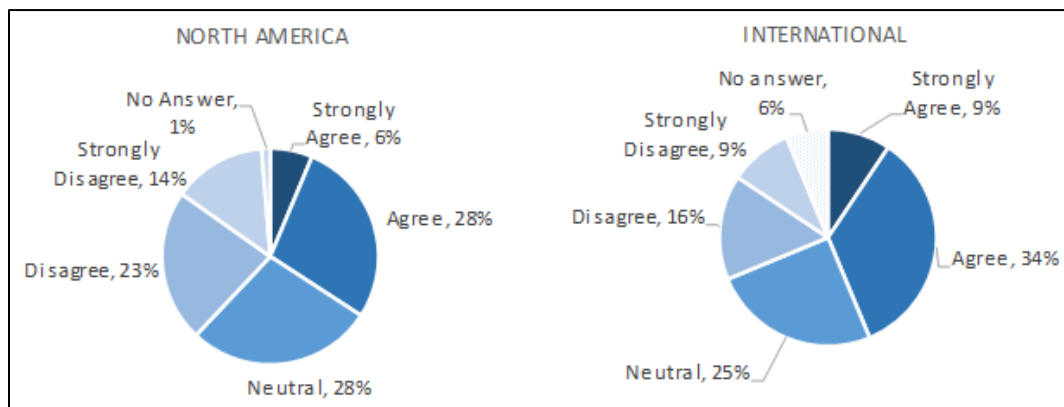
Newton-Evans Research Company continues to assess findings from its six-month research study and survey of protective relay usage patterns in the world community of electric power utilities. Insights received from 114 large and mid-sized utilities in 28 countries point to some interesting differences in plans for

implementation of the “full digital substation” concept and to increased use of condition-based maintenance (CBM) strategies for protective relays.

Implementation of the “Full Digital Substation” Concept:

Thirty-four percent of the survey respondents from the U.S. and Canada agreed with the statement, “By year end 2018, we will be well on our way toward implementing the full digital substation concept.” Thirty-seven percent disagreed with the statement. Forty percent of small North American utilities (fewer than 100,000 customers) agreed with the statement, but only 18% of large utilities (more than 500,000 customers) concurred.

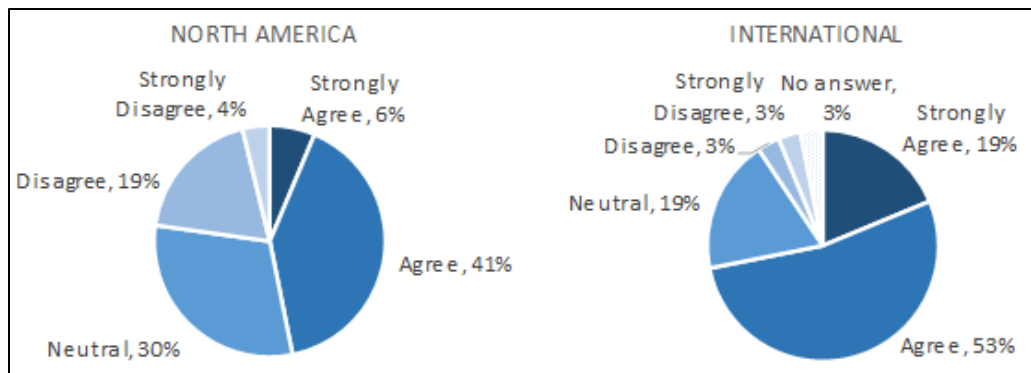
Forty-three percent of the international respondents agreed with the same statement, which is slightly more than what was observed in North America (34%). Twenty-five percent had no opinion, and another 25% disagreed. Importantly, the typical international utility respondent was somewhat larger (in terms of customers served) than their North American counterpart.



*“By year end 2018, we will be well on our way toward implementing the full digital substation concept”*

Increased Use of Condition-Based Maintenance:

Forty-seven percent of North American respondents agreed with the statement “We plan to increase use of condition-based maintenance to reduce maintenance testing time of technicians.” Fifty-six percent of IOUs, 43% of public power utilities, and 39% of utility cooperatives agreed with the statement. Fifty-nine percent of large utilities (>500,000 customers) plan to increase in use of CBM while only 37% of small utilities (<100,000 customers) plan to do this. Seventy-two percent of international respondents agreed with the statement that they plan to increase use of CBM to reduce maintenance testing time. Only 6% disagreed.



*“We plan to increase use of condition-based maintenance to reduce maintenance testing time of technicians”*

This Newton-Evans survey of electric utilities included more than 20 questions on product functionality and market-related issues. The 2016-2018 study is a series of four reports published during late-year 2016. These reports are geared to the planning needs of protective relay suppliers, power industry consultants, and utility protection and control departments. The four volumes include the North American Market Study, the International Market Study, Supplier Profiles, and Global Market Assessment and Outlook.

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#### **Planned budget range from 2017 to Year End 2019 for DMS/ADMS, OMS**

Twenty-six percent of North American utilities operating (or planning to operate) a DMS/ADMS plan to spend more than \$2 million on DMS or ADMS from 2017-2019. Fifteen percent of OMS users plan to spend that much on their OMS. As is usually the case, major IOUs have larger budgets for such operational systems than do smaller utilities.

Overall, one-half of international utilities sampled said they have budgeted less than \$500,000 for OMS from 2017-2019. Thirty-eight percent of international utilities surveyed plan to spend over \$2 million on DMS or ADMS from 2017-2019, and 14% plan to spend that amount on OMS.

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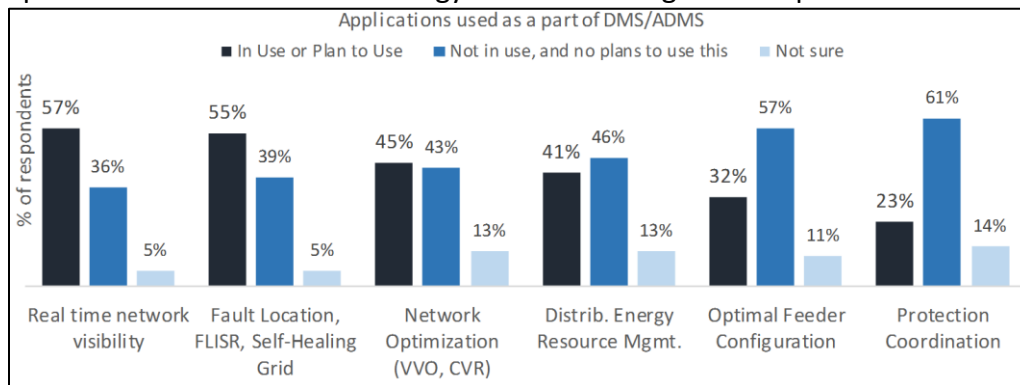
#### **Research Findings Point to Upgrade of EMS, SCADA and DMS Capabilities during 2017-2019 among North American Electric Power Utilities to Accommodate Renewables Integration and Demand Response**

*Emphasis Placed on Extending Applications and Expanding Roles of Distribution Management Systems and Outage Management Systems*

Almost one-half of all respondents to the North America survey (46%) plan to upgrade or retrofit their SCADA installations by 2019. Most respondents with such plans were mid-size and larger cooperatives and public power utilities.

Twenty percent of respondents to the North America survey plan to purchase a new or replacement DMS by 2019. Only six (major) utilities reported that they currently have an Advanced DMS, but 23 others will have an ADMS in the near future. Importantly, of the 29 respondents using or planning to use an ADMS, none indicated that their SCADA functionality and network modeling presently include distributed energy resources (DERs). However, most of this sub-group (82%) plans to include DERs in their ADMS functionality in the future.

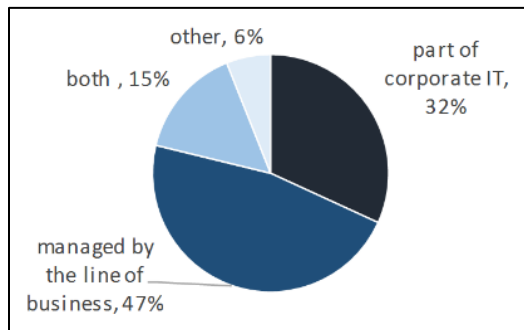
Real-time network analysis and fault location were the prevalent applications being used as part of current DMS or ADMS installations. Plans are centered on supplementing these (where not yet implemented) and adding network optimization and distributed energy resource management capabilities.



Applications used as a part of DMS/ADMS

Real-time linkages between SCADA and GIS or OMS were found in 44% of the North America utility sites. Forty-one percent reported having no real-time linkages among these systems.

Almost half of the respondents to the North America survey indicated that the operational systems support group is managed by Operations, while about one-third stated that such support is now part of corporate IT.



How is OS Support Managed?



Third party services are being used and relied upon to assist with NERC CIP compliance issues and for the conduct of vulnerability assessments.

DNP 3 continues to be the most prevalent operational data communications protocol throughout North American electric power utilities. Plans call for continuing the use of DNP 3 for the foreseeable future among most of these utilities. Some planning for IEC 61850 is underway, but remains at a low level among these respondents.

More than 20 additional topics were surveyed in this new study including the impact of NERC CIP compliance on budgets and workloads; cyber security issues; telecommunications strategies and methodologies; distribution network model maintenance; changing organizational responsibilities for control systems; budget outlooks; and applications usage patterns.

Further information on this new series, "The World Market Study of SCADA, Energy Management Systems and Distribution Management Systems in Electric Utilities: 2017-2019" is available from Newton-Evans Research Company, 10176 Baltimore National Pike, Suite 204, Ellicott City, Maryland 21042. Phone: 410-465-7316 Email: [info@newton-evans.com](mailto:info@newton-evans.com) or visit us at [www.newton-evans.com](http://www.newton-evans.com) or to order any of more than 100 related reports. For readers interested in purchasing this new series please call or email the company for special introductory pricing.



# Substation Automation Market Study Scheduled to Begin June 2017

Newton-Evans' *Worldwide Market for Substation Automation and Integration programs in Electric Utilities: 2017-2020* is a four volume, multi-client market report. Participants in this market study include utility engineers and managers from investor-owned utilities, municipal and provincial utilities, cooperative utilities within the United States and Canada, together with national power systems throughout the world.

The study will measure current market sizes and contains projections on a world region basis for the next several years. The entire research program will define the product and market requirements which suppliers must meet in order to successfully participate in one or more of these diverse world market regions.

Newton-Evans Research Company estimates from our earlier 2014 substation automation market study indicate that the total world market potential for substation automation and modernization stood at almost \$44 billion. It will be important for the T&D electric power substation design and operation community to learn how changes in the world market conditions since 2014 will affect the outlook for 2017-2020.

## Methodology

Field survey work is conducted using a mix of primary research methods including personal interviews, mail surveys, faxes, e-mail and follow-up telephone interviews. Over the past 15 years, more than 1,000 utility officials have participated in one or more Newton-Evans grid modernization and energy automation-related studies.

The survey-based findings in Volumes 1 (North American Market) and 2 (International Market) will discuss the following:

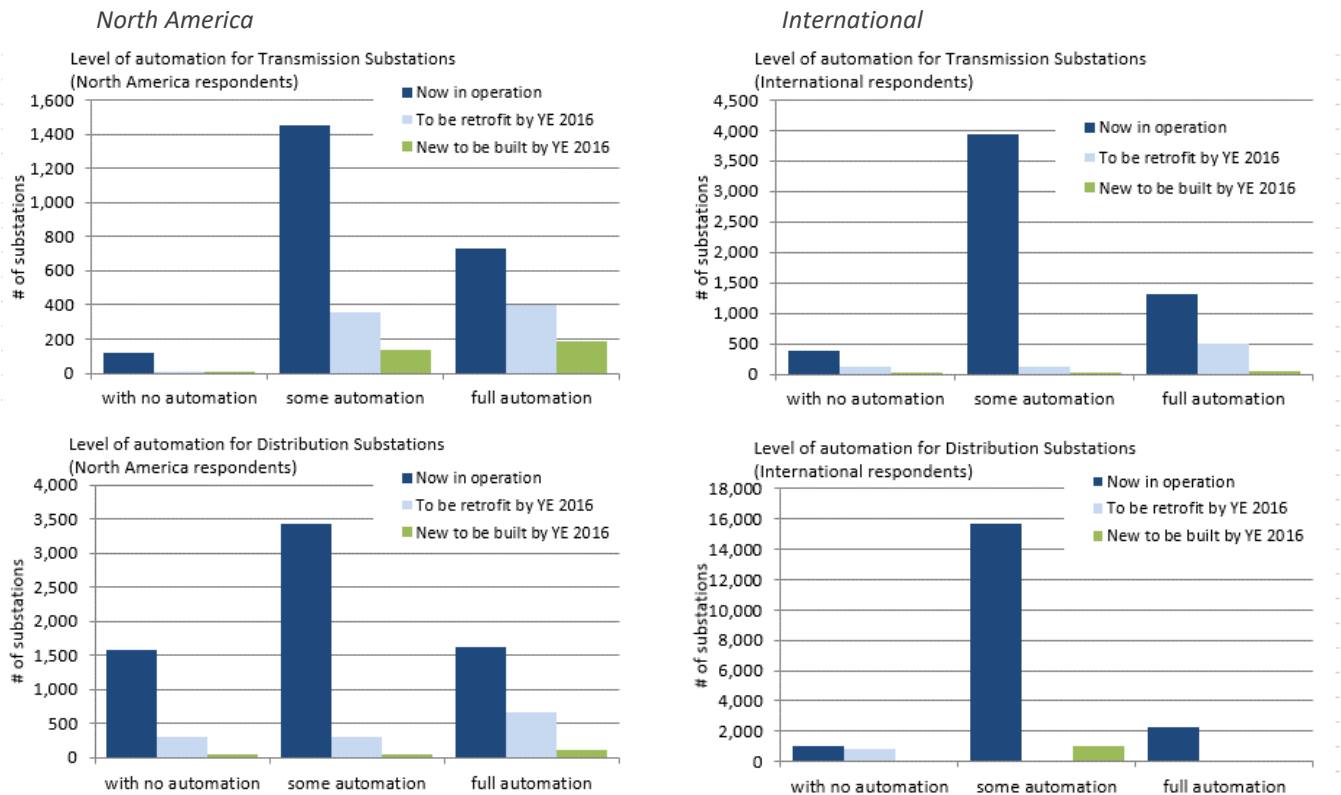
- Substation communication: Bandwidth/latency requirements; Encryption and Type of Protocols within substation, between substations, and from substation to external host; Number of simultaneous wireless connections allowed in substations
- Approach to Obtaining Substation Automation Systems and Equipment
- Current and Planned Connectivity of Substations to Other Utility Systems
- Current and Planned Use of Substation Security Measures
- Third -party assistance needed for substation automation and integration-related activities



- Level of automation for T&D substations
- Ranking of "potential obstacles" to implementing substation automation
- Spending Estimates for New and Retrofit Substation Automation Programs

## Sample Charts

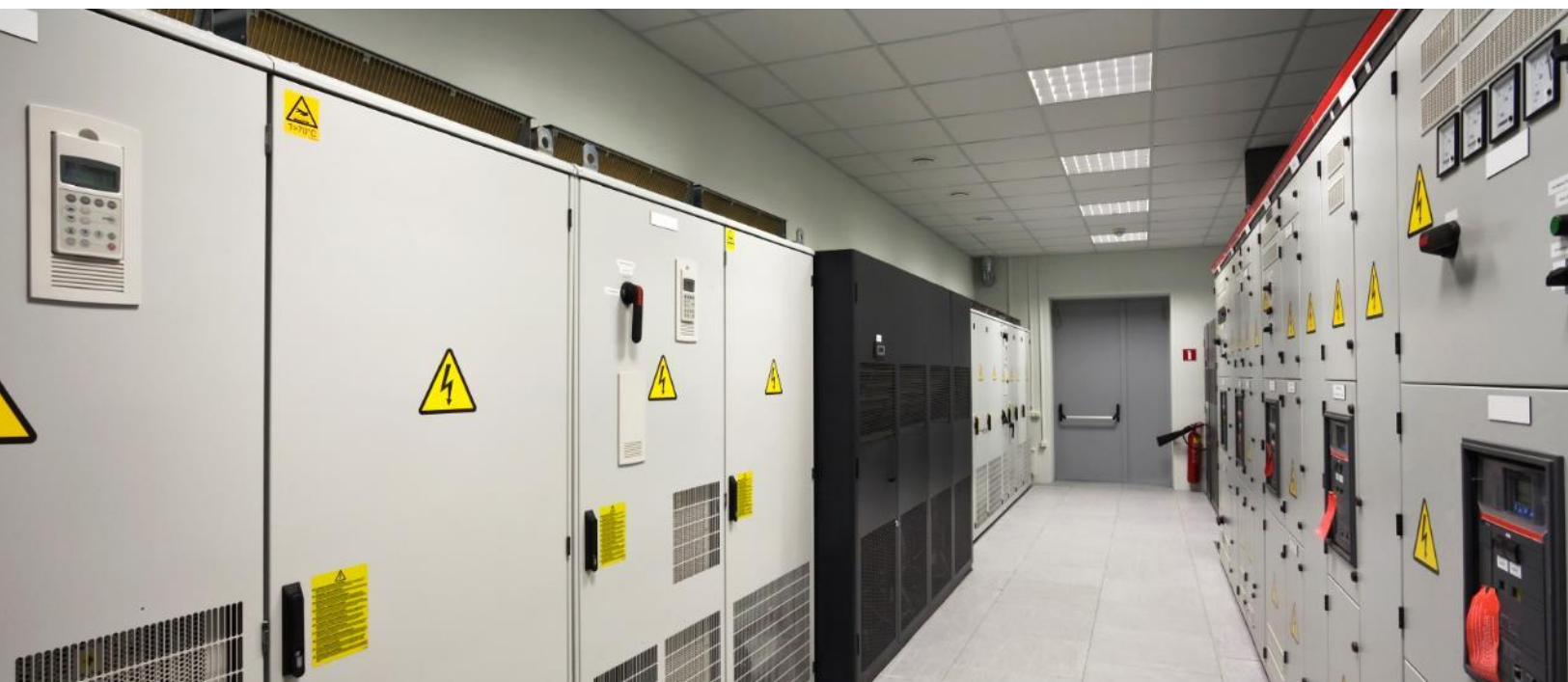
### Level of Automation for Substations Among 2014 Survey Sample



"Volume 3, Market Outlook" will include estimates of the world market potential value of substation automation programs; estimates of population, electric production capacity, operating transmission substations and operating distribution substations, and market potential for substation RTUs and PLCs by world region; and the estimated value of North American electric utility expenditures for substation automation and integration programs for 2017-2020. This volume will also include North American market share estimates for substation controlling devices.

Volume 4 of this report series will include profiles of more than 50 companies supplying substation automation related products and services to the electric power industry.

Further information on this new series *Worldwide Market for Substation Automation and Integration programs in Electric Utilities: 2017-2020* is available from Newton-Evans Research Company, 10176 Baltimore National Pike, Suite 204, Ellicott City, Maryland 21042. Phone: +1 410-465-7316 or visit [www.newton-evans.com](http://www.newton-evans.com). For readers interested in purchasing this new series please call or email [info@newton-evans.com](mailto:info@newton-evans.com) for special introductory pricing.



# Distribution Automation: Strong Investment Pattern Likely to Continue Through 2024

According to the findings from multiple research efforts undertaken at Newton-Evans over the past 24 months, the U.S. market for Distribution Automation (DA) will continue to grow. More than \$16 Billion will likely be invested by utilities to automate their distribution networks over the 2017-2024 years. In 2016, American utility DA investments stood at about \$1.5 Billion. Growth over the next eight years will proceed apace, with 2024 likely to see investments in DA approaching \$2.6 Billion. This amount includes spending for DA infrastructure (field equipment, dedicated DA communications, and related operational applications software and computing platforms).

U.S. Electric Utility Investments in Distribution Automation: *Sum of All DA Categories*  
*Mid-Range ESTIMATE*

