

Global Study of Data Communications Usage Patterns and Plans in the Electric Power Industry: 2011-2015

Volume 1: Survey Findings

NEWTON-EVANS
RESEARCH
COMPANY 

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SAMPLE

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Table 18. From the list above, which SCADA communications technology has the dominant use NOW at your utility and which do you expect to be dominant 3 years from now?

Tables 19A-K. Please indicate your level of agreement/disagreement with the following statements:

- a) Interoperability (defined as the ability of a system or product to work with other systems or products without special effort on the part of the Utility) is important to us
- b) Service Level Agreements with commercial network providers are enough to assure sufficient priority of service during emergencies
- c) With on-going changes as to where the industry is headed seeming to occur every couple years, our Utility is adopting a 'wait 'n' see' attitude
- d) We have experienced products that are supposedly standardized/open/interoperable which have not functioned as expected or promised by the vendor
- e) Within the next 3 years, the vendor community will offer systems based on the capability of connecting any device to the communications system with a standard connection (USB, Ethernet, etc.)
- f) Effective system design and redundancy is a way to insulate a utility from technology changes and obsolescence
- g) To limit the impact of changing technologies, installing a scalable RF mesh and IP backbone is a solution
- h) Open protocols provide a degree of protection from premature obsolescence of products
- i) Any upgrade in our communications technology would require a system-wide change out of meters, distribution devices, HANs, etc.
- j) The use of synchrophasor technology will be a main driver in your SG communications requirements
- k) Synchrophasors will be the catalyst for your utility to adopt IEC standard 61850

Table 20. What are some of the key datacomm issues facing your utility?

Table 21. What do vendors need to do to address these issues?

Table 22. Do you use commercial networks to supplement your communications network needs?

Table 23. Do the commercial networks provide sufficient backup capacity needs to support your operation in an emergency?

Table 24. How is your utility dealing with spectrum availability issues?

Purpose

The purposes of this study have been:

- (1) to conduct field research to learn the key issues of importance to utility telecommunications planners and operations officials.
- (2) To better understand the relationships between and among the various communications “point solutions” implemented over the years.
- (3) To describe the true status of telecommunications in today’s utilities, looking at the differences among utilities by type, by region and by size.
- (4) To scope and size expenditures for telecommunications in the world’s electric power utility community.
- (5) To assess where utilities are likely to be looking for communications solutions that will provide an enabling platform to more cost-effectively move forward with smart grid initiatives.

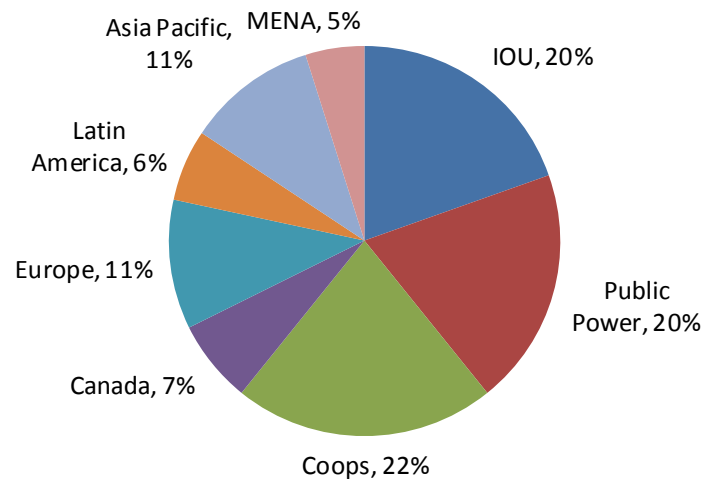
Methodology

The findings reported in this study are based on a global research survey sent out by Newton-Evans over the course of the second and third quarters of 2011. One hundred and two utility officials involved in Operations Planning and Design responded to the survey. These utilities combined serve over 153 million end use customers globally; 30 million in the U.S. alone.

Description of survey - The survey document contained several related topical question groupings including metering, distribution automation, demand response, distributed energy resources, SCADA/EMS. Attitudinal study findings of key issues, vendors, commercial network services, spectrum availability are also included in Volume One.

Many of the survey questions were submitted by clients for the study series. Newton-Evans has conducted research studies of all aspects of grid instrumentation, automation and control systems for more than 30 years. Most studies contain significant insights into the use and plans of communications technologies, protocols and methodologies.

Type of utility



Type of utility

	U.S. Public Power	U.S. Cooperatives	Canada	Europe	Latin America	Asia Pacific	MENA	Total
U.S. IOU	20	22	7	11	6	11	5	102
	20%	22%	7%	11%	6%	11%	5%	100%

Size of utility (number of customers served)

<50k	50-150k	150-500k	>500k	Unknown	Total
17	25	21	38	1	102
17%	25%	21%	37%	1%	100%

Countries included in the sample

Argentina, Australia, Belgium, Brazil, Canada, China, Colombia, Côte d'Ivoire, Cyprus, Denmark, Germany, Greece, India, Israel, Japan, Liechtenstein, Malaysia, Malta, New Zealand, Portugal, Puerto Rico, South Africa, Spain, Switzerland, Taiwan, Thailand, The Netherlands, Trinidad & Tobago, USA

Newton-Evans thanks the following utilities for participating in our survey:

U.S. Investor Owned Utilities

Arizona Public Service
 Baltimore Gas & Electric
 Central Vermont Public Service
 CT Light & Power (Northeast Utilities)
 Empire District Electric Company
 First Energy (Allegheny Power)
 Northern States Power (Xcel Energy)
 Oncor Electric Delivery
 Otter Tail Power
 PECO Energy
 Portland General Electric
 PPL Electric Utilities
 Progress Energy Carolinas
 PSEG
 Public Service Co. of NH (Northeast Utilities)
 San Diego Gas & Electric
 Southern Cal Edison
 Tucson Electric Power
 Until
 Westar Energy Inc.

U.S. Cooperatives

Appalachian Electric Cooperative
 Carroll EMC (GA)
 Cass county Electric Coop
 Citizens Electric Corp.
 Connexus Energy
 Dakota Electric Association
 Delaware Electric Coop
 Energy United EMC
 Jackson EMC
 L&O Power Coop
 Mid-Carolina ECI
 Middle Tennessee EMC
 Northern Virginia Electric Coop
 Shenandoah Valley Elec. Coop
 South Central Power Co.
 South Kentucky RECC

U.S. Public Power Companies

Anaheim CA
 Anoka (MN)
 Austin Energy
 Bryan Texas Utilities
 Cleveland Utilities (TN)
 Clinton Utilities Board
 Eugene Water & Electric
 Grant County PUD
 Hagerstown Light Dept.
 High Point (NC)
 Huntsville Utilities
 Nashville Electric Service
 Riverside Public Utilities
 Rochester (MN) Public Utilities
 Roseville Electric
 Sacramento Municipal Utilities District
 Salem Electric
 Silicon Valley Power
 Springfield (MO)
 Tallahassee Electric

U.S. Cooperatives (cont'd)

South Mississippi EPA
 Southeastern Electric Coop
 Southern Maryland Electric Coop
 United Power Inc.
 Walton EMC
 Withlacoochee River ECI

Canada

FortisBC
 Hydro Ottawa Ltd.
 Hydro Sherbrooke
 Manitoba Hydro
 Maritime Electric
 Newfoundland Power
 PowerStream Inc.

Europe

ELIA
 DONG Energy S&D
 LEW Verteilnetz GmbH
 Public Power Corporation of Greece
 Liechtensteinische Kraftwerke
 Enemalta
 EDP Distribuição
 Rede Eléctrica Nacional
 Endesa
 Centralschweizerische Kraftwerke AG
 Stedin

Belgium
 Denmark
 Germany
 Greece
 Liechtenstein
 Malta
 Portugal
 Portugal
 Spain
 Switzerland
 The Netherlands

Latin America

Yacyreta
 AES Eletropaulo
 Empresas Publicas de Medellin
 XM Compañía de Expertos en Mercados S.A. E.S.P.
 Puerto Rico Power Authority
 Trinidad & Tobago Electric Commission

Argentina
 Brazil
 Colombia
 Colombia
 Puerto Rico
 Trinidad & Tobago

Asia Pacific

Essential Energy
 CEM Macau
 Hongkong Electric Company Ltd.
 Tata Power Co Ltd.
 Kansai Electric Power Co.
 Sarawak Energy Berhad
 Northpower
 Orion New Zealand
 WEL Networks
 Taipower
 Electricity Generating Authority of Thailand

Australia
 China
 China
 India
 Japan
 Malaysia
 New Zealand
 New Zealand
 New Zealand
 Taiwan
 Thailand

Middle East/Africa

Compagnie Ivoirienne de l'électricité
 Electricity Authority of Cyprus
 JDECO Jerusalem District Elec.
 Cape Town Electric
 Eskom

Côte d'Ivoire
 Cyprus
 Israel
 South Africa
 South Africa

Utilities are at different stages in the deployment of their Data Communications Networks. Please answer the questions relevant to your situation.

Advanced Metering Infrastructure (AMI)

1. For your customer-site residential/commercial application needs, what technology do/will you employ?

- ☐ Use ZigBee 1.1 now, or plan to by YE _____
☐ Use ZigBee 2.0 now, or plan to by YE _____
☐ Use HomePlug now, or plan to by YE _____
☐ Use 2.4 GHz WiFi now, or plan to by YE _____
☐ Power Line Carrier (PLC)
☐ A decision has not yet been made to commit to a specific technology, but will by YE _____
☐ Other (specify): _____
☐ No plans

2. How do you plan to connect your smart meters to your datacomm network? Check all that apply.

- ☐ Unlicensed 900MHz RF Mesh
☐ Unlicensed 2.4GHz RF Mesh
☐ Unlicensed Point-to-Multipoint
☐ Licensed Point-to-Multipoint
☐ 2G/3G Public Cellular
☐ 4G Public Cellular (LTE or WiMAX)
☐ Other (specify): _____
☐ No plans

3. In rural and low density areas are you forced to use power line carrier (PLC) technology due to wireless coverage issues or do you have another solution? ☐ Yes ☐ No ☐ Have another solution ☐ Not an issue for us

Please identify solution:

4. Do you expect to replace current PLC and/or wireless mesh networks with broadband communications or next-generation cellular technologies such as LTE, WiFi or WiMAX?

- ☐ Already have: Specify technology used: _____
☐ Yes, by YE . Specify technology planned: _____
☐ No plans to replace
☐ Not an issue for us

5. For your AMI network, which do you currently use for backhaul information?

- ☐ Fiber ☐ T1 ☐ Microwave ☐ Star ☐ Other (specify): _____ ☐ Not applicable

6. Do/will you require your AMI network to backhaul real-time pricing and/or other HAN (Home Area Network) information?

- ☐ Yes ☐ No, but will by YE _____ ☐ No plans ☐ Not an issue for us

7. Do you support standardizing on the use of the internet protocol (IP) for all SmartGrid (SG) communications?

- ☐ Yes, for all ☐ Yes, for some (specify): _____
☐ No

Distribution Automation (DA)

8. Which communications technologies do you use to provide DA functionality? Check all that apply.

- | | |
|---|---|
| <input type="checkbox"/> AMI Network | <input type="checkbox"/> Licensed Point-to-Multipoint |
| <input type="checkbox"/> Unlicensed wireless mesh | <input type="checkbox"/> Unlicensed Point-to-Multipoint |
| <input type="checkbox"/> Licensed wireless mesh | <input type="checkbox"/> No plans |
| <input type="checkbox"/> Other (specify): _____ | |

9. Which **one** of these DA communications technologies has the dominant use at your utility? Why?

- | | |
|---|---|
| <input type="checkbox"/> AMI Network | <input type="checkbox"/> Licensed Point-to-Multipoint |
| <input type="checkbox"/> Unlicensed wireless mesh | <input type="checkbox"/> Unlicensed Point-to-Multipoint |
| <input type="checkbox"/> Licensed wireless mesh | <input type="checkbox"/> No plans |
| <input type="checkbox"/> Other (specify): _____ | |

Reason(s) technology is dominant at this time:

- | | |
|--|---|
| <input type="checkbox"/> Cost of ownership vs. lease | <input type="checkbox"/> Bandwidth/latency |
| <input type="checkbox"/> Reliability | <input type="checkbox"/> Other (specify): _____ |
| <input type="checkbox"/> Spectrum availability | |

10. Which communication technologies do you use for DA backhaul? Check all that apply.

- | | | | |
|-----------------------------------|---|------------------------------------|---|
| <input type="checkbox"/> Cellular | <input type="checkbox"/> Unlicensed 900 MHz | <input type="checkbox"/> Satellite | <input type="checkbox"/> Licensed radio frequencies |
| <input type="checkbox"/> Fiber | <input type="checkbox"/> Other (specify): _____ | | <input type="checkbox"/> No plans |

11. Which one of these DA backhaul communication technologies has the dominant use at your utility?

- | | | | |
|-----------------------------------|---|------------------------------------|---|
| <input type="checkbox"/> Cellular | <input type="checkbox"/> Unlicensed 900 MHz | <input type="checkbox"/> Satellite | <input type="checkbox"/> Licensed radio frequencies |
| <input type="checkbox"/> Fiber | <input type="checkbox"/> Other (specify): _____ | | |

Reason(s) technology is dominant at this time:

- | | |
|--|---|
| <input type="checkbox"/> Cost of ownership vs. lease | <input type="checkbox"/> Bandwidth/latency |
| <input type="checkbox"/> Reliability | <input type="checkbox"/> Other (specify): _____ |
| <input type="checkbox"/> Spectrum availability | |

12. Which DA communications network technology do you think will be dominant at your utility 3 years from now?

- | | |
|---|---|
| <input type="checkbox"/> AMI Network | <input type="checkbox"/> Licensed Point-to-Multipoint |
| <input type="checkbox"/> Unlicensed wireless mesh | <input type="checkbox"/> Unlicensed Point-to-Multipoint |
| <input type="checkbox"/> Licensed wireless mesh | |
| <input type="checkbox"/> Other (specify): _____ | |

13. Have you already, or do you plan to migrate the existing feeder automation communications network to a newer wireless technology that allows for functionality like higher bandwidth, IP enabled radios and WiMax?

- ☐ Yes, already have ☐ Not yet, but plan to by YE ☐ No plans

14. If yes, or have plans, which wireless technology do/will you use?

- ☐ WiMAX ☐ LTE ☐ 4G ☐ Other (specify): _____

Distributed Energy Resources (DER)

15. Which communications network technologies are you using/considering to support the integration of Distributed Energy Resources into the grid?

- ☐ ZigBee 1.1 ☐ ZigBee 2.0 ☐ another HAN technology ☐ Microwave Satellite ☐ No plans
- ☐ Other (specify): _____

Demand Response (DR/LM)

16. Which communications network technologies are you using/considering for your Demand Response/Load Management programs?

- ☐ Use now (specify): _____ ☐ By YE _____, plan to use (specify): _____
☐ No plans

Substation Automation (SSA)

17. Which communications technologies do you use to meet the needs of your SCADA system? Check all that apply.

- ☐ Licensed spectrum ☐ Unlicensed spectrum
☐ Combination of licensed and unlicensed spectrum
☐ Private network using leased license spectrum ☐ IP
☐ Wireless operating at _____ MHz spectrum ☐ Unlicensed _____ MHz spectrum
☐ Satellite ☐ Fiber ☐ Microwave ☐ Frame relay ☐ Other (specify): _____

18. From the list above, which SCADA communications technology has the dominant use NOW at your utility and which do you expect to be dominant 3 years from now? Now: _____ 3 Years from now: _____

Why?:

Additional Questions

19. Please indicate (x) your level of agreement/disagreement with the following statements:

Interoperability (defined as the ability of a system or product to work with other systems or products without special effort on the part of the Utility) is important to us

- ☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Service Level Agreements with commercial network providers are enough to assure sufficient priority of service during emergencies

- ☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

With on-going changes as to where the industry is headed seeming to occur every couple years, our Utility is adopting a 'wait 'n' see' attitude

- ☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

We have experienced products that are supposedly standardized/open/interoperable which have not functioned as expected or promised by the vendor

- ☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Within the next 3 years, the vendor community will offer systems based on the capability of connecting any device to the communications system with a standard connection (USB, ethernet, etc.)

- ☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Effective system design and redundancy is a way to insulate a utility from technology changes and obsolescence

- ☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

To limit the impact of changing technologies, installing a scalable RF mesh and IP backbone is a solution

- ☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Open protocols provide a degree of protection from premature obsolescence of products

- ☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Any upgrade in our communications technology would require a system-wide change out of meters, distribution devices, HANs, etc.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

The use of synchrophasor technology will be a main driver in your SG communications requirements

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Synchrophasors will be the catalyst for your utility to adopt IEC standard 61850

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

20. What are some of the key datacomm issues facing your utility?

21. What do vendors need to do to address these issues?

22. Do you use commercial networks to supplement your communications network needs?

☐ Yes ☐ No ☐ No, but plan to by 2014

23. Do the commercial networks provide sufficient backup capacity needs to support your operation in an emergency?

☐ Yes ☐ No ☐ Do not use commercial networks

24. How is your utility dealing with spectrum availability issues?

THANK YOU FOR PARTICIPATING IN THIS RESEARCH STUDY

