(1)Highlights from 2009-2011 Studies

(2) Excerpts from 2011 CAPEX Study

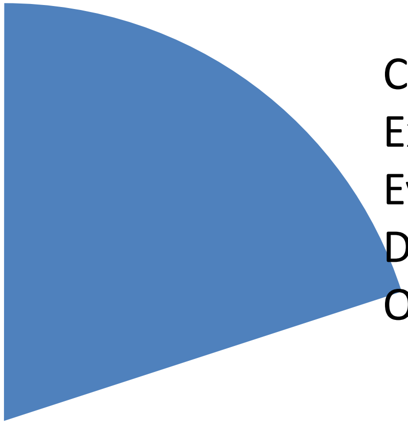
Global Outlook for P&C Investment and Use of Phasor Measurement Technology

Chuck Newton

Newton-Evans Research Company

General Research Methodology

Our approach:



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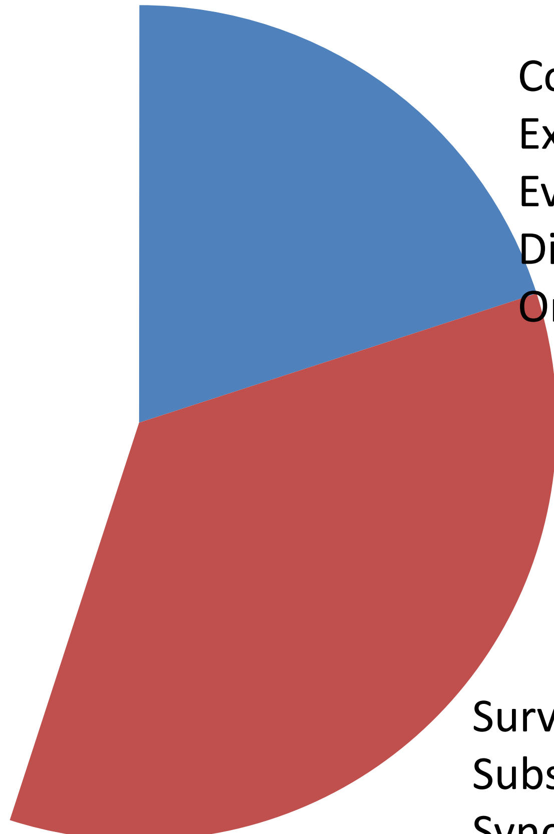

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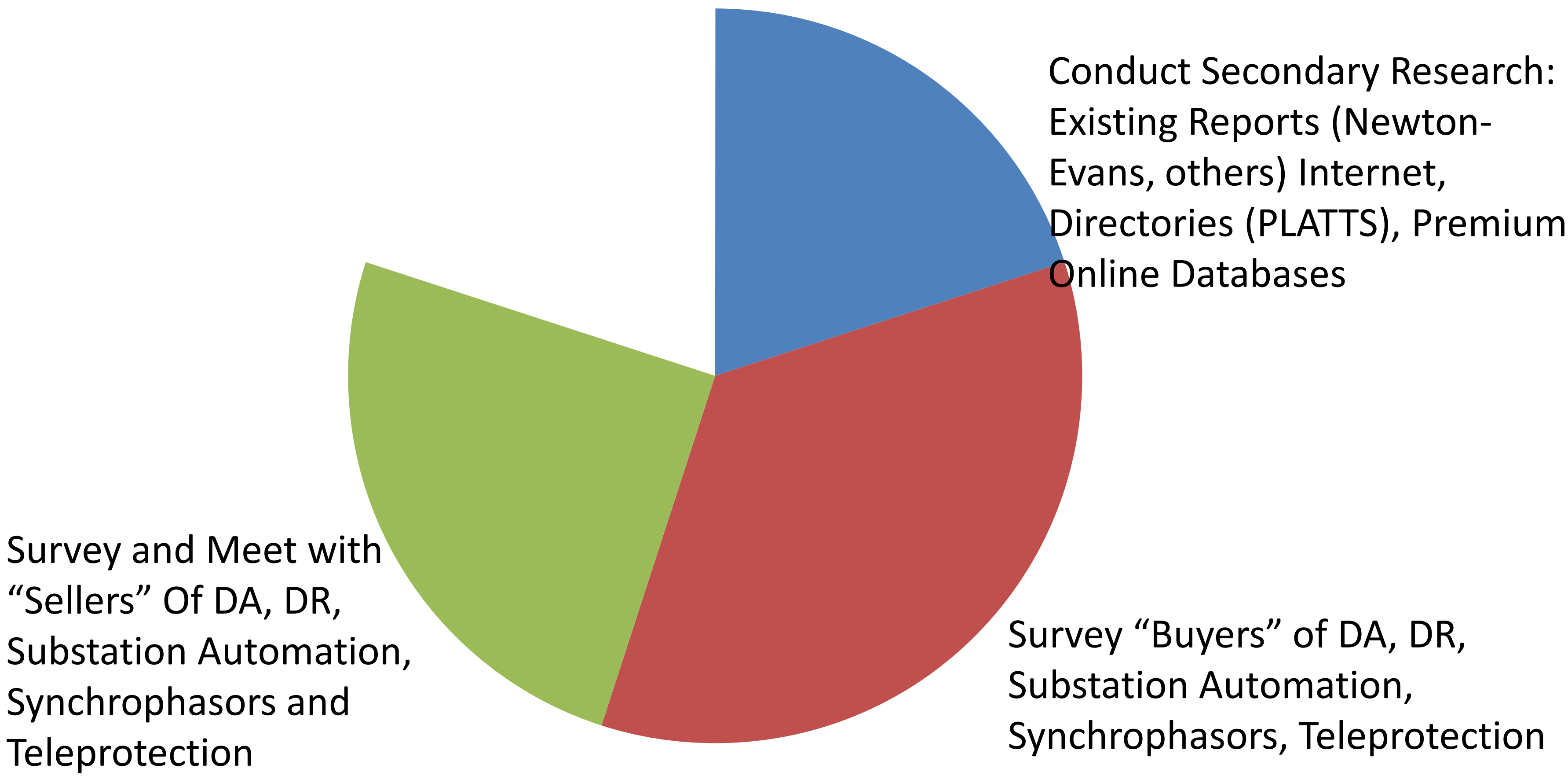

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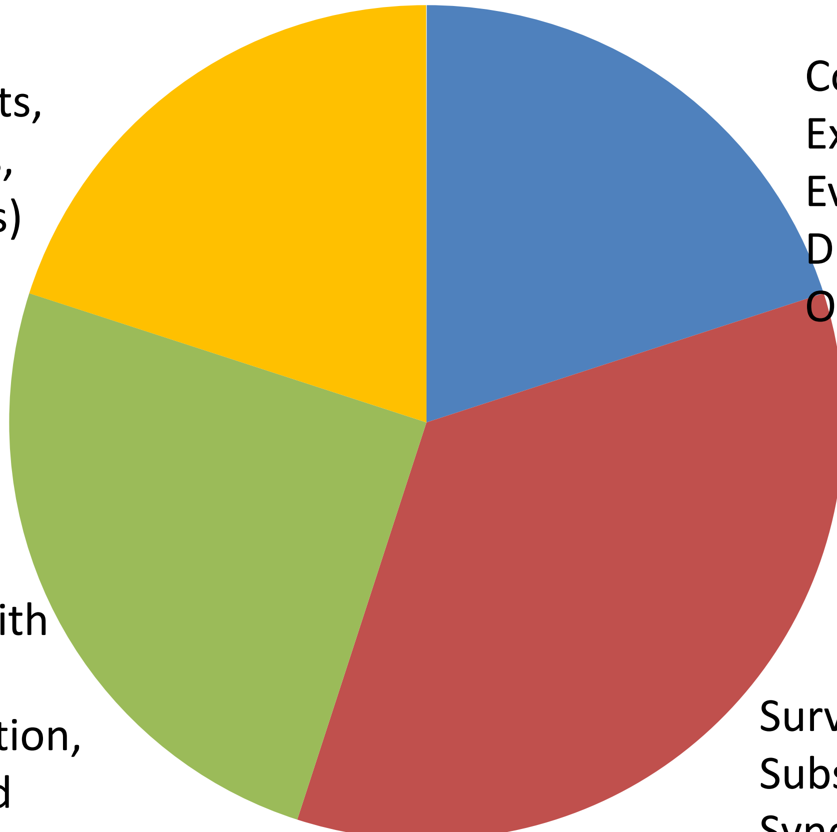


Research Methodology: Substations

- **Primary Research Studies**
  - Site Visits and Vendor, Consultant Discussions
    - IEEE; EPRI; UTC, Auburn, Competitive Interviews
      - Requested Substation Topics
        - » Included in new 2010 N-E global survey of substation automation
        - » European surveys of substation counts – including secondary substations
        - » Chuck meetings/discussions held with RuggedCom, Encore Networks, GarretCom officials and GE MDS
- **Secondary Research Studies**
  - Excerpts from several multiclient and proprietary research programs.
    - 2011-2013 Global Study Series
    - 2009 Studies and Substation Visits for DoE 's Idaho National Labs
    - 2008 RuggedCom Study on Switches and Routers
    - 2009 INTEL Study of Substations
    - 2010 GE Study on Substation Automation Topics
    - 2010 Siemens Study on Substation Construction Plans
    - 2010-2013 Global Market Study of Substation Automation (Preliminary)
- **Bottom Line Assessment Methodology**
  - Direct and Indirect Support Gathered from Viewpoints of more than 500 Utilities in interviews , surveys and meetings
  - Interviews with Leading Vendors and Consultants
  - Insights on "non-smart-grid" segments obtained from competitors
  - Meetings with IEEE officials; EPRI officials, UTC members, Auburn University attendees
  - Majority of Requested Information Obtained and Provided
  - EXCEL Spreadsheet *provided for 2010-2012* Substation Automation Study

Research Methodology: Synchrophasors

- **Primary Research Studies**
  - Vendor, Consultant Discussions
    - IEEE; EPRI; Competitive Interviews
      - Survey Topics
        - » Included in new 2010 N-E global survey of substation automation
        - » European survey conducted for CISCO on use/plans for synchrophasor systems
- **Secondary Research Studies**
  - Excerpts from proprietary research programs.
    - 2009 Study of North American PMU and PDC Market (Mehta Tech)
    - 2010 Study of North American PMU sales/shares (Siemens Energy)
- **Meetings and Interviews**
  - Meetings with Harris Corporation and GE Digital Energy-
  - Discussions with CEO of Mehta Tech, senior staff at SEL, Opns at DP&L
  - Review of NASPINET Files; Attendance at NASPINET Meeting -Oct 2010
  - Meeting and Demonstration of Synchrophasors at EPRI- August 2010

Research Methodology: Teleprotection

- **Primary Research Studies**
  - Consultant Discussions
    - With GE Digital Energy, Quanta Technology, EPRI,
      - » *GE and Quanta are home to world-class teleprotection consultants*
- **Secondary Research Studies**
  - Excerpts from 2009-2011 N-E study of Protection and Control Topics including communications
  - Excerpts from late 2009 Special Study of Relay Engineers on Communications Issues
  - Excerpts of CIGRE Reports (Chuck Newton and Newton-Evans are considered as core members of Wi-Fi Protected Access Working Group and IEC 61850 Security Working Group) with significant contributions from Newton-Evans including pro-bono research.
    - CIGRE B5.38 The Impact of Implementing Security Requirements Using IEC 61850
    - CIGRE B5.22 : Wi-Fi Protected Access for Protection and Automation

Provide penetration of low latency/high bandwidth network connectivity (e.g. fiber optic) per substation class.

Class of Substation	North America	United Kingdom	Northern Europe	Western Europe	Southern Europe	Australia
AA (EHV)	<100	<15	<100	<150	<100	<25
% low lat/high bw	100%	100%	100%	90%	100%	100%
HV Transmission	17225	600	1400	8092	4312	810
% low lat/high bw	90%	95%	90%	85%	85%	90%
MV Distribution	50,720	2,400	5,710	22,100	11,625	3,820
% low lat/high bw	15%	20%	30%	45%	30%	45%
LV Secondary + Dis TXrs	46,100,000	352,200	500,000	2,500,000	1,026,000	600,000
% Low Lat/High BW	< 5%	<5%	5-10%	5-10%	5-10%	5-10%

Accompanying Notes:

•Observers indicate good growth prospects for IP and Ethernet extended to MV substations over the 2011-2015 years.
•Newton-Evans forecasts 6-8% AAGR during this period.
•According to one senior R&D official at a leading PMU firm *"bandwidth is not/will not be an issue with transmission substations."*
•RF Radio – licensed and unlicensed spectrum – and cell mesh nets will provide a good amount of coverage required for
•communications to LV secondary substations, distribution transformers (and other DA devices).
•http://www.novatechweb.com/news_article.cfm?id=250 (Study excerpts - NovaTech 2009)

“Low” Latency Definition

Latency in a packet-switched network is measured either *one-way* (the time from the source sending a packet to the destination receiving it), or *round-trip* (the one-way latency from source to destination plus the one-way latency from the destination back to the source). Round-trip latency is more often quoted, because it can be measured from a single point. Note that round trip latency excludes the amount of time that a destination system spends processing the packet. Many software platforms provide a service called ping that can be used to measure round-trip latency. Ping performs no packet processing; it merely sends a response back when it receives a packet (i.e. performs a no-op), thus it is a relatively accurate way of measuring latency.

In a non-trivial network (***e.g. IOU-type multi-tier network***), a typical packet will be forwarded over many links via many gateways, each of which will not begin to forward the packet until it has been completely received. In such a network, the minimal latency is the sum of the minimum latency of each link, plus the transmission delay of each link except the final one, plus the forwarding latency of each gateway. In practice, this minimal latency is further augmented by queuing and processing delays.

Queuing delay occurs when a gateway receives multiple packets from different sources heading towards the same destination. Since typically only one packet can be transmitted at a time, some of the packets must queue for transmission, incurring additional delay.

Processing delays are incurred while a gateway determines what to do with a newly received packet. The combination of propagation, serialization, queuing, and processing delays often produces a complex and variable network latency profile.

High Bandwidth . . . *In the Eye of the Beholder* . . .

The term *high bandwidth* is sometimes used to distinguish faster broadband Internet connections from traditional dialup or cellular network speeds. Definitions vary, but high bandwidth connections generally support data rates of minimum 64 Kbps (and usually 300 Kbps or higher). Broadband is just one type of high bandwidth network communication method.

In the Internet realm, networkers sometimes uses the term **high bandwidth** to distinguish higher-performing Internet connections from traditional dial-up access speeds. Definitions vary, but high bandwidth connections support data rates of at least 64 Kbps and ***usually 200 Kbps or 300 Kbps and higher***. The definition of high bandwidth differs from the definition of broadband. Technically, the term broadband refers to the method of communication and bandwidth refers to the amount of data that passes through the connection over time.

1.1.4 Status of Substation Automation Programs in North America, Internationally, Western Europe.

Stage of Substation Automation	NAM Trans SS	NAM Dist SS	EUROPE Trans SS	Europe Dist SS	INTL Trans SS	INTL Dist SS
None	19%	43%	20%	82%	19%	76%
Stage 1	21%	26%	40%	6%	30%	9%
Stage 2	38%	17%	19%	5%	19%	9%
Stage 3	9%	7%	14%	1%	8%	1%
Stage 4	13%	7%	7%	6%	20%	5%

Source: ***Newton-Evans Research Company 2008-2010 Study of Substation Automation***

Definition of Automation Levels:

Stage 1 - IED implementation; substation has IEDs installed - no integration
Stage 2 - IED integration; installed IEDs are integrated, utilizing 2-way communications capability and NO substation LAN
Stage 3 IED integration; installed IEDs are integrated, utilizing 2-way communications capability and/or substation LAN
Stage 4 - Applications are run at the substation level to automate various substation functions

1.2.2.1 For each router and switch for different classes of substations and geographies, specify WAN Connection Types:

	North America	United Kingdom	Northern Europe	Western Europe	Southern Europe	Australia
AA EHV	T1/E1	T1/E1	T1/E1	T1/E1	T1/E1	T1/E1
Transmission	Fiber and T1	Fiber	Fiber	Fiber	Fiber	Fiber
MV Distribution	Mix of Fiber, Telephony, 56/64K DDS, Radio	Mix of Fiber, Telephony, Radio	Mix of Fiber, Telephony, Radio	Mix of Fiber, Telephony, Radio	Mix of Fiber, Telephony, Radio	Mix of Fiber, Telephony, Radio
Small Secondary Distribution	Wireless Some wireline – critical customers	Wireless	Wireless	Wireless Some wireline	Wireless	Wireless

Sources: 2010 Newton-Evans (ongoing) study of Substation Automation. UTC Workshop discussions. Utility and vendor discussions.

Current Use of Communications Technologies for Teleprotection

Current Use of Communications Technologies for Teleprotection	North America	United Kingdom	Northern Europe	Western Europe	Southern Europe	Australia
SONET/SDH	85%	80%	70%	65%	60%	70%
Ethernet	25%	30%	35%	35%	30%	35%
Wireline/Fiber	70%	75%	80%	80%	70%	75%
Power Line Carrier	50%	25%	20%	25%	25%	30%

Sources:
1. Survey-based findings from the Newton-Evans' 2009 study of protection and control form the basis for the Table. data.
2. Phone interviews with leading teleprotection authorities in the US provided information on teleprotection communications architecture, technoogy and protocols.
3. In person interviews on this topic were held at EPRI in two separate meetings. Also UTC meeting presentations on teleprotection. Utility discussions at Auburn University (Nov 2010) at which utility teams presented their comms use and plans to Chuck Newton (instructor).

Table 2.1. Teleprotection Market Sizing
Annualized TAM Dollars and Units (where applicable)

Teleprotection Market for Comms Topics Units/Dollars	North America	United Kingdom	Northern Europe	Western Europe	Southern Europe	Australia
Communications Networking Equipment	45-65 M 10-15, 000 units	5-10 M 1-2,000 units	15-20 M 2-4,000 units	35-45 M 8-12,000 units	15-20 M 4-6,000 units	5-10 M 1-2,000 units
SONET-based Teleprotection Equipment	80% of above $/Units	75% of $/units	80% of $/units	75% of $/Units	70% of $/Units	80% of $/Units
Security Devices and Software for Teleprotection	$5-10 M	$1-2 M	$3-5 M	$5-10 M	$3-5 M	$1-2 M
.Ongoing Maintenance and Support	$15-25 M	$3-5 M	$5-10 M	$15-25 M	$5-10 M	$3-5 M

Notes: The entire global protective relay equipment business is at $2.2 B currently. This accounts for about 750,000-950,000 units of production. A high percentage of units (25-30%) is for motor control relays used by industrials. A modern transmission substation may have 20-40 relays, while a modern distribution substation may have 12-24 relays. (Source: AG – leading consultant.)

Table 2.1.4. Percentage Use of Teleprotection in Substations

Class of Substation	North America	United Kingdom	Northern Europe	Western Europe	Southern Europe	Australia
AA	100%	100%	100%	100%	100%	100%
HV	90%	90%	90%	90%	85%	90%
MV	20%	40%	45%	50%	40%	30%
LV	10%	30%	30%	30%	30%	30%

Consultant Notes
“Most BES (= bulk electrical system) transmission substations use this (i.e., teleprotection). More than half of sub-transmission. Almost no use in distribution, but I think Smart Grid will bring some new applications.”

Newton-Evans: Do we see drivers to extend to lower voltage class substations? “Distribution networks with heavy DG penetration, plus wind farms collecting at lower voltages, will need something that is officially “teleprotection” to handle faults and to prevent safety issues. It will not look like the pilot and backup teleprotection communications used at HV/EHV today.”

“Current differential is applied at the 13kV level on underground feeders and distance protection has issues.”

- Phasor Measurement Units (PMUs) and Phasor Data Concentrators (PDCs) together with a “real-time” communications network form the basis for the U.S. synchrophasor initiative.
- Discussions were held with suppliers, meetings held with EPRI officials, and reviews of NASPINET files were undertaken.
- Additional insights based on discussions with experts at the October 2010 NASPINET meetings.

Table 3.1: Synchrophasor Network Expenditures Global Outlook

Synchrophasor Segment Category	2010	2011	2012	2013	2014	2015
3.1.1. PMU Units/Dollars; Ave unit price of $10,000-$35,000	300 units < $12M	340 units < $15 M	380 units <$20 M	420 units < $20 M	475 units <$20 M	550 units < $ 25M
3.1.2. PDC Units/Dollars Ave unit price of $12,500-$40,000	85 units < $5 M	110 units < $5 M	130 units < $5 M	150 units < $10 M	175 units < $10 M	200 units < $10 M
3.1.3.Phasor Data Gateways; Ave unit price of $14,500-$50,000	50 units< $5M	60 units < $5 M	75 units < $ 10 M	100 units < $10 M	125 units < $10 M	165 units < $ 10 M
3.1.4. Data Comms NW Equipment: Switch/Router	200-300 units	240-350 units	300-400 units	400-550 units	550-650 units	750-900 units
3.1.5. Synchrophasor Device and Network Management Solutions; Mostly in-house developments w Consultant Assist	$50 M	$75 M	$ 75 M	$ 80 M	$ 60 M	$ 40 M
3.1.6. Phasor Applications (hardware and software Development/Package Costs)	$25 M	$ 25 M	$ 25 M	$20 M	$ 20 M	$ 20 M

Notes: In Table 3.1 above, Newton-Evans Research has smoothed the expected "payout" of funding for the few major proposed synchrophasor initiatives (*WECC, Eastern Interconnection-TVA, , MISO, possibly ERCOT, and perhaps one or two similar broad-scoped efforts in Europe likely to get approval for development in the 2012 and later periods*) to reflect annual expenditures over 2-4 years, rather than total contract values in one year. Possible *total value* of proposed synchrophasor projects currently stands at about $400 million in North America and somewhat less in Europe. In the 2010 Newton-Evans report on Smart Grid initiatives, the research program uncovered a total 0f 10 phasor program initiatives planned by 5 ISO/RTO organizations and by 5 utilities. The total expected costs of these initiatives stands at about $400 million. The projects are to be underway and completed within a two-to-five year period over the forecast years. Newton-Evans completed research throughout the European sub-regions of interest for this market analysis. The findings indicate a *lower* level of interest and plans for formal, wide area phasor measurement programs than we found for North America, at least for intra-utility developments. In mid-2009, Newton-Evans Research undertook a market outlook study for the PMU/PDC market in North America (private client study). The findings from that study remain close to the outlook presented in Table 3.1 above.

Supplemental Substation Topics

- Additional Substation research topics included:
  - *Numbers of Ports, Routers and Switches in use and planned for substations.*
  - *Bandwidth and latency requirements currently and likely by 2013*.

- Newton-Evans staff has met with officials from RuggedCom, GarretCom, Encore Networks and GE Digital (MDS and Lentronics) to discuss these additional requirements.
- Newton-Evans staff also participated in conferences sponsored by UTC, IEEE, Auburn University and NASPINET and has met with scores of industry participants.
- An earlier market research study commissioned by GE Digital Energy was also referenced to verify switching assumptions used in this report.

Communications Port Requirements in T&D Substations

- Our newest ongoing study has found (preliminarily) that significant increases in the number of ports are planned for installation by 2013. This has also been verified by discussions with comms equipment suppliers.
  - These new findings are preliminary, but suggest a higher number of increasingly sophisticated, intelligent devices installed in substations that will be required to communicate on a peer-to-peer level as well as vertically (within the sub and externally to field devices and up to control center systems).
  - Redundant communications pathing within the substation environment is also becoming important for the transmission substation environment.
  - The need for more ports and switches will grow with the application of synchrophasor technology in selected transmission substations across the country and in Europe.

Bandwidth and Latency Requirements in T&D Substations

- Bandwidth requirements are being explored in the current Newton-Evans substation study. (*ongoing research)*
  - Our findings indicate a wide range of bandwidth exists currently from 56 kbps on up to 100 mbps for EHV and HV substations
  - The same study found a wide range of bandwidth installed for MV substations from 2.4 kbps to 100 mbps, with a high percentage of those operating at the lower end of the range planning to upgrade bandwidth over the next three years.
- Latency appears not to be as important an issue for many in the industry. Several respondents did not factor in their latency requirements.
  - However, among those who did report back, latency requirements are becoming more stringent for several (e.g. moving from 500ms to 50ms and similar examples).

Switch and Router Requirements in T&D Substations

- Router Activity
  - Most respondents are reporting minimal change in their need for routers, with the majority reporting only one router per substation now and through 2013.
  - Clearly there will remain a ratio of multiple switches per router.
- Switch Activity:
  - The number of switches used in transmission substations will increase over the three years of the forecast period, based on the new survey findings.
  - The largest single application of switches was reported to be in place at ConEdison (NYC) where some substations have as many as 30 switches each configured with 19 ports *(as reported to Newton-Evans).*

Status of IEC 61850 in North American Substation Automation Programs and Plans

Updated by

Newton-Evans Research Company

March 2011

Background

- Newton-Evans Research Company's three bi-annual flagship studies (Substation Automation, EMS/SCADA/DMS and Protection and Control) have requested protocol usage/plans information since 1984.
- While much of the international community has moved forward with adoption of IEC61850, this has not been the case in North America to date.
- There are substantial differences in substation automation systems, products and services procurement methods among the various world regions as described on the following chart. These differences account for a high proportion of communications protocols selected and implemented.

The Future Role of IEC 61850 in North America . . .

- ***Do We Need the Full Basket of 61850 Goodies? . . . or Should we/Will we opt for a Simpler Approach to Substation Communications?***
- While much of the world community of electric utilities has now begun active implementation of IEC 61850, it is no secret that North America and some Asia-Pacific and Latin American countries have been slow to "*hop on the 61850 bandwagon*" and take advantage of implementing the IEC standard 10-part offering.

There are several reasons for this lag between technology development and standardization versus the speed of electric utility adoption here in North America.

- Even major North American utilities (aside from AEP) are typically smaller than many of their international counterparts (like EDF, UES, ESKOM, CFE, ENEL, EDP, and many others).
- Secondly, capital and human resources have been stretched over the past 24-30 months, in a difficult economic and operating environment.
- Thirdly, there have been no national or trans-national policy directives that carry as much weight as those we see in Europe and elsewhere.
  - ***NERC has however, made some statements about the viability and desirability of IEC 61850 in promoting grid reliability.***

Newton-Evans Research Findings

- Repeated Newton-Evans Research surveys have found that, for the most part, North American utilities plan to stick with DNP 3 as a substation protocol of choice over the next few years.
  - ***However, 20 of the TOP 25 IOUs have plans to implement at least some modules of 61850 in the near-to-mid-term***.
- During the 1990’s DNP 3 came to serve as the “beautiful rose” among the thorns of a multitude of proprietary protocols that had been in use for decades.
- Currently, there is a recognizable pattern of migration from serial communications based use of DNP 3, to LAN-based use of DNP 3

A Rose and a Bouquet

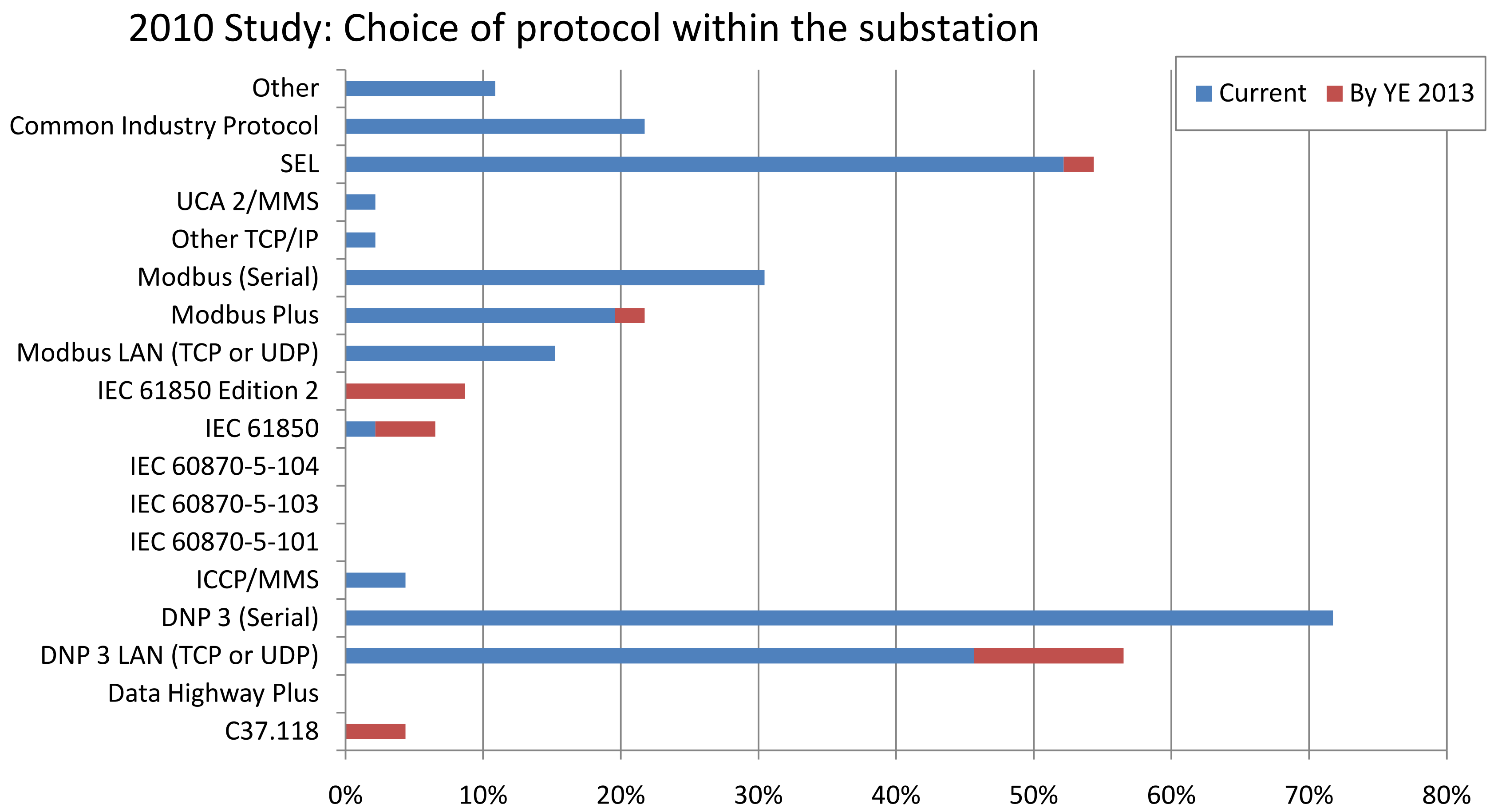
- Well, if DNP 3 is a beautiful rose, then dare we make the analogy that IEC 61850 may well be a full and lovely spring bouquet, offering an array of communications-centered data handling services for the increasingly complex substation environment?
- The only problem with this analogy is that most utilities cannot today arrange flowers very well, but can certainly pick and choose from among the ten parts of IEC 61850, such as GOOSE messaging, process bus, and even SCL.

Purchase Behavior as an Influencing Factor in Protocol Selection

- North American utilities are much more likely to buy "best in class" products and perform substation integration tasks directly (or with an integration services firm).
- **Type** (IOU, Muni, Co-op, Federal) and **Size** of Utility have a strong influence on protocol use and plans.
  - DNP 3 , followed by SEL protocols and Modbus, are the clear leaders in current North American substation automation protocol deployments.
    - Both DNP and Modbus protocols continue to be "works in progress" and expanded and will continue to be in use for *at least* another 10-15 years.
    - These are available in both serial and LAN versions. Most migration patterns among North American users are from the serial to LAN versions of these protocols, not a shift to IEC protocols.
- A significant portion of the international community, including developing nations, tend to purchase "turn-key" substations from major suppliers. These firms are able to specify and provide IEC-based solutions.
  - Internationally, IEC 61850 is the major protocol being implemented in most regions, but **not** in every major utility ,nor in every country.

Fourth Quarter 2010 Newton-Evans Study of North American Substation Automation Plans:

Preliminary Findings Based on 48 North American Surveys



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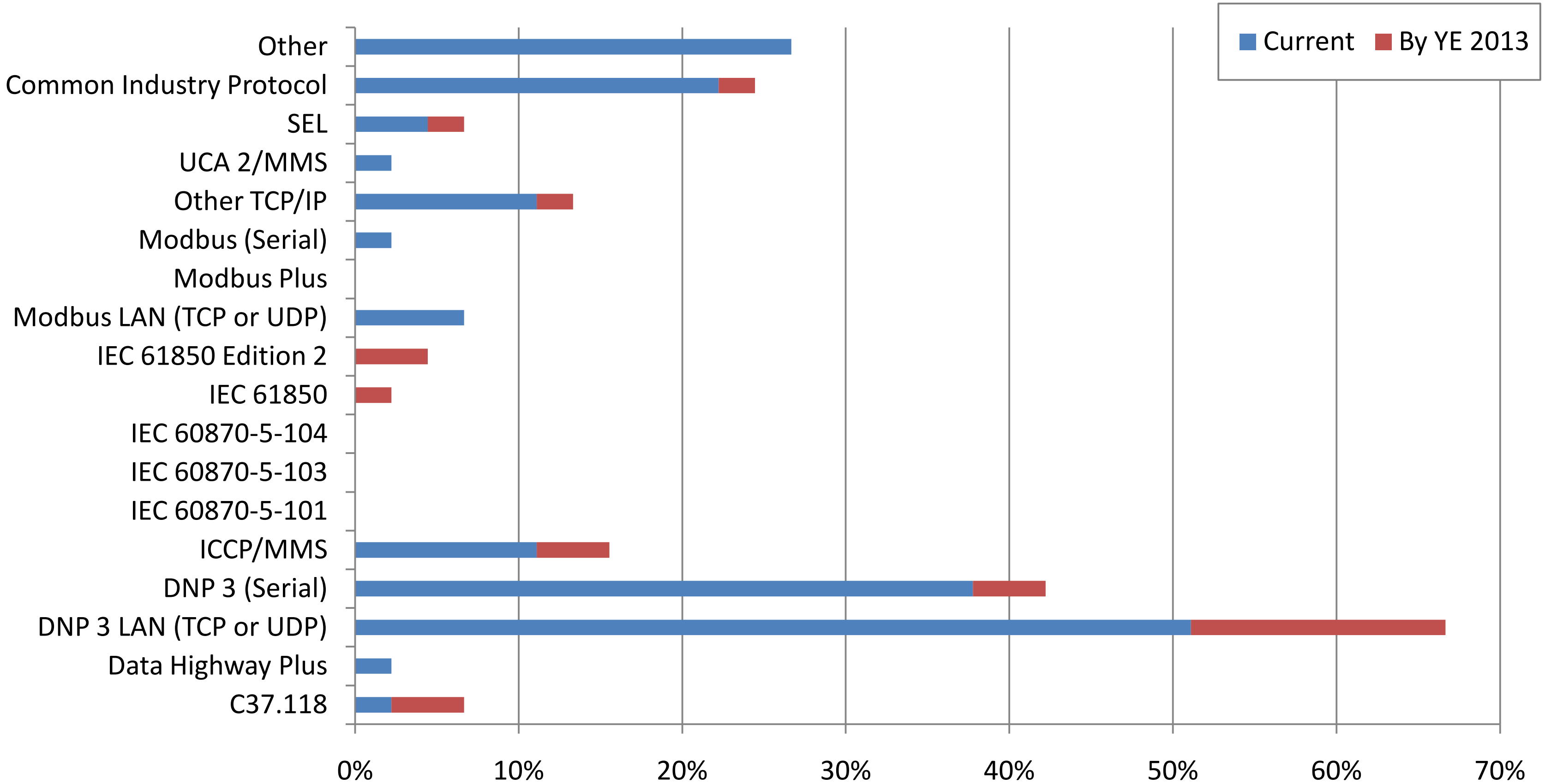
Protocol Use from Substations to Control Centers (4th Qtr 2010)

Preliminary Findings Based on 48 North American Surveys

Choice of protocol from substation to external host/network



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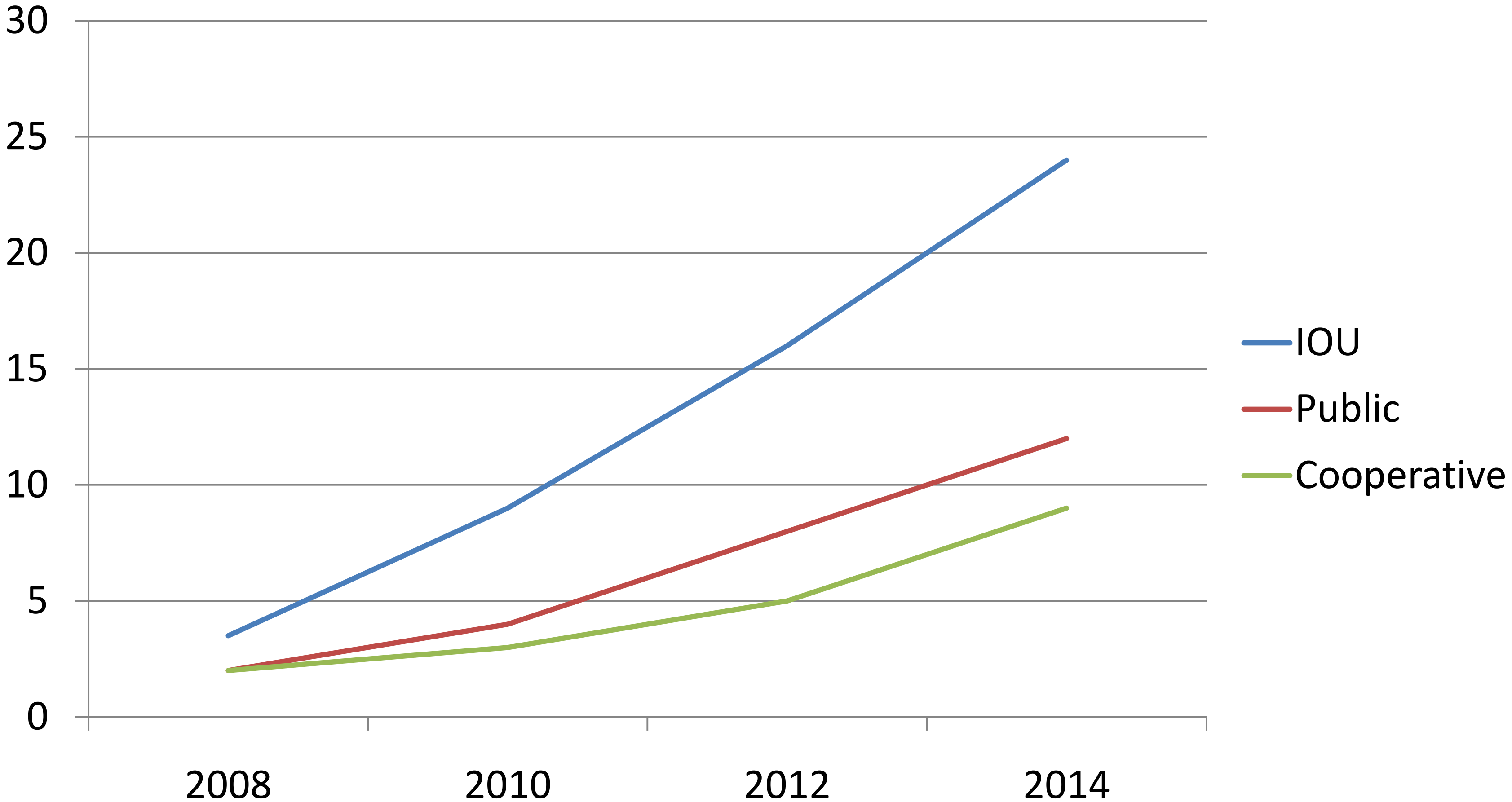
Percent Change in Adoption of IEC 61850 Among U.S. Utilities (2008-2014)

(Newton-Evans Outlook)



Note: The adoption rate is for percentage of utilities adopting the protocol for new And retrofit substation projects.

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9. If your utility has already implemented/plans to implement IEC 61850, are you still using/planning to use conventional wiring for interlocking purposes (arranging the control of equipment such that operation of one piece of equipment is dependent on another), or are you relying/planning to rely on IEC 61850 communication based software interlocking?

Global Summary

Using/plan to use conventional wiring	Relying/planning to rely on IEC 61850 communication based software	Total
11	16	27
41%	59%	100%

P&C Excerpts from the Newton-Evans Latest CAPEX and O&M Tracking Study

Global CAPEX and O&M Expenditure Outlook for Electric Power Transmission and Distribution Investments: 2011-2012 – *Funding Outlook for Smart Grid Development*

- Published March 2011

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COMPANY

Summary of CAPEX Determinants

GDP: GDP growth (along with weather) is the ultimate driver of electricity demand, and as such, electric utilities stand to benefit from steady, secure GDP growth. In the US, 2009 EEI charting shows investor-owned utility CAPEX as almost a "match" with growth or change in the nation's GDP. However, in developing nations power industry CAPEX can be a multiple (2x, 3x even 4x) of GDP growth rates.

Regulatory Mandates: Federal (or national) and state-level regulatory decisions affect CAPEX investments, especially for transmission investment and for new power generation plant investment. Current focus on smart grid initiatives, renewable portfolio standards, energy efficiency also have an effect on spending plans.

Business Considerations: Availability of capital, political pressures, customer segment demands, prices for equipment, construction costs also have a direct effect on CAPEX investment plans.

Comparison of Planned 2010 CAPEX Investment for Smart Grid Programs

Smart Grid Component and Infrastructure Category	Increase (2009 to 2010)	No Change (2009 to 2010)	Decrease (2009 to 2010)
EMS/SCADA/DMS	39%	49%	12%
Substation Automation & Integration	43%	52%	4%
Protection & Control Relays	46%	46%	8%
Distribution Automation and Field IEDs	42%	50%	8%
A M I	44%	53%	4%
Transmission Infrastructure	44%	43%	13%
Distribution Infrastructure	33%	50%	17%

Comparison of Planned CAPEX Investment for Smart Grid Programs

Smart Grid Component and Infrastructure Category	North American 2010 Investment Range (MUSD)	Global 2010 Investment Range (MUSD)
EMS/SCADA/DMS	$90-$135	$450-$550
Substation Automation & Integration	$270-$350	$800-950
Protection & Control Relays	$490-$540	$1,750-$2,150
Distribution Automation and Field IEDs	$750-800	$2100-2400
A M I	$1,300-$1,400	$3,100-$3,500
Transmission Infrastructure	$10,000-11,500	$50,000-58,000
Distribution Infrastructure	$9,000-9,750	$45,000-52,000

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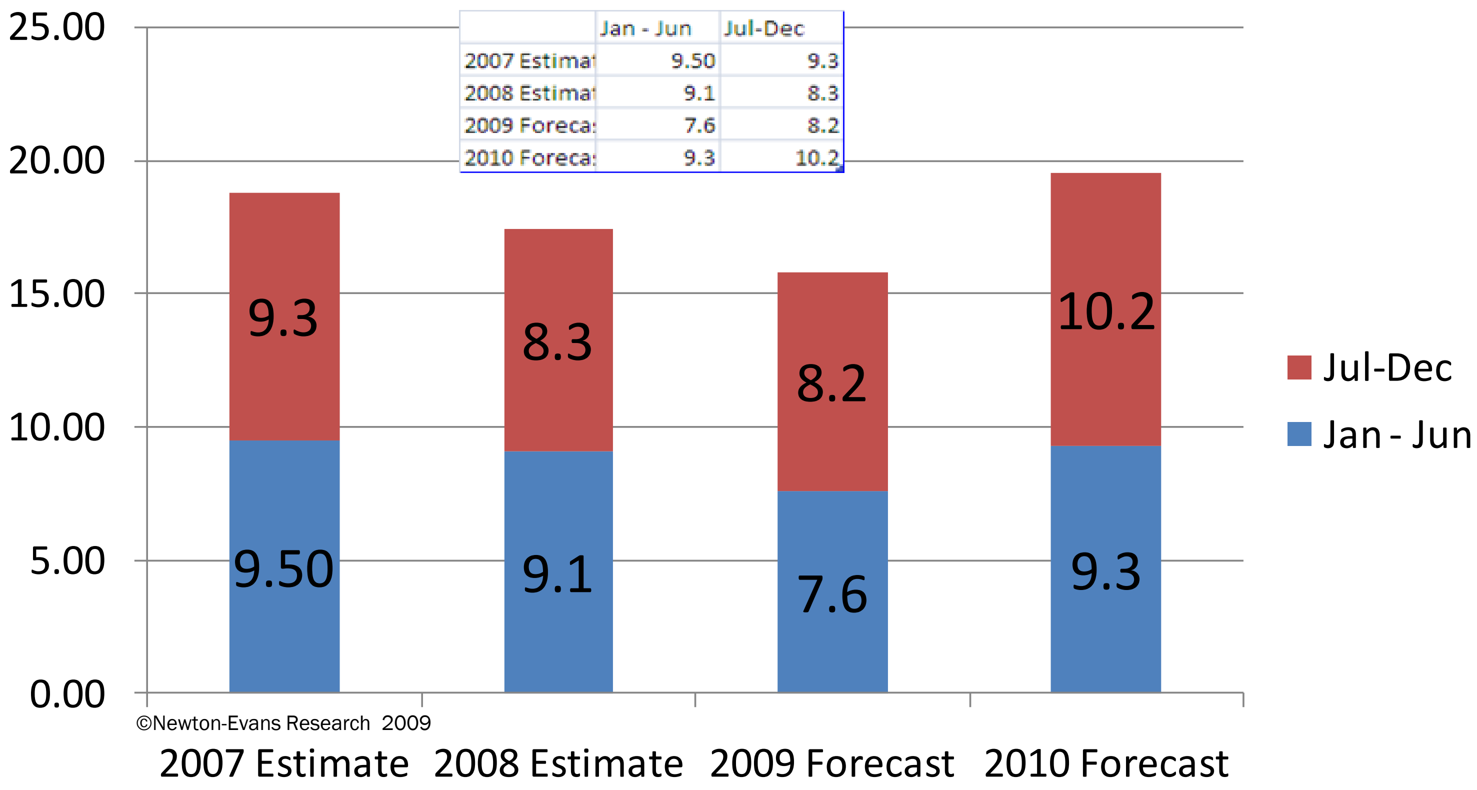
CAPEX Investment in U.S. Electric Power T&D Equipment and Systems

Amount in Billion USD



Protection and Control Summary

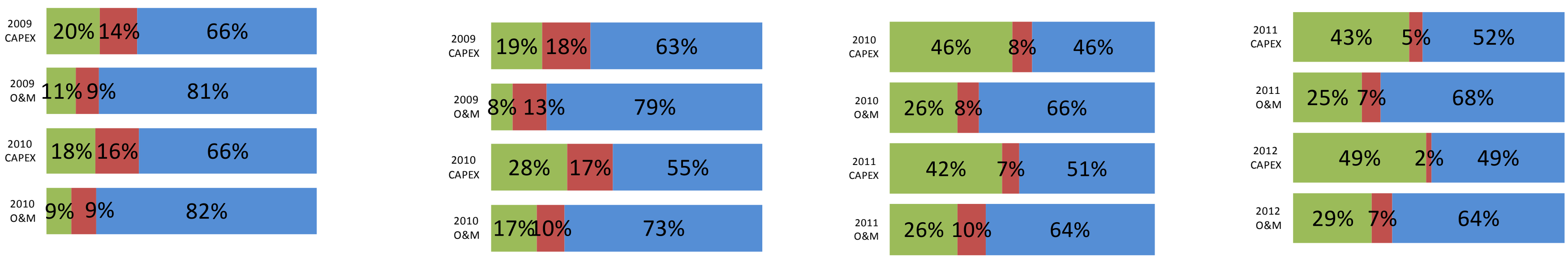
December 2008 Observations: For those utilities indicating changes to either the CAPEX budgets or O&M budgets for 2009 and 2010, the change was more likely to be an increase than a decrease. Two thirds of all respondents indicated no change to CAPEX, and those who reported a change, there were more indications of budget increases compared to budget decreases. O&M expense outlook was more likely than CAPEX to remain as had been planned in January of 2008.

June 2009 Observations: There was some indication of a pullback in CAPEX and O&M spending on protection and control equipment and systems for the current year reported, with what appears to be a welcome jump in both CAPEX and O&M spending planned for 2010.

January 2010 Observations: A nice jump to 46% that indicated an upswing in CAPEX spending for protective relays and associated controls.   Only eight percent reported a decrease in CAPEX for 2010. A similarly positive outlook for 2011 was noted, with 42% citing increases. About a quarter of the respondents reported an uptick in O&M spending plans for both years, a multiple of those citing a likely decreased level of O&M spending.

February 2011 Observations: Similar to findings from the 2010 survey, there is still an optimistic level of increase in the amount of CAPEX and O&M spending for P&C . Slightly fewer than half reported that CAPEX would increase over the 2010 forecasted level, and very few utilities reported any decrease in either CAPEX or O&M spending.

Figure 1-5. Budget Outlook for Protection and Control **Increase Decrease No Change**



Dec. 2008 June 2009 Jan. 2010

Rationale for Change in CAPEX

Reason for Increases	Yes 2010	No 2010	Yes 2011	No 2011
Regulatory Mandates	45%	55%	42%	58%
Smart Grid Initiatives	62%	38%	64%	36%
Government Stimulus	41%	59%	41%	59%

Reasons for Decreases	Yes 2010	No 2010
Regulatory Change	18%	82%
Economic Outlook	77%	23%

Thanks for Inviting Newton-Evans Research to be part of iPCGRID 2011!

From

The Newton-Evans Research Team