

North American Distribution Automation Market Assessment & Outlook 2015-2017

Final Report



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Responders by Category 5

1. Please indicate the approximate number of feeders on your system that operate at the following voltages: 4kV, 13kV/15kV, 22kV/26kV, 33kV/38kV..... 7

2. Approximately what percentage (%) of all your feeders have both fully automatic and SCADA controlled sectionalizing switches/reclosers installed? 8

3. Approximately what percentage of all your feeders have Fault Detection Isolation Restoration (FDIR)/Fault Location Isolation Service Restoration (FLISR)? 10

4. Currently, what percentage of your feeders support integrated Volt/VAR control (VVC) / Volt Var Optimization (VVO) / or Conservation Voltage Reduction (CVR)?..... 12

5. By 2017, what percentage of your feeders will support integrated Volt/VAR control / Volt Var Optimization / Conservation Voltage Reduction? 14

6. What is driving your decision for VVO? Check all that apply. 16

7. Where are the controls located for FDIR/FLISR on your distribution system? 19

8. In the future, where do you anticipate the controls to be located for FDIR/FLISR? 21

9. Where are the controls located for Volt/Var control on your distribution system?..... 23

10. In the future, where do you anticipate the controls to be located for Volt/Var control? 25

11. Does your utility use automatic fault sensing (AFS) devices (hot line status, fault indicators) in your feeder design? 27

12. If you do use automatic fault sensing, do you utilize the status of the communicating automatic fault sensing devices in your distribution automation applications? 29

13. Have you integrated any communication/controls for distributed generation (DG) into your DA system architecture?..... 31

14. Are you considering a trial deployment to manage distributed energy resources – DER - (e.g. inverters, energy storage, EV chargers, etc.) within the DA system? 33

15. Does your utility integrate sensing and/or Volt/Var control at the LV side of the distribution transformer within the DA system?..... 35

16. Does your utility plan to use sensing and/or Volt/Var control at the LV side of the distribution transformer to support any of the following applications? 37

17. What other DA applications use the same telecommunications infrastructure being used by feeder automation? 39

18. How are you notified of a feeder main fault event? 41

19. Does your utility run distributed software applications (like S&C Intelliteam II, L+G Grid Stream; SCADA center product suite, Cooper/Yukon Feeder Automation, G&W/Survalent Lazer Automation)..... 43

20. Are you using any multi-service networks (MSNs) for DA applications? (i.e. security monitoring and field crew comms on the same network, or power quality monitoring and asset management on the same network, etc.) 45

21. If you are using any multi-service networks, please identify which DA applications are on the same network 47

22. Please specify "other" DA applications per network from the previous question..... 49

23. What type of communications networks do you use for DA backhaul? 50

24. What type of communications networks do you use for DA last mile? 53

25. What vendors are you using on (or associated with) your DA communications networks? . 56

26. Do you use a centralized (control center based) tool for communication network management and security management?..... 59

27. Please check any of the following functions you would like to have integrated into a communications/security management tool for MV Feeder Device management (like recloser controller, capacitor bank controllers, remote controlled switch). 61

28. Do you currently use/plan to use encryption on your communications network for DA? 63

29. Do you plan to upgrade the existing Feeder Automation network to a newer, wireless technology that allows for features like higher bandwidth, IP enabled radios (i.e. 4G, LTE or WIMAX) by the end of 2017?..... 65

30. If you do plan on upgrading your Feeder Automaton network, which wireless technology do you plan to use?..... 67

31. Please provide an estimate of your TOTAL budget for DA projects for the years 2015-2017 69

32. For 2015, what percentage of that total budget applies to the applications listed below?.. 72

33. For 2016, what percentage of that total budget applies to the applications listed below?.. 74

34. For 2017, what percentage of that total budget applies to the applications listed below?.. 76

Average breakout of spending for key DA applications over 2015-2017..... 78

35. For the 2015-2017 time frame, please estimate (as a % of the total budget) how your total DA expenditures will be allocated among these three categories..... 79

36. Do you currently use/plan to use bi-directional regulators or reclosers on your system?.... 80

37. Do you currently use/plan to use dynamic protection (real time modification of protection settings) on your system? 82

38. Do you use or plan to use a centralized based ADMS FDIR/FLISR to manage field devices for distribution automation ? 84

39. Do you use or plan to use a centralized based ADMS VVC/VVO to manage field devices for conservation voltage reduction? 86

Utilities Participating in the Study 88

Introduction and Summary Observations

The findings presented in this report are based on the completion of detailed surveys received from 15 investor-owned utilities, 26 public power utilities, 26 electric cooperatives, and 8 electric utilities in Canada. This utility sample represents electric power service to more than 32 million customers in the US and Canada, amounting to a considerable 20% sample based on North American customer totals.

More than one-half of the survey participants were from “large” utilities (serving at least 100,000 customers). Eight NERC regions were each represented by three or more utilities.

More information on the respondent utilities can be found on the next two pages. A listing of all participating utilities is included at the end of this report.

Responders by Category

Summary	75	100%
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Type

Investor Owned	15	20%
Public Power	26	35%
Cooperative	26	35%
Canada	8	11%

Number of Customers

<100k	36	48%
100k-499k	28	37%
>=500k	11	15%

NERC Interconnection region

NPCC	9	12%
RFC	10	13%
SERC	22	29%
FRCC	3	4%
MRO	6	8%
SPP	5	7%
TRE	4	5%
WECC	16	21%

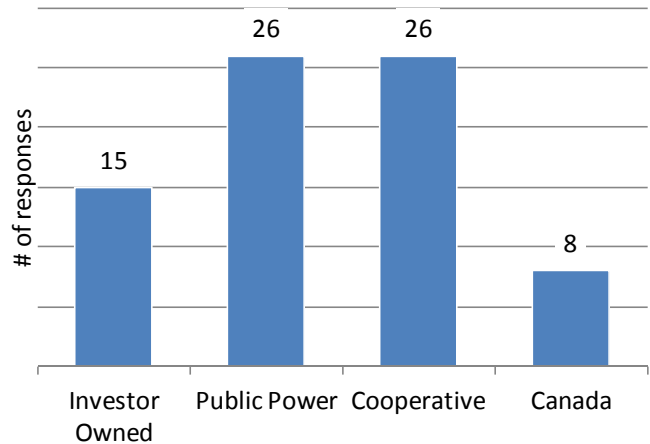


Fig. i

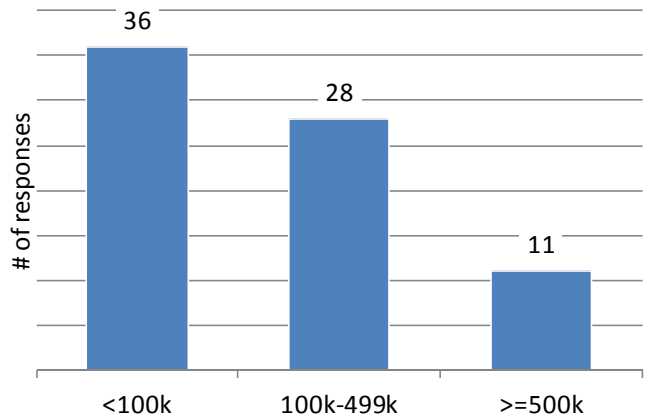
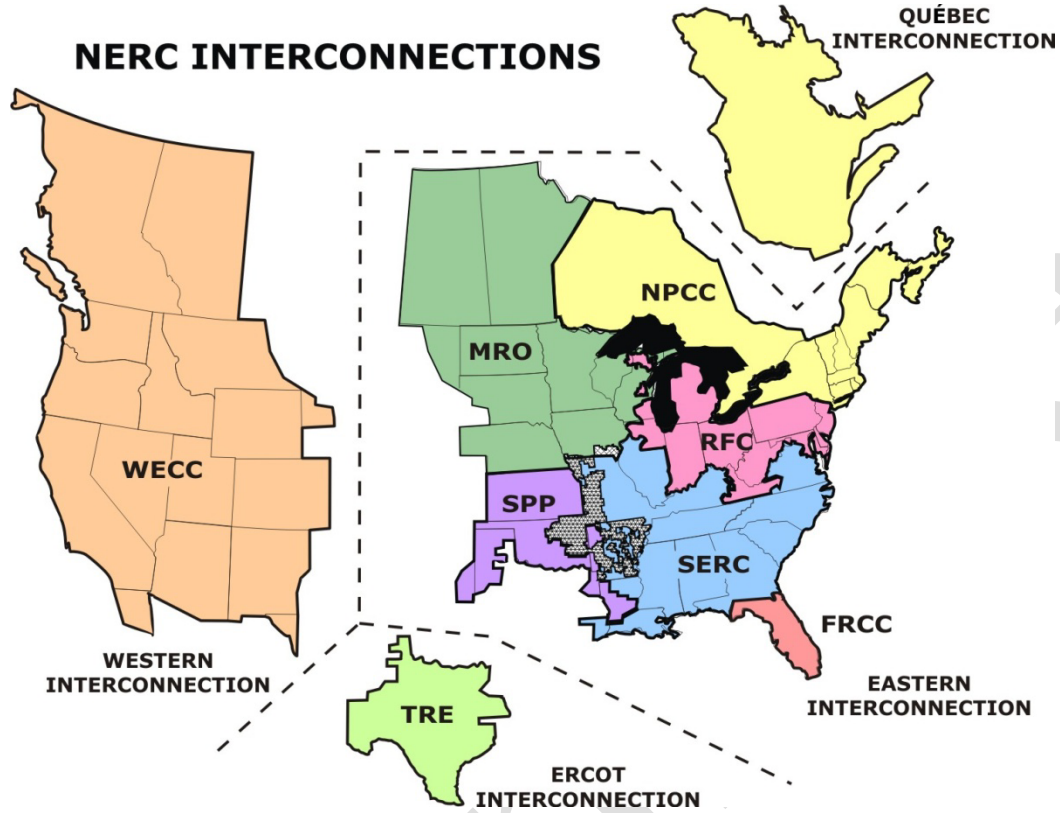


Fig. ii



Responses by NERC region:

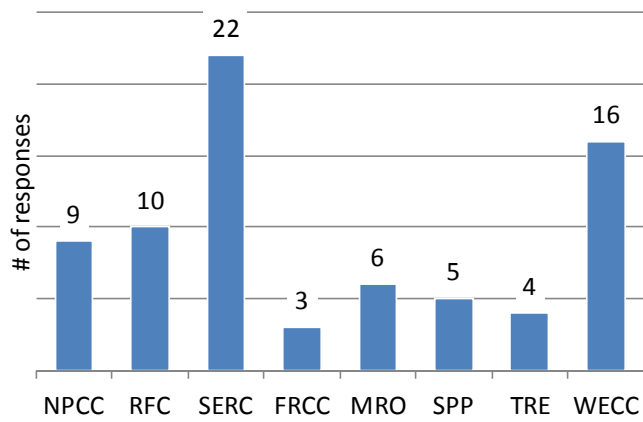
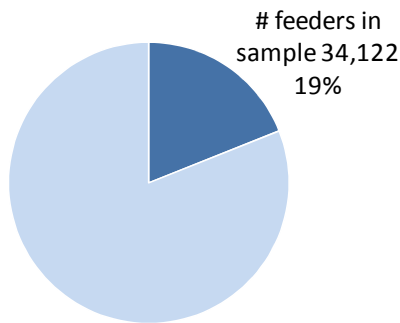


Fig. iii

1. Please indicate the approximate number of feeders on your system that operate at the following voltages: 4kV, 13kV/15kV, 22kV/26kV, 33kV/38kV

The 75 survey respondents account for many thousands of primary feeders. Newton-Evans Research estimates the total number of primary distribution feeders in the US and Canada to be 175,000-180,000. Of this total, some 34122 feeders, (providing a 19% sample), are separated into 4kV, 13kV, 24kV, and 35kV. Note in the chart below that the majority of utilities (and the majority of feeders) operate MV feeders at 13/15kV ranges.



*out of 180,000 feeders in North America, based on Newton-Evans estimates

Fig. 1a

Number of feeders indicated as being in operation by sample of 75 responding utilities

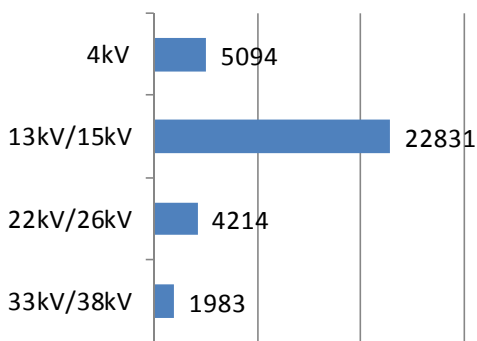


Fig. 1b

Utilities Participating in the StudyInvestor Owned

Baltimore Gas & Electric	MD
Bangor Hydro	ME
Central Hudson G&E	NY
Consumers Energy	MI
DTE	MI
Duke Progress Energy	NC
Empire District Electric Company	MO
Mid American Energy	IA
OG&E	OK
Oncor Electric Delivery	TX
Pepco	DC
PSE&G	NJ
UNITIL	NH
Westar Energy	KS
XCEL Minnesota	MN

Public Power

Austin Energy	TX
City of Roseville	CA
Clark Public Utilities	WA
Cleveland Utilities	TN
Clinton Utilities Board	TN
Cowlitz PUD	WA
Eugene Water & Electric Board	OR
Fort Collins	CO
Grant PUD	WA
Greenville Utilities	NC
Hagerstown Light Department	MD
Heber Light & Power	UT
Huntsville Utilities	AL
JEA	FL
Kerrville Public Utility Board	TX
KEYS Energy	FL
Lafayette Utilities System	LA
Lodi Electric Utility	CA
Nashville Electric Service	TN
Omaha Public Power District	NE
Riverside Public Utilities	CA
Salem Electric Dept.	VA
Seattle City Light	WA
SMUD	CA
Snohomish County PUD	WA
Tacoma Power	WA

Cooperative

Carroll EMC	GA
Cass County Electric	ND
Central Virginia E.C (CVEC)	VA
Citizens Electric Corporation	MO
Clay Electric Cooperative, Inc.	FL
Dakota Electric Association	MN
Energy United	NC
Greystone Power Corp	GA
Holy Cross Energy	CO
Jackson EMC	GA
Mid-Carolina Electric Coop	SC
Middle Tennessee EMC	TN
Midwest Energy	KS
NOVEC	VA
Oconto Electric Cooperative	WI
Ozarks Electric Cooperative	AR
Pickwick Electric Cooperative	TN
Rappahannock Electric Coop	VA
Rutherford EMC	NC
Sawnee EMC	GA
Sioux Valley Energy	SD
South Central Indiana REMC	IN
South Kentucky RECC	KY
Southern Maryland E.C.	MD
Tipmont REMC	IN
United Cooperative Services	TX

Canada

City of Medicine Hat	AB
EPCOR	AB
Horizon Utilities Corporation	ON
Hydro-Sherbrooke	QC
London Hydro	ON
Newfoundland Power	NF
Saint John Energy	NB
Whitby Hydro Electric Company	ON