

Observations and Overview of the U.S. Market for Fuses and Fusing Products Among Mid-sized Electric Utilities

A Utility Survey-Based Report



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SAMPLE

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Survey sample

A total of 38 replies were received from utility operations officials. This respondent group included: 4 Investor Owned utilities, 21 Public Power utilities, and 13 Cooperatives. These 38 utilities serve a combined total of 8.238 million end user customers, or about 6% of the 144.5 million U.S. electricity end users.

In terms of distribution line miles - another guideline for potential fuse link, power fuse and current limiting fuse usage - the U.S. has about 5.7 million distribution line miles. The survey sample in this study includes 273,000 distribution line miles or about 5% of the North American total. Thirdly, in terms of medium voltage substations, the sample utilities accounted for an estimated 2,500 MV substations, and there are about 50,115 total MV substations in the U.S., again representing about 5% of the total.

The Newton-Evans' staff has used a range of 16.7x to 20x as sample-to-market multipliers, (*inverse of the 5% samples and 6% sample size noted above*) where this seems practical and useful, in order to provide the reader with some assessment of the overall U.S. market size.

Here are some characteristics of the survey sample participating in the study. It would be prudent to use caution when extrapolating from this 5% sample.

Type

Investor Owned	4
Public Power	21
Cooperative	13
Total	38

Line Miles

>10k Dx line miles	6
5-10k Dx line miles	8
1-5k Dx line miles	13
<1k Dx line miles	11
Total Respondents	38

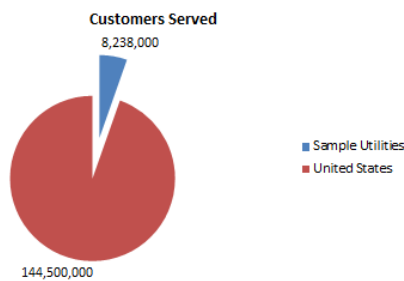
Customers

≥250k customers	5
100-250k customers	8
50-100k customers	11
10-50k customers	14
Total Respondents	38

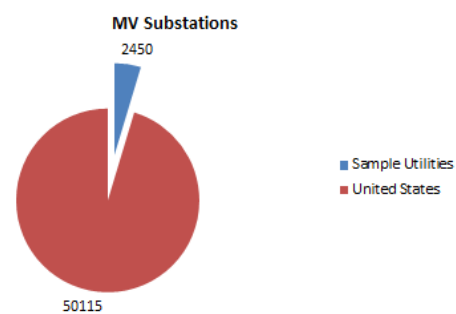
Multiplier Used for Sample-to-Universe market sizing and market potential estimates:

Using the 5% sample obtained for both MV substations and distribution line miles, one multiplier being used in this report to calculate U.S. market size estimates is 20x of whatever sample numbers apply. Using customer totals, the sample multiplier (at 6%) would be 16.7x.

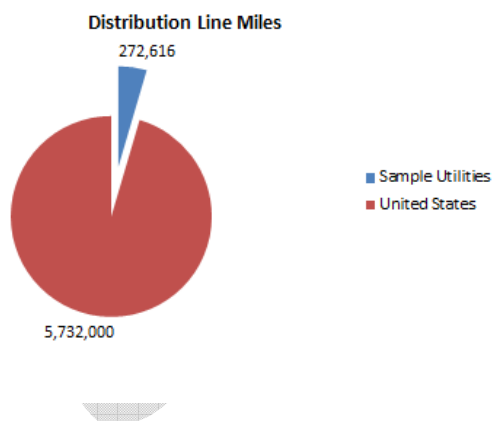
Calculating the Percent Sample
Customers = 6% of United States



Calculating the Percent Sample
MV Substations = 5% of United States totals



Calculating the Percent Sample
Distribution Line Miles = 5% of United States



1. Please provide an estimate of the number of fuse links your utility typically uses annually. Also, please indicate your most common amp ratings.

The first bar chart below (fig. 1a) shows what percent of respondents use each type of fuse *at all*. The most commonly used fuse type according to the sample is the K fuse; 61% of respondents said they use these fuses for one or more applications. T fuses were the next most common (45%). Only one utility in the sample reported any use of H fuses.

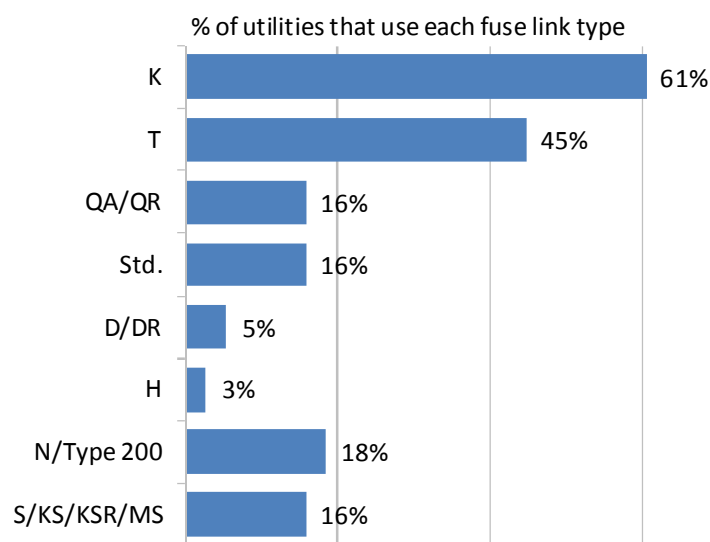


fig. 1a

19. What are some features that a specific supplier provides in their current limiting fuse product offerings that make that supplier stand out? (i.e. ceramic vs. fiberglass, lead time, etc.)

Respondents frequently mentioned that “fits existing/standard equipment” is a very important aspect in selecting a manufacturer of current limiting fuses.

Respondent# 1

Fit in a standard universal fuse bracket or holder.

Respondent# 5

We standardized on a few specific fuses for coordination reasons and compatibility with existing gear.

Respondent# 6

Competitive pricing Hi-tech vs. S&C

Respondent# 11

The CL fuses we bought were all replacement because we do not purchase the equipment that these go in any longer.

Respondent# 17

Our own historical experience without any issues.

Respondent# 20

Fuse curves match better with our devices.

Respondent# 21

Fits existing equipment.

Respondent# 22

Nothing.

Respondent# 23

None

Respondent# 25

The only current limiting fuses that we use are on some capacitor banks and our AMI system transformers. Cooper was recommended by the vendor.

Respondent# 26

None

Respondent# 27

Hinge mounting, double barrel

Respondent# 28

Bayonet under oil. Drop out from OH cutout.

Respondent# 33

Meet our specifications at the lowest price.

Respondent# 34

Experience

Respondent# 35

Low bid

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

Investor Owned

Baltimore Gas & Electric
Duke Carolinas East
Empire District Electric Co.
MidAmerican Energy

Public Power

Alameda Municipal Power
Alcoa, TN
Ames Electric Services (IA)
Clark Public Utilities
Clinton Utilities Board
Cowlitz PUD
Fayetteville PWC
Hagerstown Light Department
Harrisonburg Electric Commission
Huntsville Utilities
LADWP
Lafayette Utilities System
Loup River PPD
North Little Rock Electric Dept.
NPPD
Ocala (FL)
Riverside Public Utilities
Rochester Public Utilities
Salem Electric Dept.
Salt River Project
Silicon Valley Power

Cooperative

Cuivre River EC
Dakota Electric Association
Hart EMC
Holy Cross Energy
Jackson EMC
Middle Tennessee EMC
Midwest Energy Inc.
Owen Electricity Coop
Pickwick Electric Coop
Rutherford EMC
South KY RECC
United Power, CO
Withlacoochee River Electric Coop

FUSE LINKS

1. Please provide an estimate of the number of fuse links your utility typically uses annually. Also, please indicate your most common amp ratings.

Type	Not Used	<10,000 (Please estimate)	10,000- 30,000	30,001- 50,000	50,001- 75,000	75,001- 100,000	>100,000 (Please estimate)	Most common amp ratings (Please list)
K	<input type="checkbox"/>	#	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#	
T	<input type="checkbox"/>	#	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#	
QA/QR	<input type="checkbox"/>	#	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#	
Std.	<input type="checkbox"/>	#	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#	
D/DR	<input type="checkbox"/>	#	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#	
H	<input type="checkbox"/>	#	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#	
N/Type 200	<input type="checkbox"/>	#	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#	
S/KS/KSR/MS	<input type="checkbox"/>	#	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#	

2. Please provide a rough estimate (%) of the fuse links your utility purchases from these manufacturers.

Supplier Name	% of Installed Fuse Links
Cooper/Kearney	%
Hubbell/Chance	%
S&C	%
Other (please identify) →	%
Total	100%

3. If possible, please approximate your typical annual budget for fuse links. \$ _____

4. Are there features that a specific supplier provides in their fuse link product offerings (e.g. choice of fuse material, packaging, etc.) that make that supplier stand out? Please explain.

POWER FUSES

5. Please provide an estimate of the number of power fuses that your utility typically uses annually.

<100 (Please estimate)	100-300	301-500	501-750	751-1,000	>1,000 (Please estimate)
#	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#

6. Please provide a rough estimate (%) of the power fuses your utility purchases from these manufacturers.

Supplier Name	% of Installed Power Fuses
S&C	%
Eaton/Cooper	%
GE	%
Other (please identify) →	%
Total	100%

7. Please provide an estimate of the number of power fuse mounting assemblies that your utility plans to purchase in 2013.

☐ <100 ☐ 100-500 ☐ 501-1,000 ☐ If > 1,000 Please Estimate → # _____

8. Approximately, what percent of power fuses being purchased are re-fillable power fuses (i.e. SM4, SM5) versus one time use (replaceable) power fuses (i.e. SMD20/SMU20, SMD40/SMU40)? Re-fillable → [%] One time use → [%]

9. Approximately, what percent of power fuses are used for indoor applications (i.e. SM4Z, SM20) versus outdoor applications (i.e. SMD20, SMD40) Indoor applications→[%] outdoor applications→[%]

10. From the table below, please select the five voltage, current and speed power fuse combinations *that you use most*. ("K," "E" = Standard, "DR" = Coordinating.)

Current Rating (A)	Nominal Rating – Approximate Voltage (kV)			
	7.2	14.4	25	34.5
3	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
4	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
5	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
6	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
7	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
8	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
10	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
12	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
13	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
15	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
20	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
25	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
30	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
40	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
50	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
65	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
80	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
100	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
125	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
140	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
150	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
175	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
200	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
250	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
300	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR
400	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR	<input type="checkbox"/> K <input type="checkbox"/> E <input type="checkbox"/> DR

11. If possible, please approximate a typical annual budget for power fuses.

\$ _____

12. What features that a specific supplier provides in their power fuse product offerings make that supplier stand out?

CURRENT LIMITING FUSES

13. Does your utility use current limiting fuses?

☐ Yes, please go to next question

☐ No, you have completed the survey. Thank you for your participation.

14. Please provide an estimate of the number of current limiting fuses that your utility typically uses annually.

<100 (Please estimate)	100-300	301-500	501-750	751-1,000	>1,000 (Please estimate)
#	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	#

15. From the table below, please select the five Voltage, Current combinations *that you use most*.

Continuous Current Rating (A)	Approximate Maximum Design Voltage (kV)				
	4.3	8.3	15.5	23/27	38
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50DW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
125	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
130	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
140	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. If possible, please approximate your typical annual budget for current limiting fuses? \$ _____

17. Please estimate the percentage of current limiting fuses your utility purchases from these manufacturers.

Supplier Name	% of Installed Current Limiting Fuses
ABB (T&B, Hitech)	%
Eaton/Cooper	%
GE	%
Mersen	%
Other (please identify) →	%
Total	100%

18. Please estimate the percentage of current limiting fuses used by type.

Full Range	%
Backup (Companion) fuse	%
Partial Range	%
Under-oil	%
Total	100%

19. What are some features that a specific supplier provides in their current limiting fuse product offerings that make that supplier stand out? (i.e. ceramic vs. fiberglass, lead time, etc.)

Thank you for participating in our survey.