ELECTRICAL CONTRACTOR

POWER & INTEGRATED BUILDING SYSTEMS

2016 PROFILE OF THE ELECTRICAL CONTRACTOR **TOPLINE REPORT**

2016 ELECTRICAL CONTRACTOR PROFILE STUDY
TOPLINE REPORT

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PREPARED FOR:
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BETHESDA MD 20814

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CONTENTS

BACKGROUND and PURPOSE

For over fifty years, ELECTRICAL CONTRACTOR magazine has sponsored its exclusive "Profile of the Electrical Contractor." This survey is conducted biannually among its subscribers and aims to provide the most complete "picture" of the contracting industry available from the electrical contractor's point of view. The survey provides electrical contractors with an indication of where their business "fits" into the overall industry, while at the same time providing information that is used to guide and refine the magazine's editorial content.

METHODOLOGY

The survey was conducted by postal mail and via the Internet among a random sample of ELECTRICAL CONTRACTOR subscribers. The field period for the survey began on March 3, 2016 (for both the Internet and postal mail versions), and ended on April 12, which was the deadline for the July 2016 article. A total of 2419 interviews were completed – 1062 via the Internet and 1357 via postal mail. The data were weighted to equalize the influence of the two modes so that it was in line with the 50/50 split which was the case in the most recent Profile studies.

Each respondent who received the survey via the Internet was sent three follow-up e-mails. However, follow-up mailings were not made to non-responders in the postal mail sample. An incentive was offered for participation in the survey: For each completed survey, ELECTRICAL CONTRACTOR magazine would contribute $5 to charity.

The Internet option was first introduced in 2004. In 2004 and 2006, the proportion of surveys completed via the Internet versus postal mail is approximately 60/40. Since 2008, the proportion has been closer to 50/50. As noted above, in 2014, the data were weighted to equalize the proportion that participated via postal mail and via the Internet.

As was the case since 2004, the survey was produced in different versions. Starting with the 2008 Profile study, there were four versions of the survey, which differed from each other on fewer than 10 questions. The first 3 pages were common to all versions while the differences among the versions occurred on the last page. The major difference was that in the Internet portion respondents were *required* in almost all cases to have percentage questions add to 100%.

In 2014, order to accommodate a longer list of questions while at the same time lessening the burden on the respondent, the survey was shortened from 5 print pages to 4. In order to accommodate all of the questions, the survey was produced in 8 versions (up from 4). This required a much larger sample size so that each of the questions would be asked of a large enough sample to allow for analysis – particularly by subgroups. In 2016, there were 7 versions; the two versions that deal with training (past 12 months and next 12 months) were combined.

This research was conducted by New York, NY-based Renaissance Research & Consulting, Inc. (www.renaiss.com), an independent marketing research firm that has, as one of its specialties, market research for the construction industry.

Statistics

The margin of error on the total sample of 2419 is +/-**1.7**% for percentages around 50 percent (i.e., we are confident that a reported 50% will fall between **51.7**% on the plus side and **48.3**% on the minus side 90% of the time. Please note that different rules apply to testing of averages, which were also tested at the 90% level of confidence and are also noted in the report.

A significant difference in the total sample between 2016 with a sample size of 2419 and 2014, where the sample size was 2722 is at least **1.2**% at the 90% confidence level for percentages around 50%. Any difference less than 1.2% is not statistically significant.

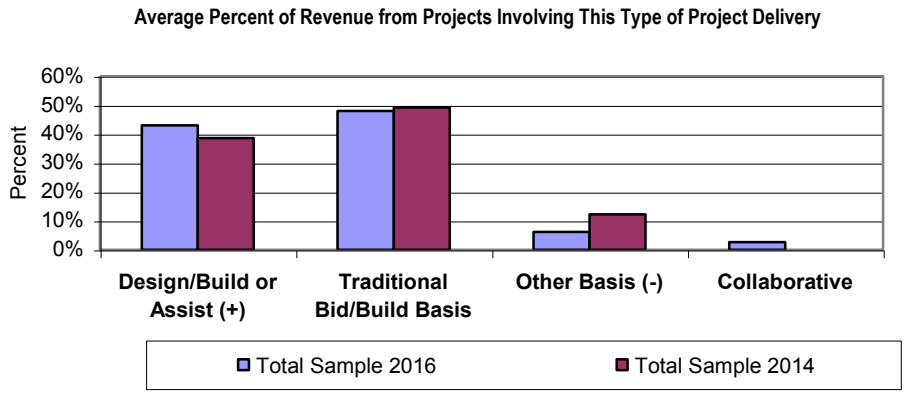
The report uses a few different graphics to indicate significant differences:

- In this example, the electrical contractors working in firms with 1- 4 (column 'a') or 1-9 employees (column 'b') are significantly older than those who work in firms with 10+ employees.

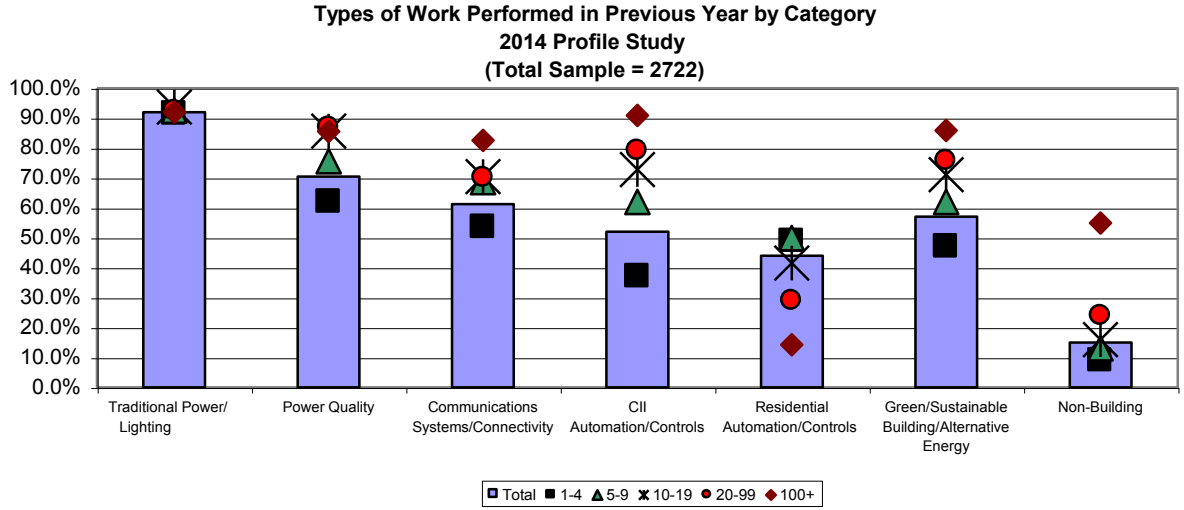
Average Age of Electrical Contractor in 2016 and Earlier				
		Firm Size		
	Total	1-4	1-9	10+
		(a)	(b)	(c)
Average Age (2016 Study) N=2419	57.3	**58.7>c**	**58.5>**	54.1
Average Age (2014 Study) N=2722	56.2	57.4	**57.1>**	53.3
Average Age (2012 Study) N=1024	56.1	57.5	**57.2>**	52.6
Average Age (2010 Study) N=1077	53	53.8	**53.8>**	50.4
Average Age (2008 Study) N=1157	51.2	**52. 6** >c	**52. 1**>c	49.2
Average Age (2006 Study) N=	49.9	**NA**	**NA**	**NA**

The bolding and the arrow indicate significant difference and the direction of the difference.

Finally, on a column or bar chart, a (+) or (-) next to the title indicates a significant difference compared to its pair. In this example from the current study, the average revenue from Design/Build or Assist rose significantly vs. two years earlier.



How to read scatter plots: Subgroups that are shown above the blue bar are significantly larger than average while those within the bar are smaller than average. Subgroups that are average are not shown.



KEY FINDINGS

More electrical contracting firms appear to be on the rebound:

- According to our survey, electrical contracting firms appear to be getting larger: both the percentage of firms with 10+ employees and firms with revenue of $1 million or more are each significantly higher in 2016 compared to 2014.
    - This is the first time since at least 2006 that the percentage of firms with 1-9 employees in our survey has decreased. In contrast, firms with 20-99 employees grew as a proportion of the total sample to 11% from 9%.
- The percent of electrical contracting companies that are losing employees, once again, has declined significantly (from 18% to 13%) while the percentage that stayed the same increased (from 61% to 65%). The percentage that added employees at 21% is statistically unchanged compared with two years earlier.
- The average percent of revenue from New construction has risen significantly to 34% from 32%, while average revenue from Maintenance/Service or Repair has dropped significantly to 39% from 41% two years earlier. New Construction, which accounted for 43% of average revenue in 2007, has not yet recovered.
- The percentage of electrical contractors that work on a Design/Build or Design/Assist basis work has risen significantly to about 73% and now accounts for an average of 43% of revenue, up from 39% two years earlier.
- While electrical contractors are continuing to work in Traditional Power/Lighting in strong numbers: 94% and an equal percentage -- 95% -- work on low voltage projects.[1] In addition, high percentages are doing HVAC work (42%), including HVAC Controls (38%) as well as HVAC Mechanical (23%). 14% have worked on Water Utilities or Waste Water Treatment Plants.
    - 19% said that their 2015 work involved Pre-Assembly/Pre-Fabrication of Electrical Components and 16% said that they performed Programming and Commissioning in the previous year.
- Given the complexity of some of these projects, it should not be surprising that 42% of electrical contracting firms have a professional relationship with engineers – either on a consulting basis (38%) or on staff/ in a separate division (15%) or both consulting and on staff/separate division (11%).

[1] Note that there is overlap, for example, LED Lighting and Lighting Controls are part of *both* the Traditional Power/Lighting and the Low Voltage nets.

- As was the case two years ago, smaller firms are continuing to do types of work that were formerly done by larger electrical contacting firms. The threshold for many types of work now appears to be 5+ employees rather than 10+ or rather than 20-99 or 100+. In fact, when reviewing 41 project types across CII and Residential construction, firms with 5-9 have a profile that is much closer to firms with 10-19 employees than to their smaller counterparts.

- However, the very smallest firms perform many aspects of Traditional Power/Lighting, Power Quality, Communications/Connectivity, Automation/Controls Systems and even HVAC Mechanical work; in fact, all categories except Sustainability. Their widespread involvement only becomes evident when CII work (which tends to overshadow residential work) is excluded.

    - Firms with 5-9 employees are in a sweet spot, because, in addition to their above average work on CII projects, they also participate to a greater than average extent on Residential projects.

- All but the smallest firms (1-4 employees) are embracing BIM. While BIM usage and the average revenue from it is low among firms with 1-4 employees, it increases dramatically as firm size increases, often starting with firms as small as 5-9 employees. At its peak among firms with 100+ employees, 70% say that they use BIM at all (any use) and that on average, it is used on about one-quarter of their projects.

- Electrical/Power Distribution accounts for about 43% of average revenue, unchanged from two years earlier. The average percent of revenue from Electrical/Power Distribution had been dropping since 2004 when it was 69%, it continues to be below its 2010 level of 56%.

    - In fact, only two of the 14 revenue sources changed compared to two years earlier: Energy Management/Power Quality rose among the total sample and among firms with 1-9 employees; Commercial Sound and Video rose among firms with 10+ employees.

- "Availability" and "Price" continue to be the <u>most mentioned reasons</u> for original brand selection and for brand substitution. Fewer mention Price in 2016 compared to two years earlier.

    - Compatibility with Existing Systems, an attribute that was added in 2014 emerged as quite compelling – 32% to 37% among the total sample cite it as a top-3 reason for brand selection. This may be a hot-button for manufacturers if they can use it differentiate their products from competitors.

Other Firm Characteristics (NECA Membership, Business Development)

- 19% of firms in this survey are NECA members, up significantly from the 2014 level of 16%. As was the case two years ago, NECA membership is significantly higher among firms with 20+ employees (45% among firms with 20-99 employees and 65% among firms with 100+ employees).

- 12% of firms have a separate person or department responsible for business development, down significantly from 20% in the 2014 Profile Study. While separate business development entities are more prevalent in firms with 10+ employees (29%), that number also dropped from 41% two years earlier. An additional 5% plan to create this responsibility (lower among firms with 1-9 employees).

    - The decline in having a separate entity that handles business development raises the question of whether more firms have shifted to viewing their workers as their ambassadors and primary sales force.

The average age of the electrical contractors participating in this survey is now 57.3, a statistically significant increase from two years ago when it was 56.2.

Types of Work Performed in Previous Year

When asked about the types of work performed in the previous year (regardless of whether Residential or CII), almost all firms worked on Power and Lighting (94%).

- About 7 in 10 worked on Automations/Controls (73%) and/or Power Quality (68%)
- About 6 in 10 worked on Sustainability (previously called Green/Sustainable Technology/Alternative Energy, 57%) and/or Communications Systems/Connectivity (also 57%).
- 53% worked on CII Automation/Controls, 47% worked on Residential Automation Controls and/or on a new category called "Other" (which includes Pre-Assembly/Pre-Fabrication of Electrical Components, HVAC Mechanical and Water Utilities or Waste Water Treatment Plants (40%).

Five new project types were included for the first time in the 2016 Profile Study. They are: Wire and Cable, LED Lighting (including Lamps, Fixtures, Controls), HVAC Controls, HVAC Mechanical, Water Utilities or Waste Water Treatment Plants.

There were relatively few changes compared with two years earlier. The most changes (15 out of 41) occurred when Residential and CII work are viewed on a combined basis:

- Six Sustainability work types posted a significant increase vs. the 2014 Profile Study: Electric Vehicle Charging Stations, Smart or Net Metering, Co-generation, Energy Storage, Smart Grid Technology and Microgrids. Pre-Assembly/Pre-Fabrication of Electrical Components also posted a significant increase vs. two years earlier.
- The other changes are as follows: Structured Wiring/Cabling declined although some of the work in this area may have been reported as part of Wiring and Cabling, a new work type added in 2016.
    - Similarly, fewer report working on Lighting Fixtures, Lamps and Lighting Controls or LED Drivers or Ballasts, but again, these types of work may have been reported as part of the new category of LED Lighting (including Lamps, Fixtures and Controls) first added in the 2016 Profile Study.

LEED Projects, Fire/Life Safety (including Alarms and Detectors) and/or Security declined compared with two years earlier.

Receipt of incomplete plans and specs continues to be quite prevalent. 72% of firms have received ANY incomplete plans and specs in 2015, a statistical decrease from the 78% observed two years earlier. On average, 40% of the plans and specs received were incomplete, statistically unchanged from 43.4% two years earlier.

As might be expected, the incompleteness of plans and specs varies dramatically by building category. It is highest in single-family construction and declines as the level of complexity increases.

As has been the case in recent Profile Studies, about three-quarters of electrical contractors report having a "high" or "medium" ability to influence the overall electrical design or specifications with building owners or design team members.

Brand Specification Options: Electrical contractors continue to have a high level of brand choice. As in earlier tracking waves, only about one-quarter of the specs indicate a single or proprietary brand, while the remainder are some variation of multiple brands.

DETAILED FINDINGS

▲"WHO" ARE THE ELECTRICAL CONTRACTORS?

Size of Firms

A large majority of the electrical contracting firms interviewed are small in terms of both their number of employees and their revenue:

72% have between 1 and 9 employees and 68% have annual revenues of less than $1 million

Compared to two years ago, a significantly lower percentage of the total sample is composed of small firms.

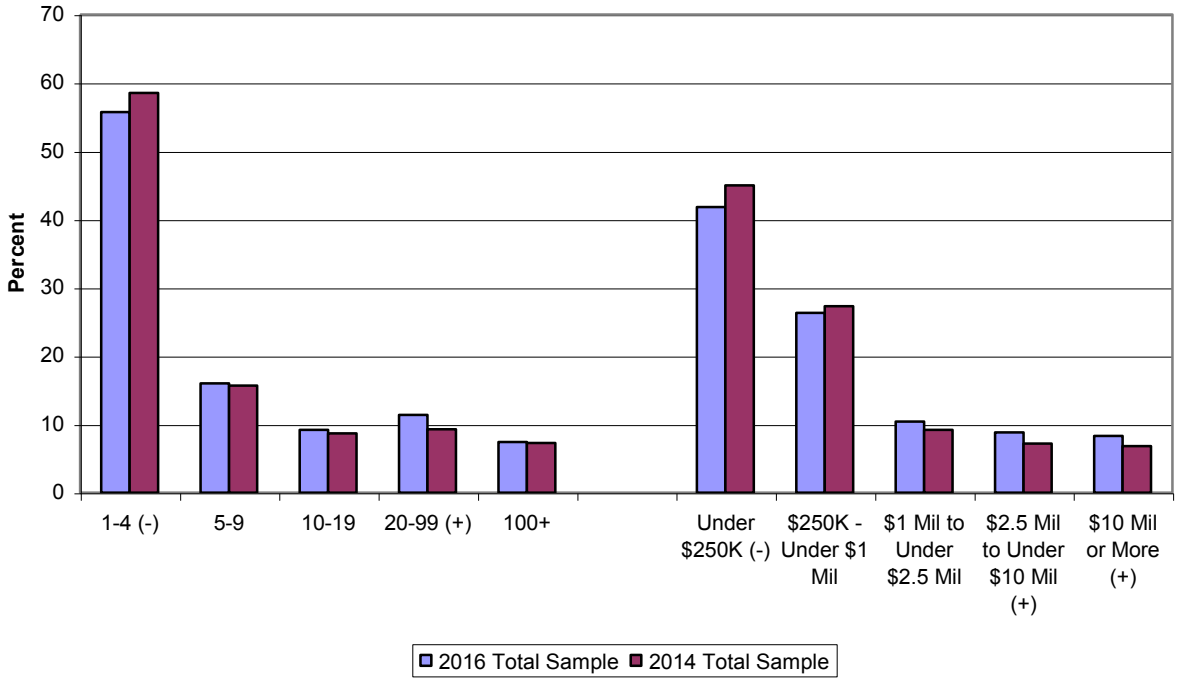
- There was a slight, but statistically significant drop in the percent of firms with 1-9 employees from 74% in 2014 to 72% in 2016. As shown on the next page, the decline was driven by a decrease in the percentage of firms that have 1- 4 employees. In contrast, firms with 20-99 employees grew as a proportion of the total sample (to 11% in the current wave from 9% in the 2014 Profile Study)

- This is the first time since 2006 that the proportion of firms with 1-9 employees decreased. The drop is attributable to a small decline in the proportion of firms with 1-4 employees (from 58.5% to 55.7% in 2016).
    - Although the rise in the percent of small companies appears to have leveled off between 2014 and 2012, the number of small companies had risen dramatically from 63% in 2006 to 74% in 2014. (In the interim, it was 74% in 2012; 72% in 2010 and 67% in 2008.)

- The percentage of companies with revenue of under $1 million declined more sharply -- from 72% in 2014 to 68% in 2016. As shown on the next page, there are fewer firms with annual revenue of under $250K while a larger percentage of the total sample of firms now have annual revenue of $2.5 million or more.

The combined categories of 1-9 and Under $1 million are not shown

Company Size Trended 2016 Profile vs. 2014 Profile
(Reporting n Previous Year)

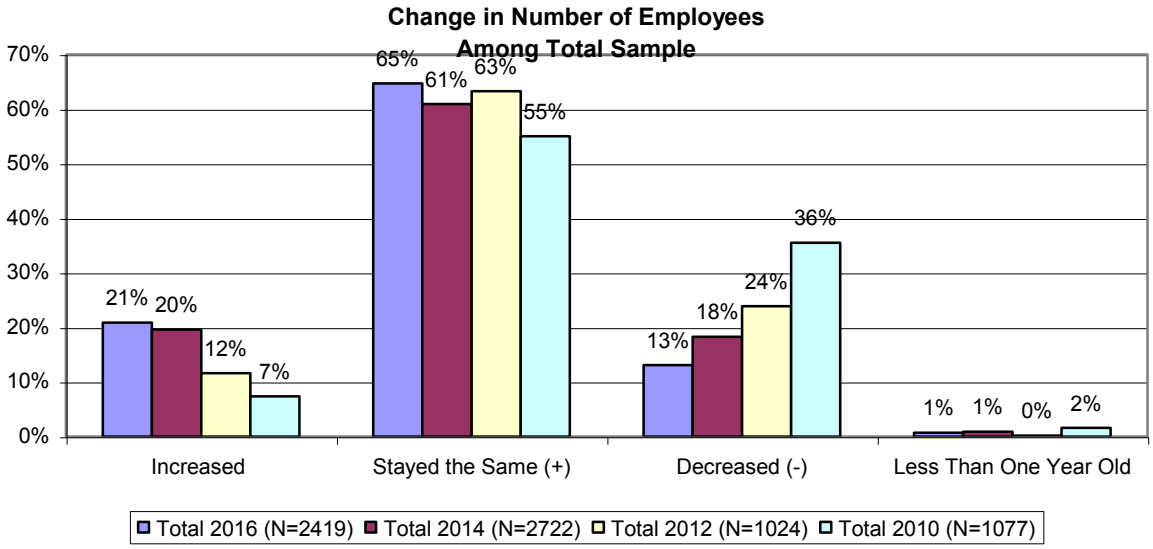


(-) and (+) indicate a significant difference from two years earlier at the 90% level of confidence

Change in Company Size During Past 12 - 18 Months

When questioned directly about changes in company size, as of the 2016 Profile Study, the percent that said that their firm "increased" is substantially higher than the percent that "decreased" (21% vs. 13%), while about two-thirds said that their firm size had stayed the same over the past 12- 18 months.

- Further, when the 2016 Profile Study is compared with the 2014 Profile results, there is a statistically significant increase in the percentage of firms that stayed the same (to 65% from 61%) and a statistically significant decrease in the percent of firms that said that they lost employees (to 13% from 18%) in the past 12 – 18 months.
    - Note the sharp and steady decline of firms that lost employees (decreased) between 2010 and 2016.



(-) and (+) indicate a significant difference from two years earlier at the 90% level of confidence

Change in Company Size During Past 12 - 18 Months, continued

Unlike two years ago, when the story was consistent across the total sample as well as among companies with 1-9 and 10+ employees, in 2016, firms with 10+ employees posted a significant increase versus two years earlier, while there was no statistically significant difference among firms with 1-9 employees compared with two years earlier.

- Rather, in 2016 compared with 2014, there was a significant increase in "stayed the same" among the total sample and among firms with 1-9 employees.
- However, "decreased" posted a significant decline among the total sample as well as among companies with 1-9 and 10+ employees.

Four years ago, the story was different:

- *In 2012, the changes were particularly dramatic among large firms **(10+ employees)**, where the percent reporting a decline dropped almost in half from 61% to 35% while the percent reporting an increase in the number of employees jumped to 27% from 15%.*
- *In 2012, the story among firms with **1-9 employees** was one of stabilization: more firms shifted into the "stayed the same" category from the "declined" category. However, the percent of firms that added an employee was small and is statistically unchanged versus 2010.*

Change in Company Size During Past 12 - 18 Months													
	Total					1-9 Employees					10+ Employees			
	2016	2014	2012	2010		2016	2014	2012	2010		2016	2014	2012	2010
	(2419)	(2722)	(1024)	(1077)		(1744)	(2039)	(759)	(780)		(665)	(668)	(258)	(285)
Increased	21%	**20%>**	**12%>**	7%		11%	**12%>**	6%=	5%		**47%>**	**42%>**	**27%>**	15%
Stayed the Same	**65%>**	61%=	**63%>**	55%		**75%>**	70%=	**72%>**	67%		38%	35%=	**37%>**	23%
Decreased	13%	**<18%**	**<24%**	**<36%**		12%	**<17%**	**<20%**	**<26%**		15%	**<23%**	**<35%**	**<61%**

Bolded numbers > and < indicate statistically significant differences in the direction of the arrow

Average Number of Employees By Firm's Revenue

As expected, almost all of the smallest firms have revenue of less than $1 million, while over half of the very largest firms have revenue of $25 million or more.

- The high percent of "don't know/no answer" among firms with 100+ employees is the reason that only 85% of these firms report annual revenue of $1 million or more.

Average Number of Employees By Firm Revenue
2016 Profile Study

	Total	(1-4)	(5-9)	1-9	10+	10-19	20-99	100+
	(2419)	(1361)	(383)	(1744)	(665)	(223)	(269)	(173)
	%	%	%	%	%	%	%	%
Less than $ 1 Million	**68**	**95**	**73**	**90**	**12**	**29**	**4**	**0**
Less than $250K	42	71	11	57	2	3	2	0
Between $250K and <$1 Million	26	24	62	33	10	26	2	0
$ 1 Million or More	**28**	**0**	**22**	**6**	**82**	**69**	**91**	**85**
Between $1 Million and <$2.5 Million	10	0	20	6	23	48	15	4
Between $2.5 Million and <$10 Million	9	0	2	0	30	21	53	5
Between $10 Million and <$25 Million	4	0	0	0	13	1	21	18
$25 Million +	5	0	0	0	16	0	2	58
Don't Know/No Answer	4	5	5	4	6	2	5	15

Q3 N=2419

Income distribution shifted upward between 2014 and 2016: a significantly smaller percentage of ecs worked for firms with revenue of under 1 million (68% vs. 72%) while a significantly higher percentage worked for firms that had revenues of $1 million or higher.

This is in contrast to the period between 2014 and 2012 when there was no change in the proportion of firms that are over and under $1 million in revenue. (2012 results are not shown)

- Firms with 1-4 employees that make up the largest proportion of the sample generally drive the results among the total sample, however, this is not the case in 2016. Rather, it is the change among firms with 5-9 employees that are reflected in the total sample.

- There is no statistically significant difference in revenue among firms with 100 or more employees. Note the very high percentage of these large firms that declined to answer the income question.

~~Average~~ Number of Employees By Firm Revenue
2016 Profile Study Vs. 2014 Profile Study

	Total		1-4		5-9		10-19		20-99		100+	
	2016	2014	2016	2014	2016	2014	2016	2014	2016	2014	2016	2014
	(2419)	(2722)	(1361)	(1613)	(383)	(426)	(223)	(231)	(269)	(248)	(173)	(189)
	%	%	%	%	%	%	%	%	%	%	%	%
Less than $ 1 Million	**68**	**<72**	**95**	**95**	**73**	**<81**	**29**	**30**	**4**	**5**	**0**	**0**
Less than $250K	42	<45	71	71	11	<17	3	4	2	0	0	0
Between $250K and <$1 Million	26	27	24	24	62	64	26	26	2	5	0	0
$ 1 Million or More	**28>**	**23**	**0**	**0**	**22>**	**17**	**69**	**65**	**91**	**90**	**85**	**80**
Between $1 Million and <$2.5 Million	10	9	0	0	20>	15	48	51	15	18	4	2
Between $2.5 Million and <$10 Million	9>	7	0	0	2	2	21 >	13	53	56	5	9
Between $10 Million and <$25 Million	4>	3	0	0	0	0	1	1	21>	13	18	19
$25 Million +	5>	4	0	0	0	0	0	0	2	3	58	50
Don't Know/No Answer	4	5	5	4	5	2	2	5	5	5	15	20

< Indicates a significant difference at the 90% level of confidence

Other Firm Characteristics

(NECA Membership, Business Development and Project Financing)

- 19% of firms in this survey are NECA members, up significantly from the 2014 level of 16%. As was the case two years ago, NECA membership is significantly higher among firms with 20+ employees (45% among firms with 20-99 employees and 65% among firms with 100+ employees).

- 12% of firms have a separate person or department responsible for business development, down significantly from 20% in the 2014 Profile Study. While separate business development entities are more prevalent in firms with 10+ employees (29%), that number also dropped from 41% two years earlier. An additional 5% plan to create this responsibility (lower among firms with 1-9 employees).

    - The decline in having a separate entity that handles business development raises the question of whether more firms have shifted to viewing their workers as their ambassadors and primary sales force.

- 9% of firms currently offer assistance with project financing (12% among firms with 5-9 employees and 15% among firms with 10+ employees); an additional 3% plan to institute this offering.

    - Of the firms that offer assistance with financing, 3% say that it involves a 3rd party, 3% say that a 3rd party is not involved. The remaining 3% say that it depends on the circumstance.

"WHO" WORKS FOR CONTRACTING FIRMS?

Age of Respondents

Regardless of company size (number of employees), the survey respondents tend to be at least middle aged, rather than young. Across the total sample, 30% are between the ages of 35 –54, which is a statistical decrease from the 36% reported in 2014. With the exception of the period between 2014 and 2012, where it was unchanged, there has been a sharp decline in electrical contractors aged 35-54; it was 47% in 2010. 72% are between the ages of 35 and 64 (statistically unchanged from 70% in 2012 but a significant decline from 2010 when it was about 80%).

- The average age of the electrical contractors participating in this is now 57.3, a statistically significant increase from two years ago when it was 56.2.
    - The average age also rose among electrical contractors in firms with 1-4 employees and with 1-9 employees but not among firms with 10+ employees. Two years ago, the finding was reversed: In 2014 compared to 2012, the average age of the electrical contractor in the smaller firm was unchanged (or lower) vs. 2012, while the average age of the electrical contractor respondent in the larger firm has increased by about a full year from 53.3 to 54.1.

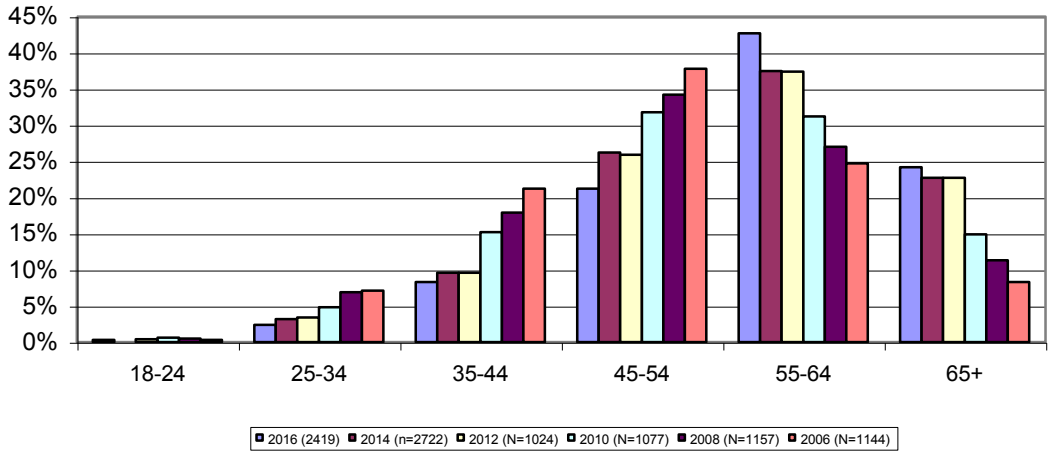
- As was the case in the recent past, the electrical contractors in smaller firms are older than those in larger firms. One hypothesis is that older electrical contractors may found their own -- smaller firms -- after working for others earlier in their careers.

Average Age of Electrical Contractor in 2016 and Earlier				
		Firm Size		
	Total	1-4	1-9	10+
		(a)	(b)	(c)
Average Age (2016 Study) N=2419	57.3	58.7	**58.5>c**	54.1
Average Age (2014 Study) N=2722	56.2	57.4	**57.1>c**	53.3
Average Age (2012 Study) N=1024	56.1	57.5	**57.2>c**	52.6
Average Age (2010 Study) N=1077	53	53.8	**53.8>c**	50.4
Average Age (2008 Study) N=1157	51.2	**52. 6** >c	**52. 1**>c	49.2
Average Age (2006 Study) N=	49.9	**NA**	**NA**	**NA**

As has been the case -- except between 2012 and 2014, when there was no change – in 2016, the survey participants are again continuing to trend older. That is, when looked at by age bracket, between 2006 and 2016 there was a significant *decline* in the percentage of electrical contractors who were aged 35-54 (from 59% in 2006 to 52% in 2008 to 47% in 2010 and 35% in 2012 and 2014 and 30% in 2016) and a significant *increase* in the percent that were 55 or older (from 33% in 2006 to 38% in 2008 to 46% in 2010 to 60% in 2012 and 2014 to 67% in 2016).

- Note that almost all of the increase in the proportion of ecs aged 55+ is due to ecs aged 55- 64 (to 43% in 2014 from 38% in 2014). The increase in electrical contractors who are 65+, which grew dramatically since 2006, was statistically unchanged vs. 2014. [The combined age breaks of 35-54 and 55+ are not shown]

Comparison of Age Composition Over Time



Respondent Education

A majority of survey respondents --57% across the total sample -- have some college education. The findings among the total sample are consistent with those reported two years ago with one exception**:** a significantly higher percentage of respondents have a Bachelors degree or higher in 2016 compared with 2014 (22% vs. 19%, respectively).

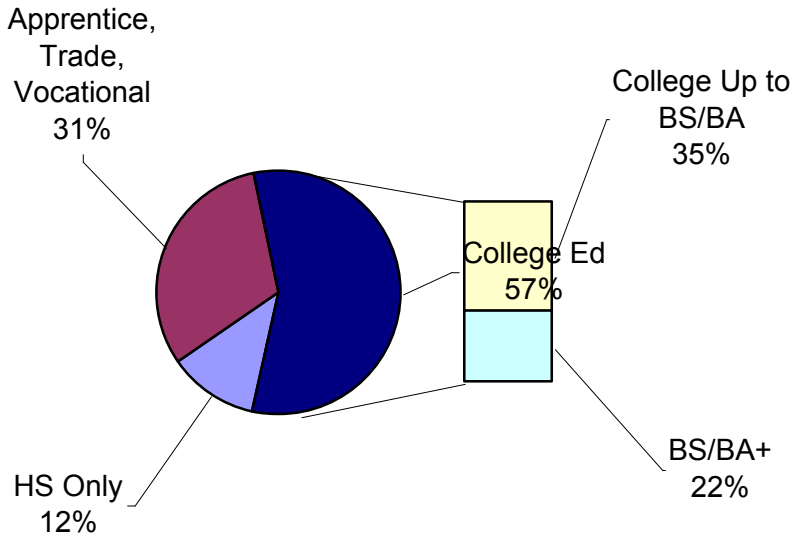
- There is no single educational level that declined significantly to offset the higher percent with a BA/BS degree or higher.

Those in larger firms (10+ employees) are significantly more likely to have attended college than those in firms with 1 - 9 employees (63% vs. 54%), particularly a BA/BS degree (30% of those in firms with 10+ employees versus 18% for those in firms with 1- 9 employees)

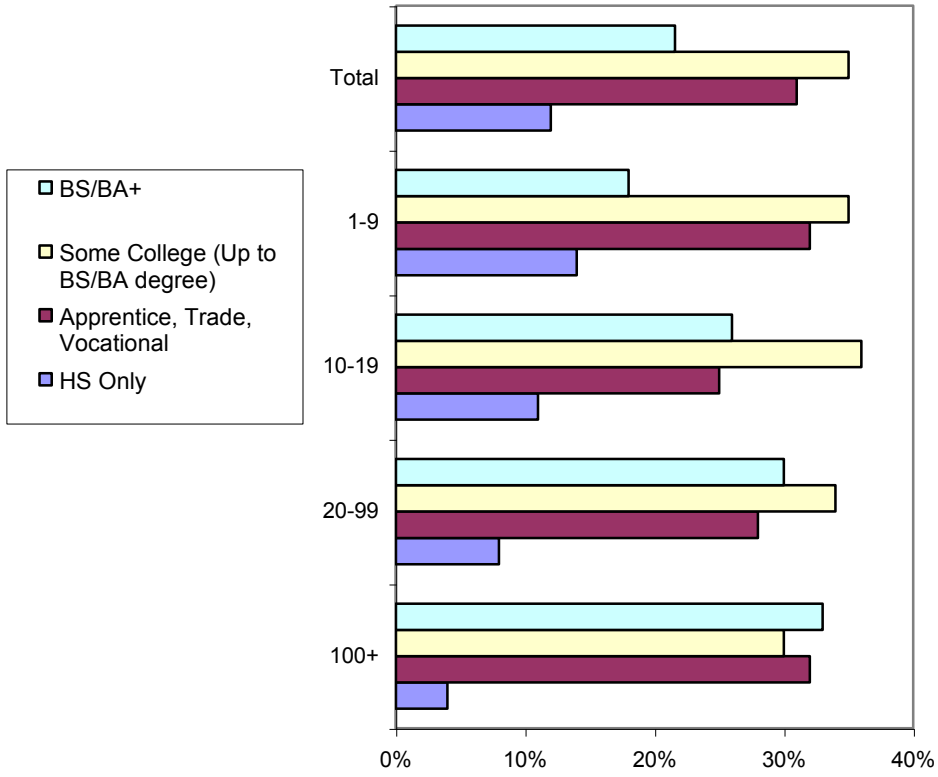
Those in smaller firms (1-9 employees) are more likely to have only Apprenticeship, Trade or Vocational School training compared to those in firms with 10+ employees (32% vs. 28%), statistically unchanged compared with two years earlier.

- 2014 Profile results are not shown.

Respondent Education
Among Total Sample
2016 Profile Study



Respondent Education by Number of Employees
2016 Profile Study



Level of Responsibility

79% of the sample is composed of company owners and top management, 10% say that they are Master Electricians or the Equivalent Title, 4% say that they are project managers (added this year), 2% are field managers and 3% say that they have another title.

- These percentages are generally in line with those from 2014. While the percent of Master Electrician or Equivalent is down slightly, but significantly from 12% to 10%, the difference may be accounted for somewhat by the addition of project mangers, first added in 2016 and which accounted for 4 % of answers in 2016.

- Those in the West are more likely to describe their responsibility as Owner/Top Management (85%) compared with the total sample (79%). In contrast, those in the West are less likely to describe their responsibility level as Master Electrician or Equivalent (5% vs. 10% for the total sample).

Gender

97% of the electrical contractors who participated in this survey are male; 3% are female.

- In 2016, the women we interviewed are more likely to work for firms that are HQ'd in the West (34% vs.18% of the total sample and less likely to work for firms that are HQ'd in the South (15% vs. 25% among the total sample).

- As was the case two years ago, the women in this survey are younger on average, 42% of the women in this survey are aged 35-54, compared with 30% of the total sample. The women in this survey are less likely than the total sample to be 65+ (7% vs. 24% for the total sample).

- The women who participated in this survey are far more likely to work for firms with 5-9 employees (35% vs. 16% among the total sample) or those with 10+ employees (46% of these women work for firms with 10+ employees compared with 28% of the total sample). The higher concentration of women in firms with 10+ employees is driven by

their higher concentration in firms with 20-99 employees (23% of the women surveyed work for firms with 20-99 employees, compared with 11% of the total sample.)

As was the case two years ago, the women in the survey are *less* likely than the men to have the title of Owner/Top Management (63% compared with 79% of the total sample) or the title of Field Management (0% vs. 2% of the total sample), There is no difference in terms of Master Electrician or Equivalent (7% of women vs. 10% of the total) or Project Management (4% for women and 4% among the total sample). However, the women in this survey are significantly and dramatically more likely to have an "Other" title (27% among women compared with 3.3% of the total sample)

▲*"WHAT" TYPES OF WORK DO CONTRACTORS PERFORM?*

Green/Sustainable Building Elements

Electrical contractors were asked to estimate the percentage of company sales that included Green/Sustainable Building elements in the previous calendar year.

- More than one-half of electrical contractors say that some percentage of their sales are from Green/sustainable Building elements and, that on average in 2015, it accounted for 15% of their revenue.
    - *Discussion of G/S – isn't everything??*

Percent of Company Sales That Included Green/Sustainable Building Elements			
	Average (Mean) Percent		
	Profile Study Year		
	2016 Version 5 Total (341)	2014 Version 5 Total (382)	2012 Total (1024)
Any	56.4%	53.5%	54.4%
Average	14.9%>	12%	10.9%

Table is Table 170, page 519

As shown on the next two pages, larger firms are more likely to be engaged in Green/Sustainable Building and are also more likely than smaller firms to derive a higher average percentage of their revenue from it.

- In 2016, as was the case two years ago, firms with 20-99 and 100+ employees report deriving the highest percentage of revenue from Green/Sustainable Building elements.

Percent of 2015 Sales That Included Green/Sustainable Building Elements

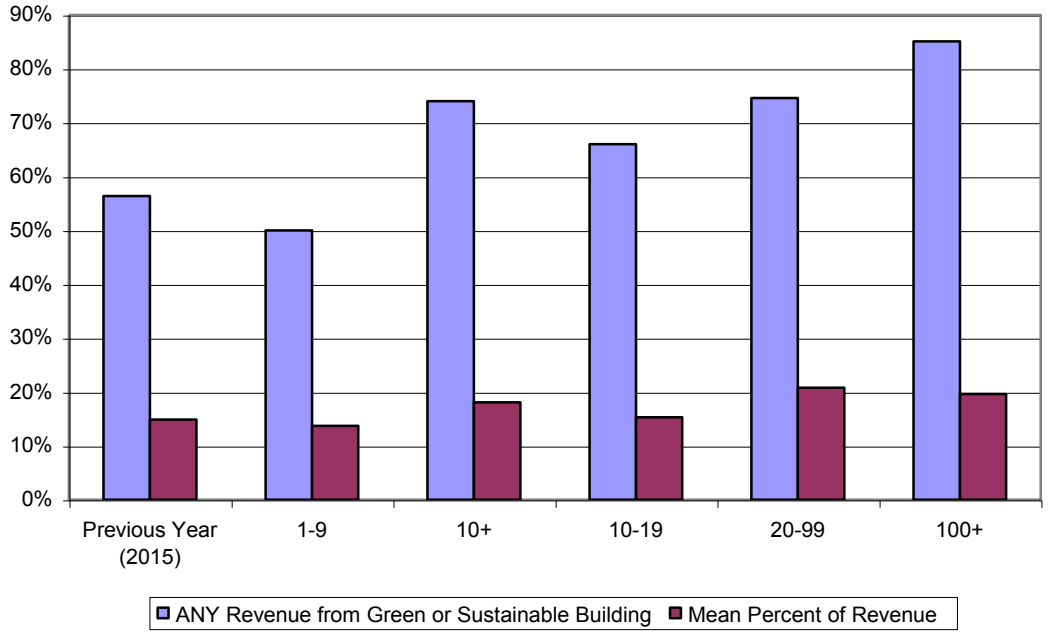


Table is table 170, Pg. 519

The importance of Green/Sustainable Building to the larger firm's bottom line has also been true historically.

Percent of Sales That Included Green/Sustainable Building Elements in Previous Year Trended 2016-2012

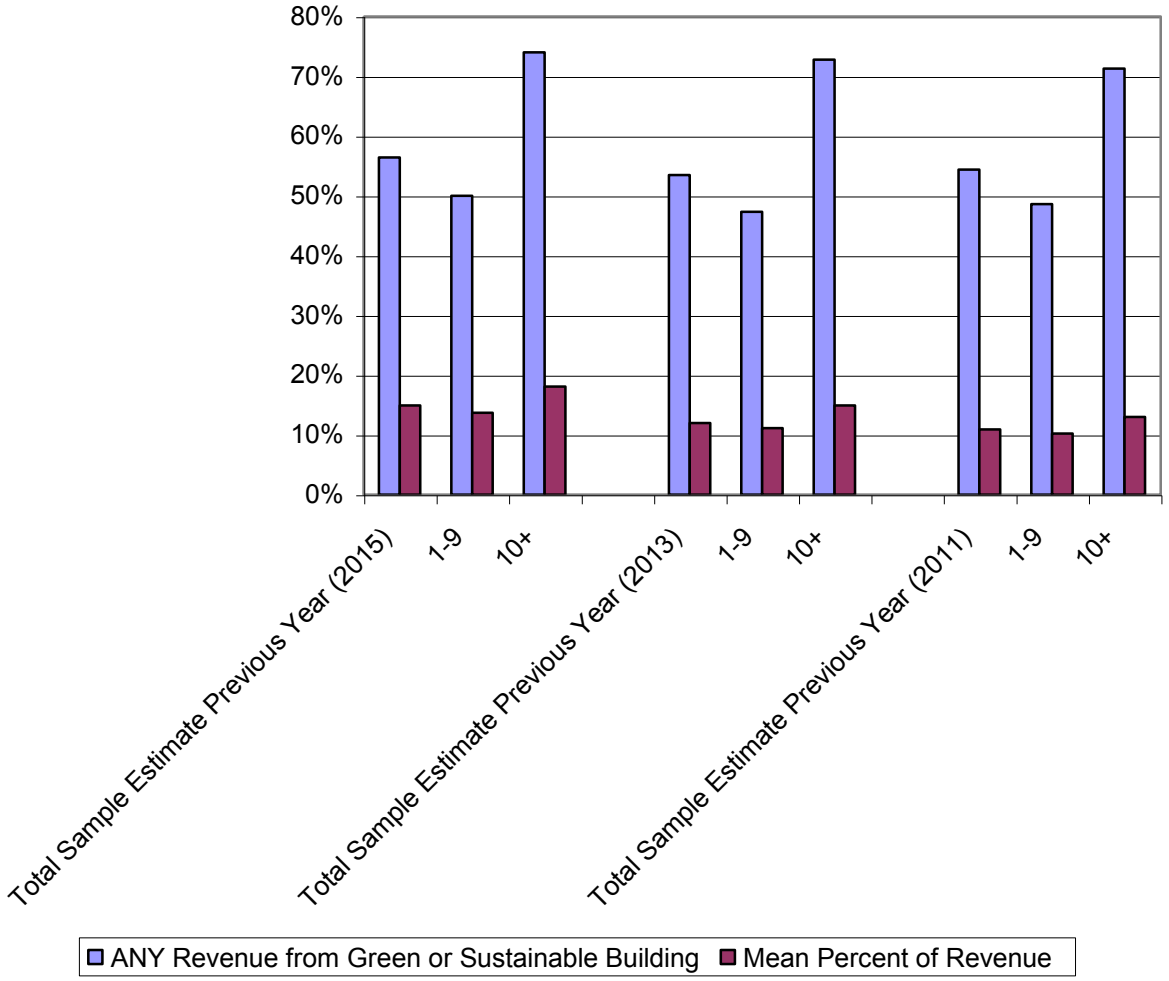


Table is table 170, Pg. 519

Types of Work Performed in Previous Year

Electrical contractors were shown a list of up to 41 different project types and were asked to indicate which they had performed in the previous year. Starting in 2014, the project types were asked separately for Residential and CII construction.

- Five new project types were included for the first time in the 2016 Profile Study. They are: Wire and Cable, LED Lighting (including Lamps, Fixtures, Controls), HVAC Controls, HVAC Mechanical, Water Utilities or Waste Water Treatment Plants. Because of these additions and the fact that we grouped some of the project types within different categories, the results by *category* are not trended.

Overview of CII and/or Residential Work Performed (Combined Basis)

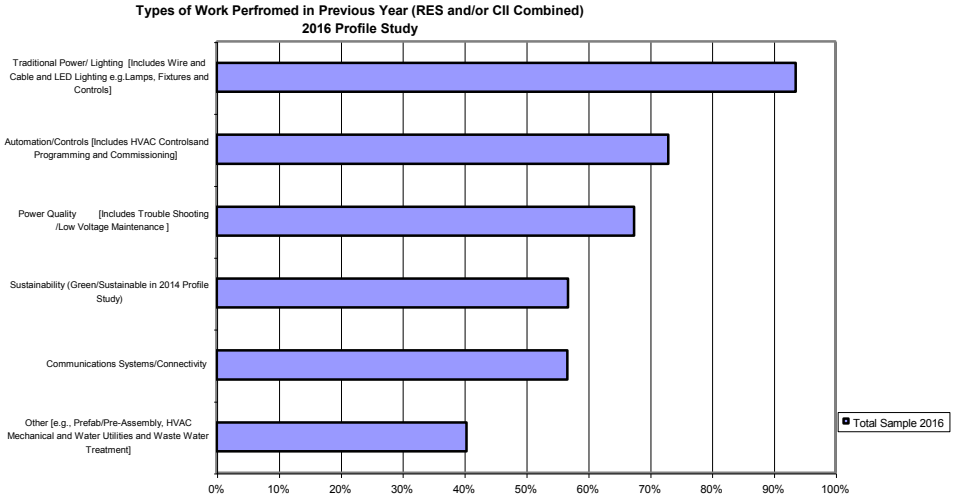
When asked about the types of work performed in the previous year (regardless of whether Residential or CII), almost all firms worked on Power and Lighting (94%).

- About 7 in 10 worked on Automations/Controls (73%) and/or Power Quality (68%)

- About 6 in 10 worked on Sustainability (previously called Green/Sustainable Technology/Alternative Energy, 57%) and/or Communications Systems/Connectivity (also 57%)

- 53% worked on CII Automation/Controls*, 47% worked on Residential Automation Controls* and/or on a new category called "Other" (which includes Pre-Assembly/Pre-Fabrication of Electrical Components, HVAC Mechanical and Water Utilities or Waste Water Treatment Plants (40%).

*CII and Residential Automation/Controls are shown separately on the tables starting on page 27.


Types of Work Perfromed in Previous Year (RES and/or CII Combined)
2016 Profile Study
Traditional Power/ Lighting [Includes Wire and Cable and LED Lighting e.g.Lamps, Fixtures and Controls]
Automation/Controls [Includes HVAC Controlsand Programming and Commissioning]
Power Quality [Includes Trouble Shooting /Low Voltage Maintenance]
Sustainability (Green/Sustainable in 2014 Profile Study)
Communications Systems/Connectivity
Other [e.g., Prefab/Pre-Assembly, HVAC Mechanical and Water Utilities and Waste Water Treatment]
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Total Sample 2016

The individual project types that make up each category are shown on the next page in total[2] and by whether the work was done in Residential or CII construction.

Five new project types were included for the first time in the 2016 Profile Study. They are: Wire and Cable, LED Lighting (including Lamps, Fixtures, Controls), HVAC Controls, HVAC Mechanical, Water Utilities or Waste Water Treatment Plants.

Observations:

- Higher percentages of electrical contractors perform most given types of work in CII rather than in Residential construction. For example, as shown on the next page, 34% of electrical contractors said that they worked on Structured Wiring/Cabling in CII compared with 25% who did this kind of work in Residential construction.

    - The main exceptions are Power, Wire and Cable, Fire Alarms, HVAC Mechanical and Electrical Vehicle Charging Stations, where there is great similarity between the percentages performing these types of work in Residential or CII.

    - Note that we cannot formally stat test the comparison between Residential and CII because the two groups of electrical contractors are not discrete. That is, there is tremendous overlap between electrical contractors that work on Residential (76%)and CII Construction (89%), so in effect we'd be testing most electrical contractors vs. themselves.

Note also that there is repeated evidence throughout this report that electrical contractors are working in somewhat non-traditional areas. For example, 42% worked on either HVAC Controls and/or HVAC Mechanical; 12% work on ***both*** HVAC Controls **and** HVAC Mechanical [not shown]. 14% worked on Water Utilities/Waste Water Treatment projects in the previous year.

95% performed Low Voltage work[3], mentioned here because it is <u>not</u> traditional power (although it often ties into it!).

[2] Without regard to whether the work was done in Residential or CII construction

[3] NOTE: LOW VOLTAGE (NET) - IN THIS TABLE - INCLUDES: NETWORKING, FIBER OPTICS, STRUCTURED WIRING/CABLING, DATA CENTERS, TROUBLE SHOOTING/MAINTENANCE OF LOW VOLTAGE SYSTEMS, LED LIGHTING, LIGHTING CONTROLS, HOME AUTOMATION, FIRE/LIFE SAFETY, SECURITY, HOME THEATER/SOUND, AUTOMATED BUILDING SYSTEMS, INDUSTRIAL CONTROLS, SOUND AND VIDEO, PROGRAMMING AND COMMISSIONING, HVAC CONTROLS

Types of Work Performed by Company in 2015
Among Those That Work in Residential and /or CII Construction

(Base Answering: 2419)			
COMMUNICATIONS SYSTEMS/CONNECTIVITY	Any **57**	Res **33**	C/I/I **43**
Structured Wiring/Cabling	45	25	34
Networking VOIP/ Wireless/Broadband, etc.)	35	18	27
Fiber Optics (Communications and Security)	20	4	18
Data Centers	17	3	16

SUSTAINABILITY	Any **57**	Res **33**	C/I/I **40**
Energy Efficiency Projects/ Upgrades (non-LEED)	37	16	30
LEED Projects	19	7	15
Electric Vehicle Charging Station	17	11	9
Solar/Photovoltaics	16	9	10
Energy Audits (including Thermal Imaging)	11	3	10
Co-Generation	10	4	7
Smart or Net Metering	10	5	7
Geothermal	7	5	3
Energy Storage	5	2	4
Wind Generation	4	2	3
Smart Grid Technology	2	1	2
Microgrids	2	0.5	1
Fuel Cells	2	0.5	2

POWER QUALITY	Any **68**	Res **42**	C/I/I **48**
Backup Power/UPS	49	25	34
Trouble Shooting/ Maintenance of Low Voltage Systems	45	26	33
TVSS/Lightning Surge Suppression	34	17	24
Energy Management/Power Quality	20	5	17

(Base Answering: 2419)			
TRADITIONAL POWER/LIGHTING	Any **94**	Res **70**	C/I/I **72**
Power	84	61	62
Wire and Cable	84	61	63
LED Lighting (Including Lamps, Fixtures and Controls)	84	59	62
Lighting Fixtures	84	60	63
Lamps	73	49	54
Lighting Controls	72	46	52
Ballasts or LED Drivers	69	44	53
Daylighting/Shading Systems	23	10	18

AUTOMATION/CONTROL SYSTEMS	Any **73**	Res **47**	C/I/I **53**
Fire/Life Safety (including Alarms/Detectors)	48	30	33
HVAC Controls	38	21	27
Security: CCTV/Access/Motion, etc.	33	16	26
Industrial Controls	29	N/A	29
Home Automation/Smart Home/Connectivity	21	21	N/A
Home Theater/Sound or VDV	18	18	N/A
Automated Building Systems/ Connectivity	16	N/A	16
Sound and Video or VDV	16	N/A	16
Programming and Commissioning	16	5	15

OTHER	Any **40**	Res **19**	C/I/I **31**
HVAC (Mechanical)	23	15	15
Pre-Assembly/Pre-Fabrication of Electrical Components	19	7	16
Water Utilities or Waste Water Treatment Plants	14	N/A	14

Above Table is Table 39. Pg. 190 (Net), Table 37, Pg. 158 (CII), Table 35, Pg. 131 (Res)

In the case of Residential and CII projects on a *combined* basis, 15 of the 41 work types showed significant changes compared with two years earlier:

- Six Sustainability work types posted a significant increase vs. the 2014 Profile Study: Electric Vehicle Charging Stations, Smart or Net Metering, Geothermal, Energy Storage, Smart Grid Technology and Microgrids. Pre-Assembly/Pre-Fabrication of Electrical Components also posted a significant increase vs. two years earlier.

- The other changes are as follows:

    - Structured Wiring/Cabling declined although some of the work in this area may have been reported as part of Wiring and Cabling, a new work type added in 2016.

    - Similarly, fewer report working on Lighting Fixtures, Lamps and Lighting Controls or LED Drivers or Ballasts, but again, these types of work may have been reported as part of the new category of LED Lighting (including Lamps, Fixtures and Controls) first added in the 2016 Profile Study.

    - LEED Projects, Fire/Life Safety (including Alarms and Detectors) and/or Security declined compared with two years earlier.

- There were changes in 5 of the 41 work types when the results are limited to Residential construction: Electric Vehicle Charging Stations increased; Structured Wiring/Cabling declined although, as noted above, some of the work in this area may have been reported as part of Wiring and Cabling, a new work type added in 2016. Similarly, the declines in Lamps, Lighting Controls and LED Drivers or Ballasts may have been that the work in these areas was now reported in the new category of LED Lighting.

- There were changes in 8 of the 41 project types when the results are limited to CII construction. Electric Vehicle Charging Stations increased as did work on Pre-Assembly/Pre-Fabrication of Electrical Components. As noted in the two sections above, the declines in Structured Wiring/Cabling and in several areas of Lighting may be that these types of work were now reported in the two new categories that were added in 2016. Fewer mentioned Security or Sound and Video in the 2016 profile Study compared with two years earlier.

+ and – on the next tables indicate significant changes at the 90% level of confidence vs. the 2014 Profile Study (each reporting on the previous year)

TRENDED SUMMARY Types of Work Performed by Company in 2015
Residential and /or CII Construction on a Combined Basis

(Base Answering: 2419)			
COMMUNICATIONS SYSTEMS/CONNECTIVITY	Any **57**	Res **33**	C/I/I **43**
Structured Wiring/Cabling	45-	25-	34-
Networking VOIP/ Wire-less/Broadband, etc.)	35	18	27
Fiber Optics (Communications and Security)	20	4	18
Data Centers	17	3	16

SUSTAINABILITY	Any **57**	Res **33**	C/I/I **40**
Energy Efficiency Projects/ Upgrades (non-LEED)	37	16	30
LEED Projects	19-	7	15-
Electric Vehicle Charging Station	17+	11+	9
Solar/Photovoltaics	16	9	10
Energy Audits (including Thermal Imaging)	11	3	10
Co-Generation	10+	4	7
Smart or Net Metering	10+	5	7
Geothermal	7	5	3
Energy Storage	5+	2	4
Wind Generation	4	2	3
Smart Grid Technology	2+	1	2
Microgrids	2+	0.5	1
Fuel Cells	2	0.5	2

POWER QUALITY	Any **68**	Res **42**	C/I/I **48**
Backup Power/UPS	49	25	34-
Trouble Shooting/ Maintenance of Low Voltage Systems	45	26	33
TVSS/Lightning Surge Suppression	34	17	24
Energy Management/Power Quality	20	5	17

- and + see legend on page 27

(Base Answering: 2419)			
TRADITIONAL POWER/LIGHTING	Any **94**	Res **70**	C/I/I **72**
Power	84	61	62
Wire and Cable	84	61	63
LED Lighting (Including Lamps, Fixtures and Controls)	84	59	62
Lighting Fixtures	84-	60	63-
Lamps	73-	49-	54-
Lighting Controls	72-	46-	52-
LED Drivers or Ballasts	69-	44-	53
Daylighting/Shading Systems	23	10	18

AUTOMATION/CONTROL SYSTEMS	Any **73**	Res **47**	C/I/I **53**
Fire/Life Safety (including Alarms/Detectors)	48-	30	33
HVAC Controls	38	21	27
Security: CCTV/Access/Motion, etc.	33-	16-	26
Industrial Controls	29	N/A	29
Home Automation/Smart Home/Connectivity	21+	21+	N/A
Home Theater/Sound or VDV	18	18	N/A
Automated Building Systems/ Connectivity	16	N/A	16
Sound and Video or VDV	16	N/A	16-
Programming and Commissioning	16	5	15

OTHER	Any **40**	Res **19**	C/I/I **31**
HVAC (Mechanical)	23	15	15
Pre-Assembly/Pre-Fabrication of Electrical Components	19+	7+	16+
Water Utilities or Waste Water Treatment Plants	14	N/A	14

Types of Work Performed by Company in 2015 vs. 2013
Residential and/or CII Construction on a Combined Basis

(Base Answering: 2419)			
COMMUNICATIONS SYSTEMS/CONNECTIVITY	2015 **57**		2013 **61**
Structured Wiring/Cabling	45	<	**51**
Networking VOIP/ Wire-less/Broadband, etc.)	35		34
Fiber Optics (Communications and Security)	20		19
Data Centers	17		18

SUSTAINABILITY	2015 **57**		2013 **32**
Energy Efficiency Projects/ Upgrades (non-LEED)	37		38
LEED Projects	19	<	**22**
Electric Vehicle Charging Station	**17**	>	14
Solar/Photovoltaics	16		16
Energy Audits (including Thermal Imaging)	11		12
Smart or Net Metering	**10**	>	8
Co-Generation	**10**	>	8
Geothermal	7		7
Energy Storage	**5**	>	4
Wind Generation	4		4
Smart Grid Technology	**2**	>	1
Fuel Cells	2		2
Microgrids	**2**	>	0.1

POWER QUALITY	2015 **68**		2013 **70**
Backup Power/UPS	49		51
Trouble Shooting/ Maintenance of Low Voltage Systems	45		47
TVSS/Lightning Surge Suppression	34		34
Energy Management/Power Quality	20		21

(Base Answering: 2419)			
TRADITIONAL POWER/LIGHTING	2015 **94**		2013 **92**
Power	84		84
Lighting Fixtures	84	<	**86**
Wire and Cable	84		N/A
LED Lighting (Including Lamps, Fixtures and Controls)	84		N/A
Lamps	73	<	**76**
Lighting Controls	72	<	**76**
LED Drivers or Ballasts	69	<	**79**
Daylighting/Shading Systems	23		21

AUTOMATION/CONTROL SYSTEMS	2015 **73**		2013 **71**
Fire/Life Safety (including Alarms/Detectors)	48	<	**52**
HVAC Controls	38		N/A
Security: CCTV/Access/Motion, etc.	33	<	**36**
Industrial Controls	29		31
Home Automation/Smart Home/Connectivity	**21**	>	19
Home Theater/Sound or VDV	18		18
Automated Building Systems/ Connectivity	16		17
Sound and Video or VDV	16		18
Programming and Commissioning	15		N/A

OTHER	2015 **40**		2013 **15**
HVAC (Mechanical)	23		N/A
Pre-Assembly/Pre-Fabrication of Electrical Components	**19**	>	14
Water Utilities or Waste Water Treatment Plants	14		N/A

> and < indicate significant changes at the 90% level of confidence vs. the 2014 Profile Study (each reporting on the previous year)

Types of CII Work Performed by Company in 2015 vs. 2013 (C/I/I)

(Base Answering: 2419)			
COMMUNICATIONS SYSTEMS/CONNECTIVITY	2015 **43**		2013 **45**
Structured Wiring/Cabling	34	<	**37**
Networking VOIP/ Wire-less/Broadband, etc.)	27		26
Fiber Optics Communications and Security)	18		18
Data Centers	16		17

SUSTAINABILITY	2015 **40**		2013 **42**
Energy Efficiency Projects/ Upgrades (non-LEED)	30		30
LEED Projects	15	<	**19**
Solar/Photovoltaics	10		10
Energy Audits (including Thermal Imaging)	10		11
Electric Vehicle Charging Station	9		8
Co-Generation	7		6
Smart or Net Metering	7		6
Energy Storage	4		3
Wind Generation	3		3
Geothermal	3		3
Fuel Cells	2		2
Smart Grid Technology	2		2
Microgrids	1		0.8

POWER QUALITY	2015 **48**		2013 **52**
Backup Power/UPS	34	<	**37**
Trouble Shooting/ Maintenance of Low Voltage Systems	33		35
TVSS/Lightning Surge Suppression	24		25
Energy Management/Power Quality	17		19

(Base Answering: 2419)			
TRADITIONAL POWER/LIGHTING	2015 **72**		2013 **74**
Lighting Fixtures	63	<	**66**
Wire and Cable	63		N/A
Power	62		63
LED Lighting (Including Lamps, Fixtures and Controls)	62		N/A
Lamps	54	<	**59**
LED Drivers or Ballasts	53		63
Lighting Controls	52	<	**58**
Daylighting/Shading Systems	18		17

AUTOMATION/CONTROL SYSTEMS	2015 **53**		2013 **52**
Fire/Life Safety (including Alarms/Detectors)	33		35
Industrial Controls	29		31
HVAC Controls	27		N/A
Security: CCTV/Access/Motion, etc.	26	'=	28
Automated Building Systems/ Connectivity	16		17
Sound and Video or VDV	16	<	**18**
Programming and Commissioning	15		N/A
Home Automation/Smart Home/Connectivity	**N/A**		
Home Theater/Sound or VDV	**N/A**		

OTHER	2015 **31**		2013 **13**
Pre-Assembly/Pre-Fabrication of Electrical Components	**16**	>	12
HVAC (Mechanical)	15		N/A
Water Utilities or Waste Water Treatment Plants	14		N/A

> and < indicate significant changes at the 90% level of confidence vs. the 2014 Profile Study (each reporting on the previous year)

Types of Residential Work Performed by Company in 2015 vs. 2013 (Residential)

(Base Answering: 2419)			
COMMUNICATIONS SYSTEMS/CONNECTIVITY	2015 **33**		2013 **44**
Structured Wiring/Cabling	25	<	**30**
Networking VOIP/ Wire-less/Broadband, etc.)	18		18
Fiber Optics (Communications and Security)	4		3
Data Centers	3		3

SUSTAINABILITY	2015 **33**		2013 **32**
Energy Efficiency Projects/ Upgrades (non-LEED)	16		16
Electric Vehicle Charging Station	**11**	>	8
Solar/Photovoltaics	9		9
LEED Projects	7		8
Geothermal	5		6
Smart or Net Metering	5		4
Co-Generation	4		4
Energy Audits (including Thermal Imaging)	3		3
Wind Generation	2		2
Energy Storage	2		2
Smart Grid Technology	1		1
Fuel Cells	0.5		0.5
Microgrids	0.5		0.1

POWER QUALITY	2015 **42**		2013 **43**
Trouble Shooting/ Maintenance of Low Voltage Systems	26		27
Backup Power/UPS	25		26
TVSS/Lightning Surge Suppression	17		17
Energy Management/Power Quality	5		5

(Base Answering: 2419)			
TRADITIONAL POWER/LIGHTING	2015 **70**		2013 **69**
Power	61		62
Wire and Cable	61		N/A
Lighting Fixtures	60		61
LED Lighting (Including Lamps, Fixtures and Controls)	59		N/A
Lamps	49	<	**52**
Lighting Controls	46	<	**49**
LED Drivers or Ballasts	44	<	**50**
Daylighting/Shading Systems	10		9

AUTOMATION/CONTROL SYSTEMS	2015 **47**		2013 **44**
Fire/Life Safety (including Alarms/Detectors)	30		31
Home Automation/Smart Home/Connectivity	21	>	19
HVAC Controls	21		N/A
Home Theater/Sound or VDV	18		18
Security: CCTV/Access/Motion, etc.	16	<	**19**
Programming and Commissioning	4.6		N/A
Automated Building Systems/ Connectivity	**N/A**		
Industrial Controls	**N/A**		
Sound and Video or VDV	**N/A**		

OTHER	2015 **5**		2013 **5**
HVAC (Mechanical)	15		N/A
Pre-Assembly/Pre-Fabrication of Electrical Components	**7**	>	5
Water Utilities or Waste Water Treatment Plants	**N/A**		

> and < indicate significant changes at the 90% level of confidence vs. the 2014 Profile Study (each reporting on the previous year)

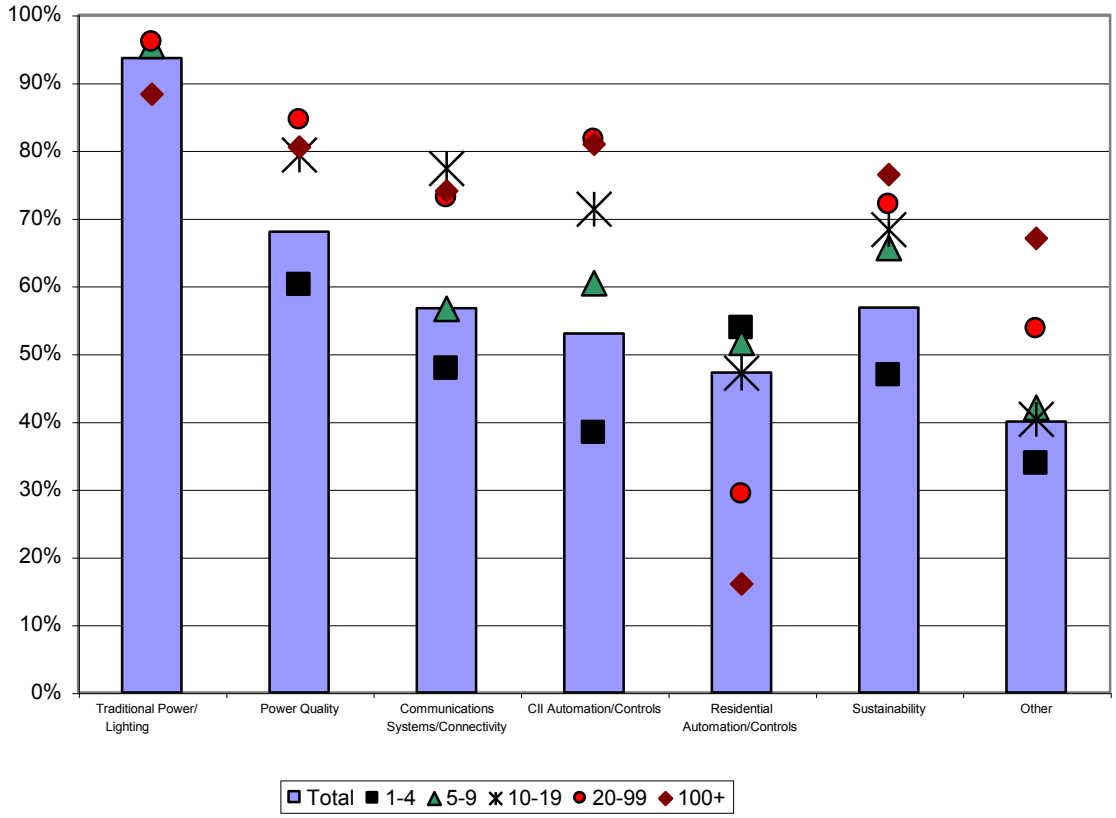
The differences by category by company size are shown below:

- In general, larger firms -- particularly those with 100+ but also those with 20-99 employees -- are more likely to perform most of the different types of work shown below. In addition, firms with 5+ employees are also more likely than smaller firms to perform work in most aspects of Traditional Power/Lighting, Power Quality, Communications Systems/Connectivity, CII Automation/Controls work, some aspects of Residential Automation/Controls and Sustainability. On the pages to follow note the extent to which firms with 5-9 employees are more similar to those with 10-19 than to firms with 1-4 employees.

With the exception of the broad category of Traditional Power/Lighting, and the specific project type of HVAC Mechanical,[4] a higher percentage of the electrical work is done in CII rather than in Residential construction.

[4] Specific project types – such as HVAC Mechanical – are not shown on the next page which is limited to broader categories.

Types of Work Performed in Previous Year by Category
(2016 Profile Study Total Sample = 2419)



Subgroups that are shown above the blue bar are significantly larger than average while those within the bar are smaller than average. Subgroups that are average are not shown

On the next pages, results by subgroup are compared to the total. Where a subgroup is greater than the total, the percentage is **bolded**; where it is smaller it is in *italics*. Empty cells indicate that there is no difference between that subgroup and the total.

The above table is from pg. 187, Table 39 (ask mom, all values or more significance)

Among firms working in Residential and/or CII on a Combined Basis:

- Firms with **20-99** employees are more likely than average to perform all types of work shown on this page with the exception of Home Automation and/or Home Theater/Sound, which are the province of firms with 1-4 or 5-9 employees.
- Firms with **100+** employees are also more likely than average to perform almost all types of work with the exception of Power and Lighting, which are more the province of firms with 5-9 employees and to some extent, firms with 10-19 employees.

Types of Work Performed in Previous Year By Number of Employees
Total Sample (2016 Profile Study) Residential and/or CII Construction on a Combined Basis

	Total	1-4	5-9	1-9	10-19	20-99	100+
	%	%	%	%	%	%	%
Power	84	*82*		*82*		**92**	
Wire and Cable	84	*81*	**89**	*83*		**95**	
LED Lighting (Including Lamps, Fixtures, and Controls)	84	*81*	**90**	*83*		**91**	
Lighting Fixtures	84	*83*	**89**			**89**	
Lamps	73	*68*	**78**	*70*	**78**	**83**	
Lighting Controls	72	*66*	**80**	*69*	**78**	**88**	**79**
Ballasts or LED Drivers	69	*62*	**77**	*65*	**80**	**84**	**76**
Daylighting/Shading Systems	23	*12*		*14*	**33**	**51**	**54**
Structured Wiring/Cabling/Connectivity	45	*37*		*39*	**60**	**61**	**64**
Networking (VOIP/Wireless/Broadband, etc.)	35	*27*		*29*	**50**	**50**	**56**
Fiber Optics (Communications and Security)	20	*6*	*16*	*8*	**32**	**50**	**65**
Data Centers	17	*7*		*9*	**28**	**34**	**55**
Backup Power/UPS	49	*40*		*42*	**57**	**70**	**71**
Troubleshooting/Maintenance of Low-Voltage Systems	45	*38*		*40*	**59**	**59**	**58**
TVSS/Lightning Surge Suppression	34	*23*		*26*	**45**	**58**	**60**
Energy Management/Power Quality	20	*11*	*17*	*12*	**26**	**45**	**50**
Fire/Life Safety (Including Alarms/Detectors)	48	*38*		*41*	**58**	**73**	**70**
HVAC Controls	38	*34*		*35*		**48**	**49**
Security: CCTV/Access/Motion, etc.	33	*22*		*24*	**46**	**59**	**64**
Industrial Controls (Including PLCs and VFDs)	29	*18*		*21*		**58**	**65**
Home Automation/Smart Home/Connectivity	21	*16*	**24**	**29**		*16*	9
Home Theater/Sound or VDV	18	**21**	*16*	**20**		*14*	*5*
Automated Building Systems/Connectivity	16	*6*		*8*	**25**	**36**	**51**
Sound and Video or VDV	16	*7*		*9*	**22**	**37**	**44**
Programming and Commissioning	16	*8*		*9*	**22**	**34**	**53**

Table Continues on Next Page

As firm size increases (above 10 employees) so does the firms' involvement in most types of Sustainability projects (100+> 20-99> 10-19). The main exception is Electric Vehicle charging Stations, which are more likely to be performed by firms with 5-99 employees).

- In aggregate, the greater involvement in most types of work by larger firms is shown in the rows highlighted in yellow.

Types of Work Performed in Previous Year By Number of Employees, Total Sample (2016 Profile Study) Residential and /or CII Construction Combined

	% Total	% 1-4	% 5-9	% 1-9	% 10-19	% 20-99	% 100+
Energy Efficiency Projects/Upgrades (Non-LEED)	37	*27*		*30*	**51**	**52**	**62**
LEED Projects	19	*10*		*13*		**38**	**<53**
Electric Vehicle Charging Stations	17	*11*	**21**	*14*	**25**	**22**	**<30**
Solar/Photovoltaics	16	*11*		*12*	**22**	**24**	**<38**
Energy Audits (Including Thermal Imaging)	11	*5*		*6*		**23**	**<37**
Co-Generation	10	*6*		*7*		**15**	**<32**
Smart or Net Metering	10	*6*		*7*		**21**	**<28**
Geothermal	7						
Energy Storage	5	*4*		*4*		**8**	**<15**
Wind Generation	4	*3*		*3*			**13**
Fuel Cells	2	*1*		*1*			**10**
Microgrids	2	*1*		*1*			**6**
Smart Grid Technology	2	*2*		*2*			**8**
HVAC (Mechanical)	23				*18*		
Pre-Assembly/Pre-Fabrication of Elec Components	19	*12*		*14*		**39**	**<50**
Water Utilities or Waste Water Treatment Plants	14	*8*		*10*		**27**	**<37**
	Total	**1-4**	**5-9**		**10-19**	**20-99**	**100+**
Any HVAC (HVAC ***or*** Mechanical)	42	*39*				**52**	**53**
HVAC Controls *and* Mechanical	18				***14***		
Any Low Voltage	95	*94*	**97**		**98**	**98**	**91**
Number of Categories Worked In (of 6)							
Only 1	8	**11>**	*5*		*4*	*3*	*4*
2	12	15	12		8	5	6
3	17	21	15		13	10	7
4	19	19	21		**22>**	15	13
5	23	*20*	**<27**		24	**<32>**	16
All 6	19	*11*	**<18**		**28**	**34**	**<50**
Number of Project Types (ANY)	**98**	**99**	**99**		**100**	**98**	**96**
Mentioned 1-9 Types	36	**48>**	**29**		21>	*14*	17
Mentioned 10-11 Types	13	15	16		9	5	5
Mentioned 12+ Project Types	49	36	**<54**		**<70**	**79>**	74
Mentioned 12-19	32	29	**<41**		**46**	*37*	16

Mentioned 20 + (out of 41) Project Types	17	7	**<14**		23	**<42**	**<58**

Among firms working in CII

- As noted in earlier Profile Study reports, CII work is really the province of firms with 10+ employees. However, firms with 5-9 employees do play a role. As shown below, they are also more likely than those with 1-4 employees to perform basic CII Power and Lighting projects and HVAC Controls projects.

Types of Work Performed in Previous Year By Number of Employees, CII (2016 Profile Study)

	Total	1-4	5-9	1-9	10-19	20-99	100+
	%	%	%	%	%	%	%
Wire and Cable	63	*50*	**75**	*56*	**77**	**89**	**82**
Lighting Fixtures	63	*52*	**73**	*56*	**75**	**83**	**78**
Power	62	*50*	**72**	*55*	**74**	**87**	**83**
LED Lighting (Including Lamps, Fixtures, and Controls)	62	*50*	**72**	*55*	**79**	**85**	**79**
Lamps	54	*41*	**63**	*46*	**71**	**78**	**73**
Ballasts or LED Drivers	53	*38*	**64**	*44*	**72**	**79**	**75**
Lighting Controls	52	*37*	**66**	*43*	**68**	**81**	**78**
Daylighting/Shading Systems	18	*6*		*9*	**27**	**46**	**53**
Structured Wiring/Cabling/Connectivity	34	*21*		*24*	**54**	**57**	**64**
Networking (VOIP/Wireless/Broadband, etc.)	27	*16*		*18*	**45**	**47**	**56**
Fiber Optics (Communications and Security)	18	*5*	*14*	*7*	**31**	**48**	**64**
Data Centers	16	*5*		*8*	**26**	**32**	**54**
Backup Power/UPS	34	*20*		*23*	**50**	**65**	**49**
Troubleshooting/Maintenance of Low-Voltage Systems	33	*22*		*25*	**51**	**54**	**57**
TVSS/Lightning Surge Suppression	24	*12*		*14*	**35**	**54**	**59**
Energy Management/Power Quality	17	*8*	*15*	*9*	**24**	**43**	**49**
Fire/Life Safety (Including Alarms/Detectors)	33	*17*		*21*	**49**	**69**	**67**
Industrial Controls (Including PLCs and VFDs)	29	*18*		*21*		**58**	**65**
HVAC Controls	27	*19*	**31**	*22*	**33**	**46**	**47**
Security: CCTV/Access/Motion, etc.	26	*13*		*16*	**43**	**56**	**62**
Automated Building Systems/Connectivity	16	*6*		*8*	**25**	**36**	**51**
Sound and Video or VDV	16	*7*		*9*	**22**	**37**	**44**
Programming and Commissioning	15	*6*		*7*	**20**	**33**	**52**
Home Automation/Smart Home/Connectivity	**N/A**						
Home Theater/Sound or VDV	**N/A**						

Table Continues on Next Page

Among firms working in CII, continued:

The largest firms (100+ employees) are also the most likely to perform most types of Sustainability projects in CII construction. Firms with 20-99 and 10-19 employees are also more likely than smaller firms to work in CII Sustainability projects but their work is limited to fewer areas.

- The differences by company size in aggregate are shown in the rows highlighted in yellow.

Types of Work Performed in Previous Year By Number of Employees, CII (2016 Profile Study)							
	Total	1-4	5-9	1-9	10-19	20-99	100+
	%	%	%	%	%	%	%
Energy Efficiency Projects/Upgrades (Non-LEED)	30	18		21	47	49	61
LEED Projects	15	7		8		34	52
Solar/Photovoltaics	10	4		5	18	18	38
Energy Audits (Including Thermal Imaging)	10	3		5		23	37
Electric Vehicle Charging Stations	9	4		5	17	17	28
Co-Generation	7	3		3		13	31
Smart or Net Metering	7	3		3		17	28
Energy Storage	4	2		2		7	15
Wind Generation	3	0.7		1		4	13
Geothermal	3	1		2		5	5
Fuel Cells	2	0.6		0.8			10
Smart Grid Technology	2	0.8		1			8
Microgrids	1	0.5		0.6			6
Pre-Assembly/Pre-Fabrication of Electrical Components	16	8		10		29	49
HVAC (Mechanical)	15	11	18	12		23	23
Water Utilities or Waste Water Treatment Plants	14	8		10		27	37
Any HVAC (HVAC ***or*** Mechanical)	30	21	35		36	50	51
HVAC Controls ***and*** Mechanical	12	8	14			18	20
Any Low Voltage	74	63	82		90	93	89
	Total	1-4	5-9		10-19	20-99	100+
Number of Categories Worked In (of 6)							
1	11	15>	8		5	4	4
2	12	15	12		9>	5	
3	14	15	19>		11	10	6
4	13	10	16		22	16	13
5	15	10	19		21	27	18
All 6	14	5	<12		<24	<32	<48
Number of Project Types (ANY)	79	70	<86		92	95	94
Mentioned 1-9 Types	35	44>	34		23>	15	16
Mentioned 10-11 Types	9	9	<14		8	6	4
Mentioned 12+ Project Types	35	17	<38		<61	<74	
Mentioned 12-19	22	14	<29		<45>	37>	16
Mentioned 20 + (out of 41) Project Types	13	3	<9		<16	<37	<57

Among Firms Working in Residential:

What is interesting here is that the very smallest firms perform so many aspects of Traditional Power/Lighting, Power Quality, Communications/Connectivity, Automation/Controls Systems and even HVAC Mechanical work; in fact, all categories except Sustainability. Note that their widespread involvement only becomes evident when CII work (which tends to overshadow residential work) is excluded. As shown on the next page, more than two-thirds perform *Residential* Low Voltage work.

- Firms with 5-9 employees – the next size up from firms with 1-4 employees--are also above average in their work in Residential construction.

Types of Work Performed in Previous Year By Number of Employees, Residential (2016 Profile Study)

	Total	1-4	5-9	1-9	10-19	20-99	100+
	%	%	%	%	%	%	%
Power	61	**72**		**70**	*54*	*36*	*21*
Wire and Cable	61	**71**	**67**	**70**		*37*	*21*
Lighting Fixtures	60	**72**		**70**	*54*	*34*	*19*
LED Lighting (Including Lamps, Fixtures, and Controls)	59	**69**	**63**	**68**		*32*	*17*
Lamps	49	**56**	**53**	**56**		*31*	*17*
Lighting Controls	46	**53**	**50**	**52**		*29*	*14*
Ballasts or LED Drivers	44	**50**	**48**	**49**		*27*	*14*
Daylighting/Shading Systems	10	*9*			**16**		*6*
Structured Wiring/Cabling/Connectivity	25	**29**		**28**		*20*	*7*
Networking (VOIP/Wireless/Broadband, etc.)	18	**20**		**19**		*13*	*5*
Fiber Optics (Communications and Security)	4	*3*		*3*		**6**	**7**
Data Centers	3	*3*			**6**		
Troubleshooting/Maintenance of Low-Voltage Systems	26	**30**		**29**		*19*	*5*
Backup Power/UPS	25	**29**		**28**		*15*	*4*
TVSS/Lightning Surge Suppression	17			**18**	**23**	*13*	***5***
Energy Management/Power Quality	5						
Fire/Life Safety (Including Alarms/Detectors)	30	**32**	**33**	**32**		*22*	*13*
HVAC Controls	21	**26**		**25**	*15*	*11*	*6*
Home Automation/Smart Home/Connectivity	21		**24**	**22**		*16*	*9*
Home Theater/Sound or VDV	18	**21**		**20**		*14*	*5*
Security: CCTV/Access/Motion, etc.	16				**21**		*10*
Programming and Commissioning	5	*4*					
Automated Building Systems/Connectivity	**N/A**						
Industrial Controls (Including PLCs and VFDs)	**N/A**						
Sound and Video or VDV	**N/A**						

Table Continues on Next Page

Among Firms Working in Residential, continued:

- Firms with 5-9 employees are more likely than firms with 1-4 employees to work in two Sustainability project types: Electric Vehicle Charging Stations (firms with 10-19 employees are also higher) and LEED projects. Firms with 1-4 employees are more likely to work on HVAC Mechanical.
- Note that firms that do residential work tend **not** to work on all of the project types or categories. In contrast, larger firms working in CII tend to work on many more project types.

Types of Work Performed in Previous Year By Number of Employees, Residential (2016 Profile Study)							
	Total	**1-4**	**5-9**	**1-9**	**10-19**	**20-99**	**100+**
	%	%	%	%	%	%	%
Energy Efficiency Projects/Upgrades (Non-LEED)	16			**17**	**22**	*11*	*6*
Fuel Cells	12						*0*
Electric Vehicle Charging Stations	11	*9*	**16**		**16**	*7*	*6*
Solar/Photovoltaics	10						*4*
LEED Projects	7	*7*	**10**				
Smart or Net Metering	5						*2*
Geothermal	5			**6**			*0.5*
Co-Generation	4						*1*
Energy Audits (Including Thermal Imaging)	3						
Wind Generation	2						*0*
Energy Storage	2			**3**			*0.5*
Smart Grid Technology	1						*0*
Microgrids	0.5						*0*
Pre-Assembly/Pre-Fabrication of Electrical Components	7						
HVAC (Mechanical)	15	**19**		**20**	*10*	*6*	*5*
Water Utilities or Waste Water Treatment Plants	**N/A**						
	Total	**1-4**	**5-9**		**10-19**	**20-99**	**100+**
Any HVAC (HVAC ***or*** Mechanical)	**25**	**31**			*17*	*11*	*8*
HVAC Controls *and* Mechanical	**11**	**13**				*5*	*4*
Any Low Voltage	**69**	**82**				*39*	*23*
Only 1 of 6	12	14	12		9	8	*8*
2 of 6	14	**17>**	13		10	7	*6*
3 of 6	16	**20>**	12		**14>**	*7*	*5*
4 of 6	15	**17**	16		**14>**	9	*3*
5 of 6	13	14	**<18**		**14>**	8	*2*
All 6	5	6	5		7	5	*3*
Number of Project Types	**76**	**88>**	**77**		**69>**	**45>**	**28**
Mentioned 1-9 Types	41	**51**	37		**29**	22	*18*
Mentioned 10-11 Types	11	13	12		9	4	*2*
Mentioned 12+ Project Types	24	24	28		31	19	*8*
Mentioned 12-19	20	22	25		25	13	*6*
Mentioned 20 + (out of 41) Project Types	3	3	3		5	6	*2*

Low Voltage: Firm's Active Engagement in Systems Integration or Data Centers

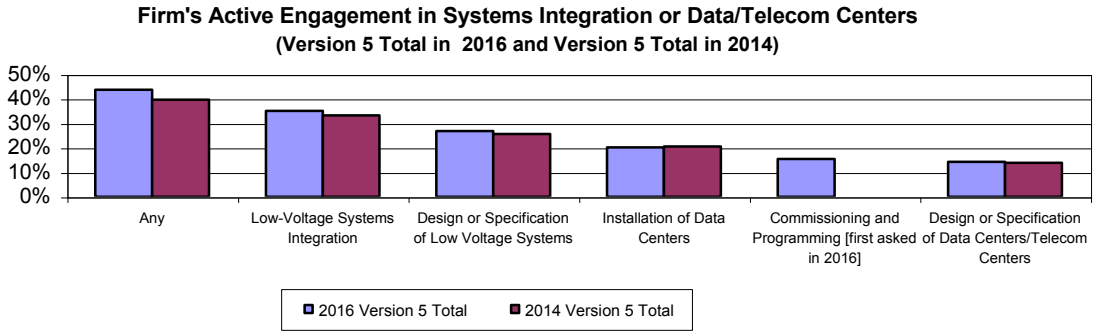
To put the following results into context, across the total sample 95% perform low voltage work.

In the 2016 Profile Study, 10% of firms said that they currently have a separate low voltage division, up significantly from 7% in 2014. As was the case two years ago, larger firms (those with 10+ employees) are more likely to have a separate low voltage divisions (25% in 2016 vs. 20% in 2014, a significant increase). [Separate low voltage division findings are not illustrated.]

Where the data can be trended, there does not appear to be significant differences from two years ago. About 4 in 10 electrical contracting firms are actively engaged in Systems Integration and/or Data/Telecom Centers. The apparent increase in **any** from two years ago is likely due to the inclusion of an additional option (Commissioning and Programming).

Low-Voltage Systems Integration was mentioned most often (35%). Design or Specification of Low Voltage Systems, which was first asked in 2014, received the next the next most mentions (27%). 20% of firms said that they installed data or telecom centers and 14% were involved in the design or specification of data or telecom centers. Commissioning and Programming, which was first included in the 2016 Profile Study, was performed by an impressive 16% of firms.

Table is Table 171, Pg. 521



Roles Played by Firm in Integrated Systems, continued

Electrical contractors were asked to indicate the extent to which they specify, install or both specify **and** install selected integrated systems.

- Almost 60% of electrical contractors say that they both **specify *and* install Lighting**. This is about double the percent that only install.
- For all of the other integrated systems, the percent that both specify **and** install or only specify is around 20% to 25%, while the percent that install only ranges from 23% to 32%.

Roles Played by Firm in Integrated Systems
2016 Profile Study

	Specify *Only*	Install *Only*	Specify *and* Install	Don't Work in This Category	No Answer
Version 7 Base (388)	%	%	%	%	%
Security	3	23	19	49	7
Fire/Life Safety	2	32	24	35	7
Lighting (including Controls)	3	25	58	9	4
Communications (VDV, etc.)	2	27	22	42	7
Building Controls (including HVAC)	2	29	23	39	8

Table is from Table 212-216, pg. 609-614

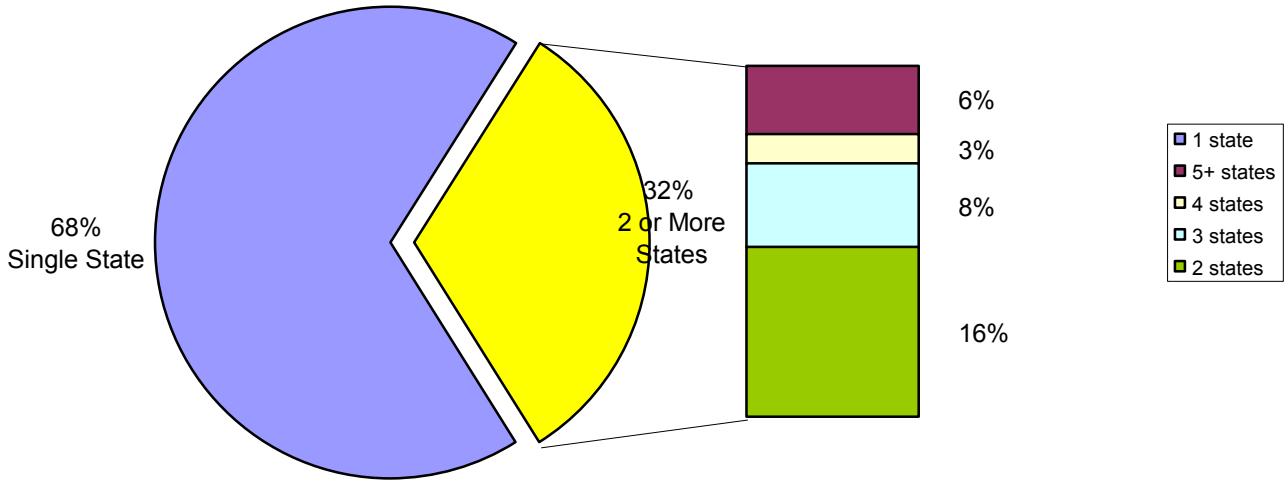
▲*"WHERE DO CONTRACTORS PERFORM THE WORK?*

Number of States In Which Electrical Contracting Firm Works

About one-third of electrical contracting firms perform their work in multiple states, suggesting, as noted in the past, that there may be issues of licensing and certification. The proportion working in 2 or more states is unchanged from two years ago.

These results are consistent with those reported two and four years ago.

Number of States in Which Electrical Contracting Firm Performs Its Work (2016 Profile Study)



Q 1b N=2419 Table is Table 3, Pg 40

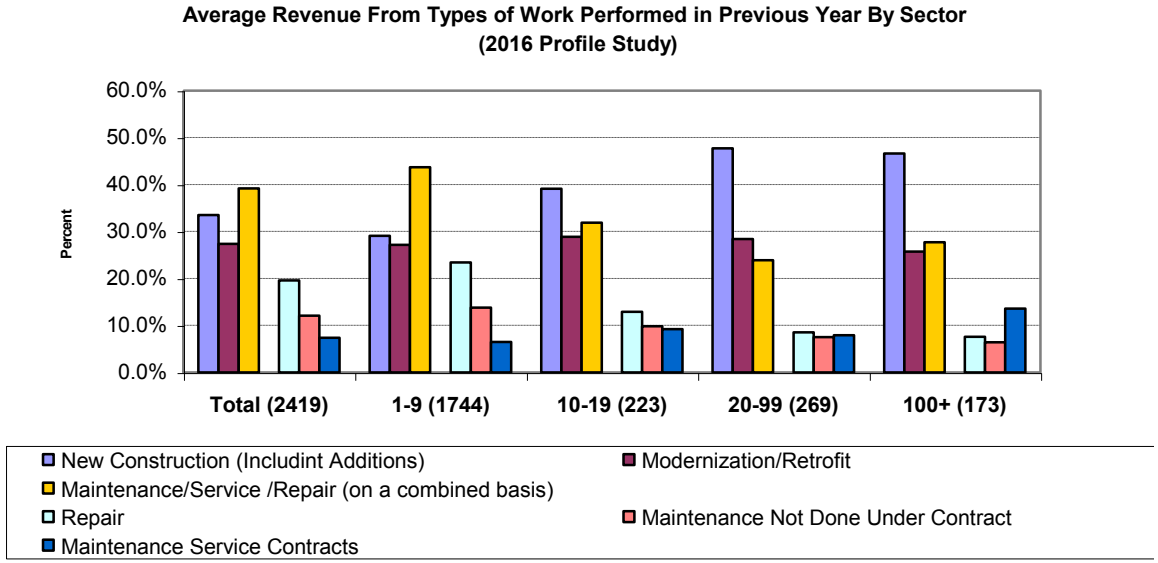
Not surprisingly, larger firms are more likely to work in multiple states. This was also the case in earlier Profile Studies.

	Total	1-4	5-9	1-9	10+
Work in 2+ States (2016)	32%	22%	30%	24%	<54%
Work in 2+ States (2014)	31%	20%	<37%	23%	<55%

Types of Work: By Sector (New Construction Vs. Modernization Vs. Maintenance and Repair)

On average, 39% of electrical contractor revenue comes from Maintenance/Service or Repair, which is a small, but significant decline since 2014 when it was 41%; 34% of average revenue comes from New Construction, up slightly but significantly from the 2014 level of 32%: 27% comes from or Modernization/Retrofit, unchanged since 2014. New Construction, which accounted for 43% of average revenue in 2007, has not yet recovered.

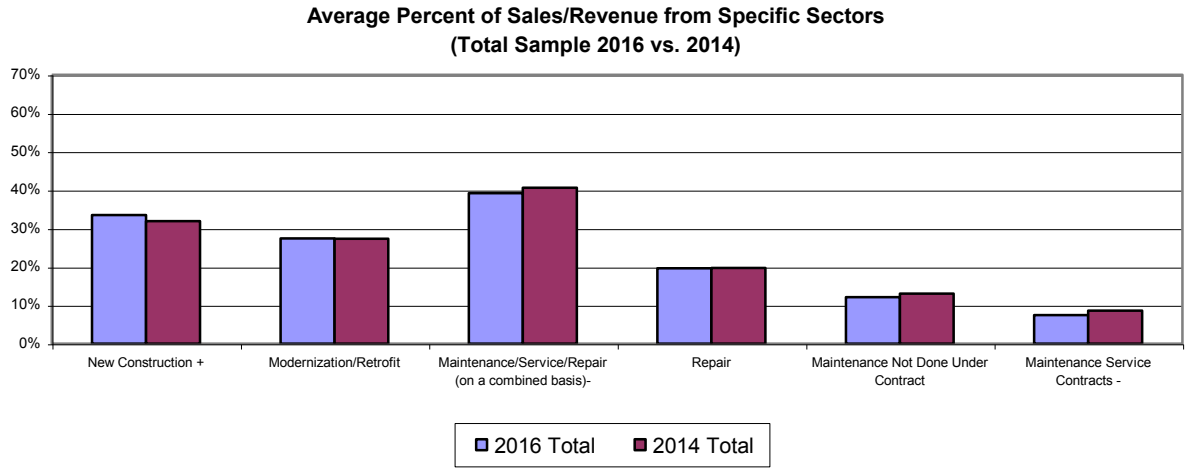
- As was the case in earlier Profile studies, New Construction (the blue bar) plays a proportionally larger role to firms with 10+ employees than to smaller firms, while Maintenance/Service/Repair – on a combined basis -- (the gold bar) accounts for a proportionally larger share of revenue among smaller firms.
    - However, with the exception of firms with 20-99 employees, where it is low for a large firm, Maintenance *Contracts* continue to play a proportionately bigger role to larger than smaller firms.



Q 5 Total Sample N=2419 (base sizes in parentheses above) From data Tables 26-31

Other than the differences noted above, where, among the total sample, New Construction posted a small but significant increase and Maintenance/Service/Repair posted a small but significant decline, there are no differences in average revenue from each sector by company size compared to two years ago.

Statistically significant differences (2016 compared with 2014) are shown below via + or – next to label



2016 Total Sample = 2419; 2014 Total Sample = 2722

	Average Revenue from Sector by Number of Employees														
	Total					1-9 Employees					10+ Employees				
	2016	**2014**	**2012**	**2010**	**2008**	**2016**	**2014**	**2012**	**2010**	**2008**	**2016**	**2014**	**2012**	**2010**	**2008**
New Construction	**34%>**	32%	31%	**<34%**	**<43%**	29%	28%	26%	**<30%**	**<38%**	45%	43%	43%	47%	52%
Modernization/Retrofit	27%	27%	27%	28%	27%	27%	27%	27%	29%	27%	27%	29%	28%	26%	26%
Maintenance/Service/Repair	39%	**<41%**	**42%>**	**38%>**	31%	44%	45%	**47%>**	**41%>**	35%	28%	28%	28%	**27%(>)**	22%
Repair	20%	20%	21%	**18%>**	14%	23%	24%	**25%>**	21%	18%	10%	9%	9%	9%	7%

(>) Difference is just short of significance at the 90% confidence level

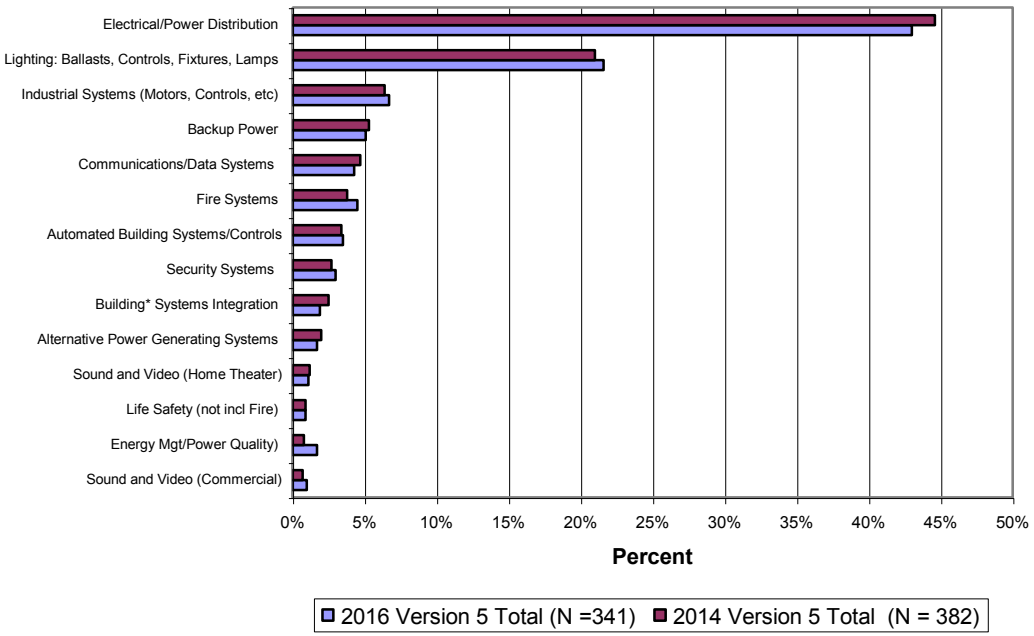
Types of Electrical Projects: Sources of Revenue

- Electrical/Power Distribution, at 43%, continues to account for the largest percent of company sales, by far. It is statistically unchanged from its 2014 level of 44.6%. The average percent of revenue from Electrical/Power Distribution had been dropping steadily since 2004 when it was 69%, it continues to be below its 2010 level of 56%. (Years prior to 2012 are not shown).

    - Energy Management/Power Quality, rose significantly from .8% to 1.7% among the total sample and among firms with 1-9 employees (from .5% to 1.8%). Note however, that this category had experienced a significant decline between 2014 and 2012. [Only the total sample is shown on the next page]

    - The only other change was in Commercial Sound and Video or VDV, which rose among firms with 10+ employees from 1% to 1.9%. There are no other significant differences versus two years ago among the total sample or by 1-9 or 10+ employees. [Only the total sample is shown on the next page]

Average Revenue From Specific Areas -- Trended



*** The word "Building" was added to Systems Integration in the 2016 Profile Study**

Table is Table 168, Q14A

In a departure from findings going back to at least the 2012 Profile Study, the revenue from Electrical/ Power Distribution is no longer statistically higher among small firms compared with their larger counterparts. However, Lighting (a hold-over from 2014) and Back Up Power account for significantly more revenue to firms with 1-9 employees than to their larger counterparts.

In contrast, large (10+ employee) firms derive more of their revenue from Building Systems Integration, Communications/Data Systems, Security, Fire and Life Safety and Commercial Sound and Video compared to their smaller counterparts.

There is no difference by number of employees from these areas: Industrial Motor Controls, Residential Sound and Video, Alternative Power or Energy Management.

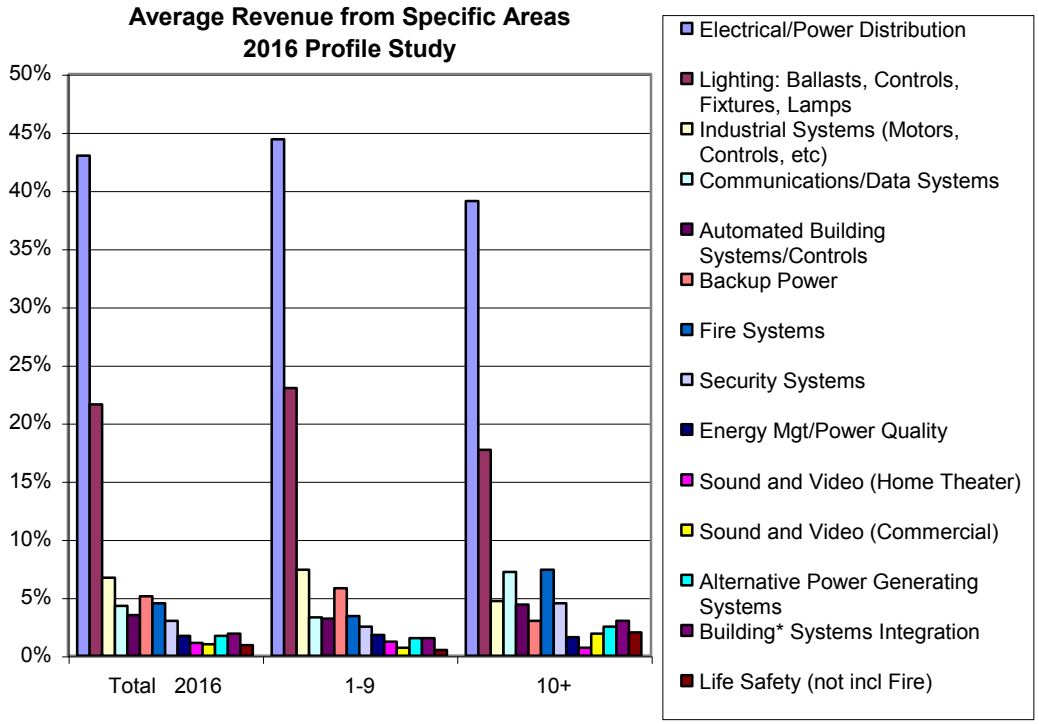
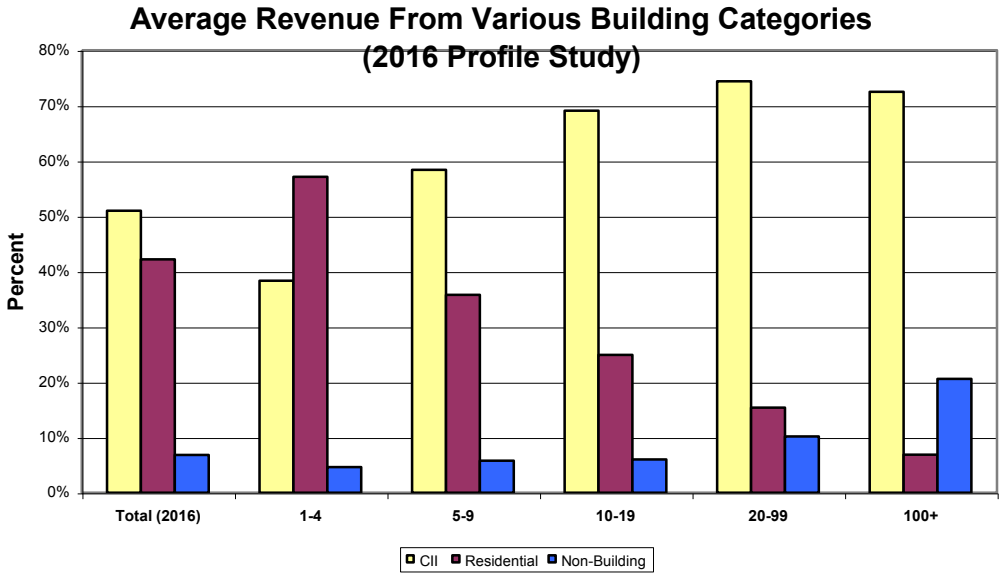


Table is Table 168, Pg. 513-515

Work in Various Building Categories (Residential vs. CII and Non-Building)

Across the total sample, electrical contractors continue to get more of their average revenue from CII (Commercial, Industrial, Institutional and Public Places), 51% on average, than from Residential projects, 42% on average. Non-Building projects (Transportation/Lighting and Utility) account for about 7% of the contractors' business.



Q4 N=2419

CII = **Commercial** (Offices, Stores, Hospitality, etc); **Institutional** (Schools/Hospitals/Stadiums/Parks/Terminal/Cultural/Correctional, etc); **Industrial** (Manufacturing Plants/Process Industries/Factories/Warehouses, etc); **Residential**: Single Family; Multifamily (1-5 stories); Multifamily (6+ stories) **Non-Building:** Line Work (Overhead/Underground Construction/Transmission & Distribution/Maintenance and Repair, Transportation Lighting, and Communications (Airport Runway/Highway/Street Lightingincluding Parking Garages and Traffic Controls/Electric Signage/Traffic Calming Signs); Power Generation and/or Substations; Distributed Generation/Alternative Energy; Smart Grid; Electric Vehicle Charging Stations; Energy Storage was first added in 2016.

Table is Table 23, Pgs. 93-95

Work in Various Building Categories (Residential vs. CII and Non-Building), continued

- Except as shown below, there were very few significant differences between 2016 and 2014.
- The average percent of revenue from Residential construction declined from 45% to 42%. While the percentage of revenue from non-building increased, it may have been due, in part, to the addition of Energy Storage in 2016.

	Average Revenue in Previous Year From Specific Categories									
	Total		1-9		10-19		20-99		100+	
	2016	2014	2016	2014	2016	2014	2016	2014	2016	2014
	(2419)	(2722)	(1744)	(2039)	(223)	(231)	(269)	(248)	(173)	(189)
CII	51%	50%	43%	43%	69%	67%	74%	76%	73%	75%
Residential	42%	**<45%**	52%	54%	25%	24%	15%	17%	7%	8%
Non-Building	**6.8%>**	5.2%	**4.9%>**	3.3%	6%	8.5%	10.2%	7.6%	20.6%	17.7%

Table is Table 23, Pg. 95

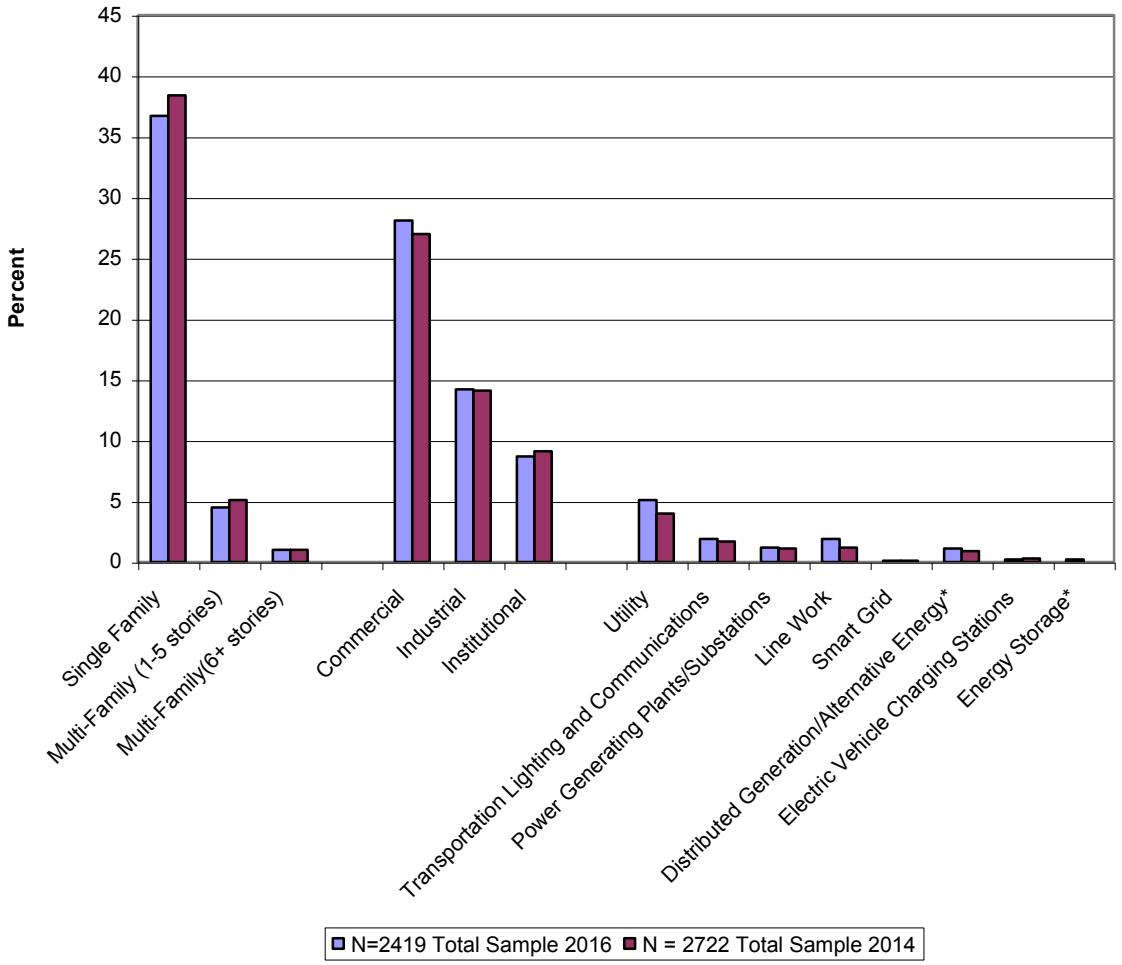
Types of Residential and CII Work Performed

- Although on average, the greatest portion of electrical contractors' revenue comes from CII work, Single Family housing accounts for the *single* largest source of revenue (36.7% in the 2016 Profile Study). Also within the housing category, a higher percentage of revenue comes from Multi-Family housing with 1-5 stories compared with taller Residential buildings. This was also the case two and four years ago.

- As was also the case two and four years ago, within the broad CII category, a greater percentage of electrical contractors' revenue is from Commercial construction (28.1%) than from Industrial (14.2%) or Institutional projects (8.7%).

    - In 2016, the average revenue from Industrial projects declined significantly among the total sample (driven by a decrease in average revenue among firms with 1 – 4 employees (1-4 employees not shown). This is reversal of an increase that occurred between 2010 and 2012.

Average Percentage of Business in Previous Year From Specific Categories
(Total Sample 2016 vs. 2014)



*** Denotes: Wording change in the case of Distributed Generation/Alternative Energy (was Distributed Generation in 2014); Energy Storage is new in 2016**

Table is Table 23, Pgs. 93-96

As noted in previous Profile reports, while Single Family projects account for a high percentage of revenue across the total sample, this type of work is extremely important to electrical contracting firms with 1-9 employees. On average, these small firms derive almost one-half of their revenue from Single Family projects.

- Electrical contracting firms with 10-99 employees derive the greatest percentage of their revenue from Commercial projects.

    - In addition, electrical contracting firms with 100+ employees get a disproportionate percentage of their revenue from Industrial and Institutional projects and from Utility/Non-Building work.

Average Percent of Business in Previous Year From Specific Categories
2016 Profile Study

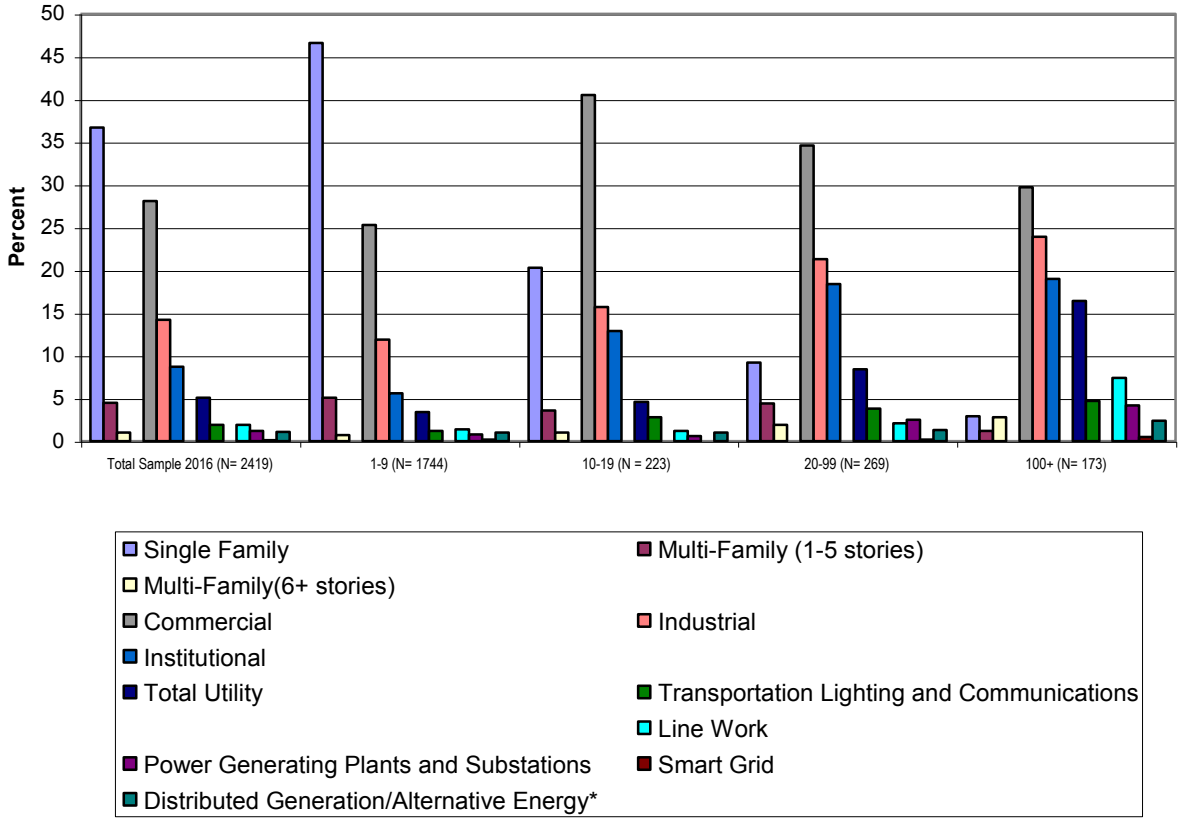


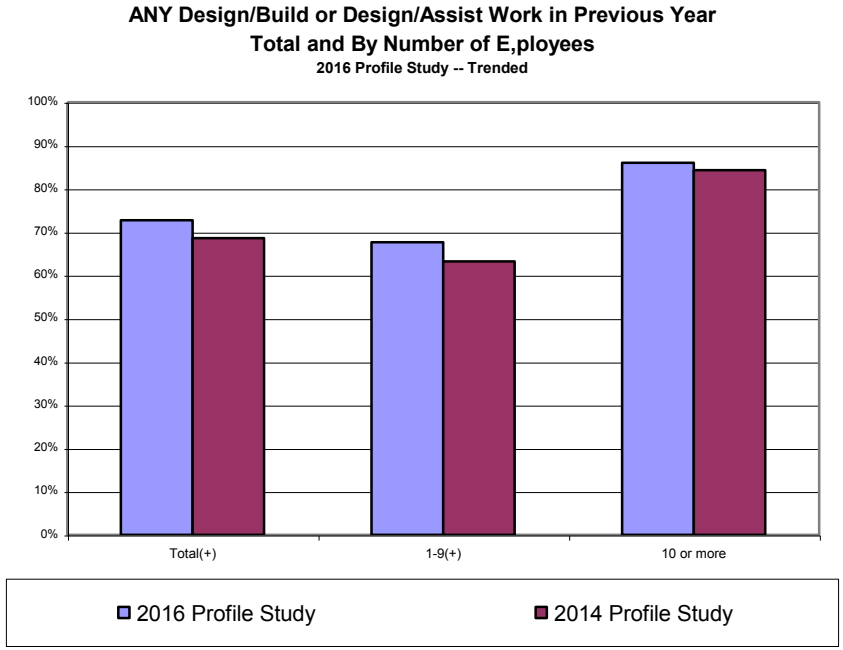
Table is Table 23, Pgs. 93-96

▲ *"HOW" DO CONTRACTORS PERFORM THEIR WORK?*

Roles in Specification/Types of Project Delivery (Design/Build or Design/Assist)

Across the total sample, 73% of electrical contractors performed (**any**) Design/Build or Design/Assist work in the previous year. As in the past, larger firms are even more likely than smaller firms to have engaged in D/B or D/A work:

- While 68% of firms with 1-9 employees performed any DB or DA work in 2015, **any** D/B//D/A work was performed by 86% of firms with 10+ employees.
    - Compared to two years earlier, levels of doing **any** D/B//D/A rose significantly among the total sample and among firms with 1-9 employees but not among firms with 10+ employees.



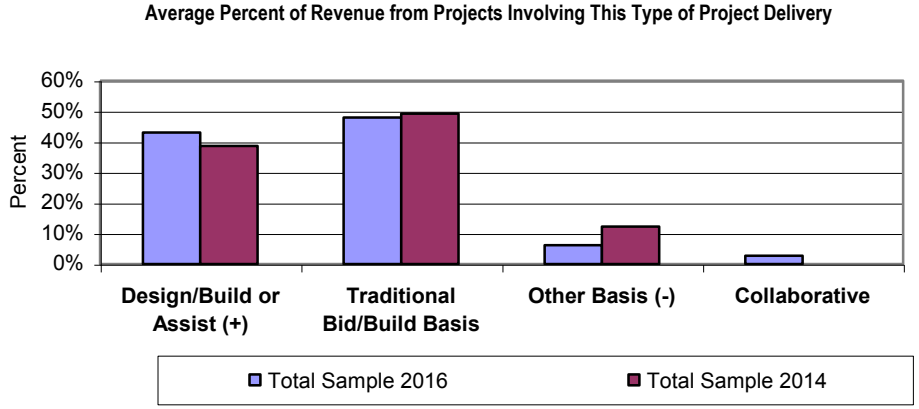
Q9 2016 Sample =2419; 2014 Sample = 2722

Table is Table 51, Pg. 229

Overall, an average of 43% of electrical contractors' revenue was done on either a Design/Build or Design/Assist basis. This is a statistically significant increase from the 2014 level of 39% and marks a return to the 43% last observed in 2012 (As in the past, the vast majority continues to be done as Design/Build --32%-- rather than Design/Assist --11%). .

About one-half of electrical contractors' revenue comes from Traditional Bid/Build projects (49%, unchanged from 2014).

- "Other delivery methods", which accounted for 6% of project delivery revenue, posted a sharp drop from its 2014 level of 12%. While 12% in 2014 may have been an outlier (it was 10% in 2012) some of the decline (from 12% to 6%) may be due to the addition a new category – collaborative building.
    - Across the total sample, Collaborative building accounts 2.7% of average revenue. It accounts for 2.2% of revenue among firms with 1-9 employees but by contrast, for a significantly higher average revenue for firms with 20-99 (3.9%) and firms with 100+ employees (5.9%). We expect the importance of collaborative building to grow in the future both among the largest firms and for it to be adopted to a greater extent by smaller firms.
        - To put this into context, across the total sample, 12% say that they have done **any** collaborative building (21% among firms with 10-19 employees and about 32% among firms with 20+ employees), again, making it an area to watch in the years to come. [**Any** collaborative building is not shown.]



Q 9 2016 Sample = 2419 2014 Sample = 2722

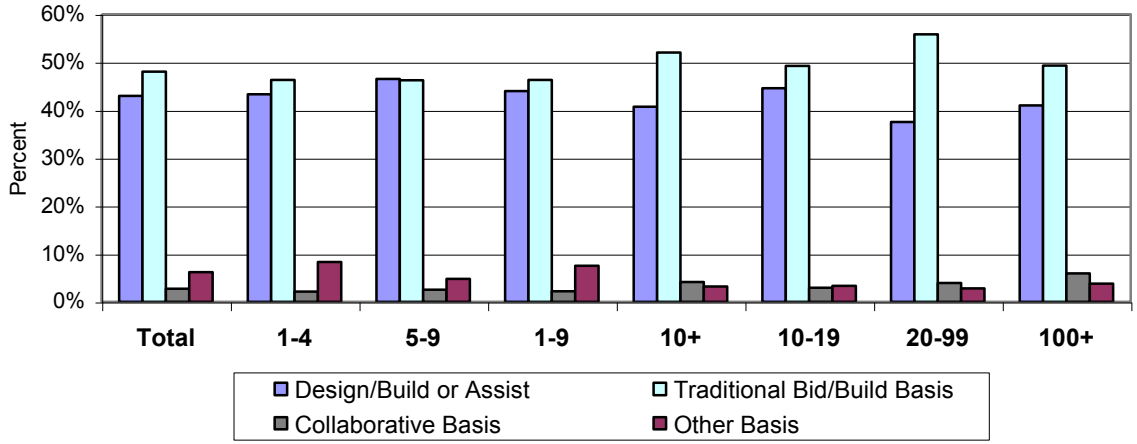
(+) Indicates a significant increase vs. 2014; (-) Indicates a significant decline vs. 2014
Table is Table 50, Pgs. 227-228

In the 2016 Profile Study, the average percent of revenue from Design/Build or Design/Assist is significantly higher among firms with 1-9 employees (driven by firms with 5-9 employees). Average revenue from Traditional Bid/Build is significantly higher among larger firms – especially those with 20-99 employees. Average revenue from Collaborative is about twice as high among firms with 10+ compared with those with 1-9 employees. In contrast, some "Other" basis is about twice as high among firms with 1-9 compared with those with 10+ employees.

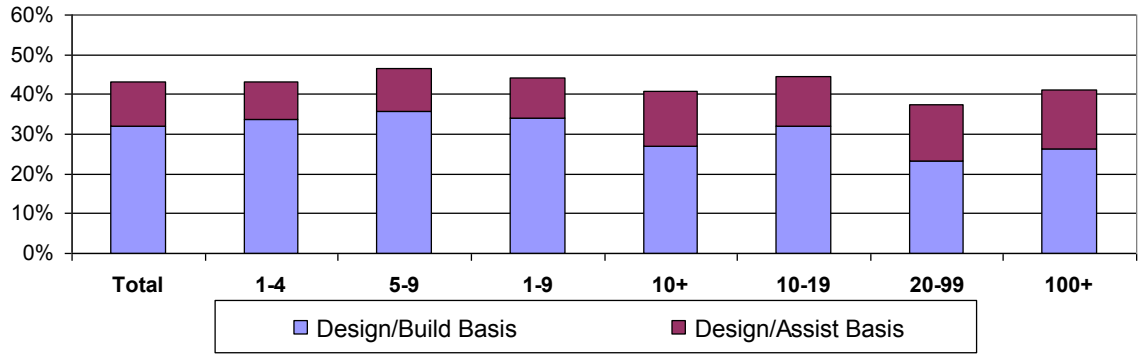
- In 2014, there was no difference in mean revenue from D/A or D/B between firms with 1-9 and 10+ employees. (In 2012, average revenue from D/A or D/B was higher among larger firms).
    - However, since at 2012, average revenue from Traditional Bid/Build has been higher among larger firms.
    - Similarly, since at least 2012, average revenue from work bid on another basis has been higher among firms with 1-9 employees (In each case, driven by firms with 1-4 employees). [Earlier years are not shown.]
        - Project delivery on a Collaborative basis cannot be trended since it was first asked in the 2016 Profile Study.

[Earlier years are not illustrated]

Average Percent of Revenue from Projects Involving This Type of Project Delivery
2016 Profile Study (N= 2419)



Average Percent of Revenue from Projects Involving Design/Build or Design /Assist
2016 Profile Study (N= 2419)



Tables are Table 50, Pgs. 227-228

BIM (Building Information Modeling)

Electrical contractors were asked to estimate the percentage of the time that they or someone in their firm uses BIM (Building Information Modeling). This question was first asked in the 2012 Profile Study.

As shown below, across the total sample, the use of BIM has been fairly steady over the past three Profile Studies: **any** use is in the range of 22%; average use is in the 6% to 7% range.

Use of Building Information Modeling (BIM)						
	2016		2014		2012	
	Any Use	Average	Any Use	Average	Any Use	Average
Survey Year (Current Use)	22.3%	6.0%	23.7%	7.1%	20%	5.8%

Table is Table 52, Pgs. 231-232

However, looking at BIM usage among the total sample obscures a larger finding: that while BIM usage is low among firms with 1-4 employees, it increases dramatically as firm size increases. The increase in use and average revenue is evident among firms as small as 5-9 employees. In fact firms with 5-9 and 10-19 are similar in terms of their use (**any** use and average revenue). Firms with 20-99 employees form a second, higher level of use and firms with 100+ employees make the highest usage and derive the highest average revenue from BIM.

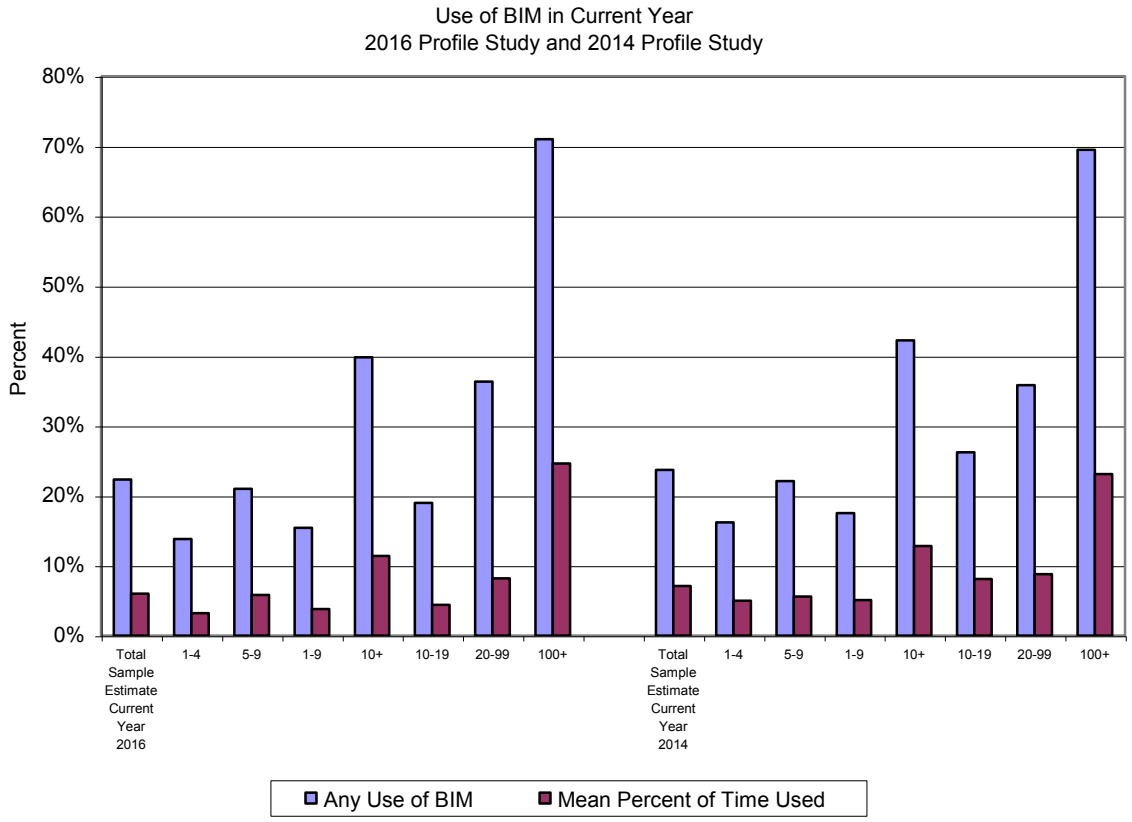


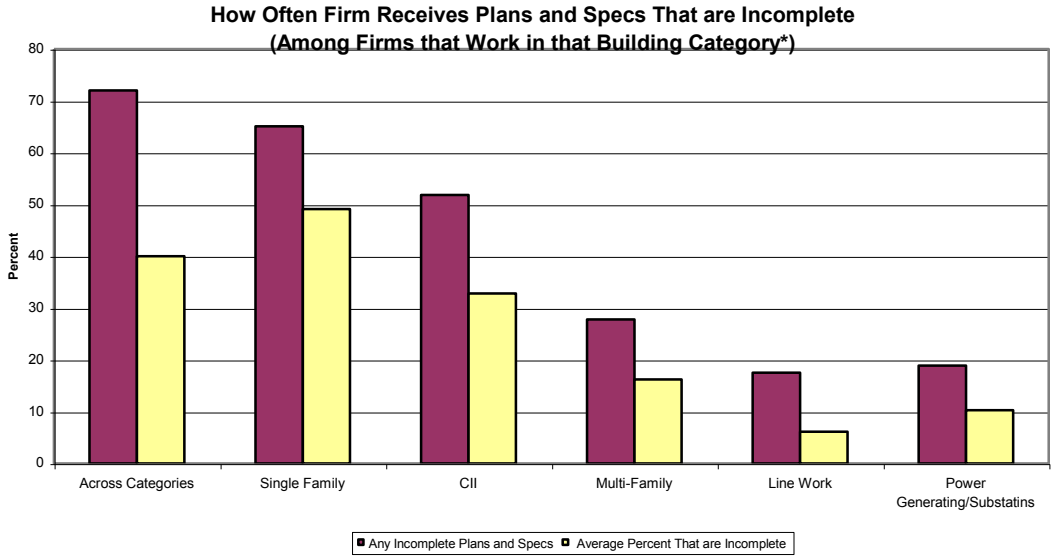
Table is Table 52, Pgs.231-232

Completeness of Plans and Specifications –

Receipt of incomplete plans and specs continues to be quite prevalent. 72% of firms have received ANY incomplete plans and specs in 2015, a statistical decrease from the 78% observed two years earlier. On average, 40% of the plans and specs received were incomplete, statistically unchanged from 43.4% two years earlier.

As might be expected, the incompleteness of plans and specs varies dramatically by building category. It is highest in single-family construction and declines as the level of complexity increases. Although we did not ask specifically about each of the types of CII construction, from the response below, we are assuming that the CII answer was in terms of commercial construction.

Incompleteness of plans and specs by construction type was first asked in the 2016 Profile Study and therefore cannot be trended.



*Categories are as follows: Residential for Single and Multi-Family housing; CII for CII and Non-Building for Line Work and Power Generating/Substations

Above Table is both from Table 202 and 203

Role of Engineers within Electrical Contracting Firms

For the first time in the 2016 Profile Study, electrical contractors were asked about the professional relationship(s) that their firm has with engineers:

- Consulting Relationship
- On staff or in a separate engineering division
    - These questions were asked independent of each other since we did not want to assume that one type of relationship would rule out the other.

Across the total sample, more than four in ten (42%) of firms have a professional relationship with an engineer. While *consulting* relationships are more prevalent (38%), 15% report having an engineer on staff and/or having a separate engineering division. About one in ten firms (11%) have **both** a consulting relationship as well as having an engineer on staff or a separate engineering division. Not surprisingly, these types of relationships are far more common among large firms and the prevalence rises with firm size. However, even among firms with 1-4 employees, more than one-quarter has a professional relationship with an engineer.

The high prevalence of working with engineers speaks to the complexity of much of the work performed by electrical contractors.

	Professional Relationship With Engineer(s)								
		Number of Employees							
	TOTL	**1-4**	**5-9**		**1-9**	**10+**	**10-19**	**20-99**	**100+**
	(326)	(194)	(53)		(247)	(77)	(24)*	(32)*	(21)*
	%	%	%		%	%	%	%	%
Any Professional Relationship	42	27	**<45**		31	**<78**	59	81	96
Consulting	38	24	**<40**		27	**<75**	59	78	87
On Staff/Separate Division	15	8	**<15**		9	**<32**	5	31	64
Both	11	4	**<10**		5	**<28**	5	28	56

*** Caution: Small base**

Table is Table 204, pg 601

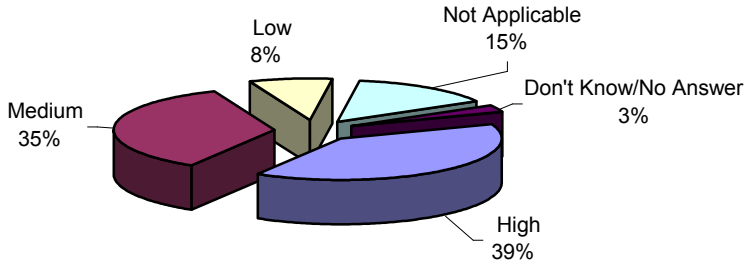
Project Collaboration/Level of Influence

As has been the case in recent Profile Studies, about three-quarters of electrical contractors report having a "medium" or "high" ability to influence the overall electrical design or specifications with building owners or design team members

- About 4 in 10 describe their level of influence as "high" (39%) while 35% characterize their level of influence as "medium."
- There are only a few meaningful differences by company size (not shown):
  - Those in firms with 1-9 employees are more likely than those in firms with 10+ employees to report a "high" level of influence (42% in firms with 1-9 employees vs. 30% in firms with 10+ employees). This difference first emerged in the 2012 wave.
  - In contrast, larger companies (those with 10+ employees are more likely than average to report a "low" ability to influence the overall electrical design or specifications (17%, compared with 6% among firms with 1-9 employees).
    - There are no significant differences vs. 2014. In fact, these findings are consistent with earlier Profile Studies going back to at least 2010.

2016 Profile Study

Ability to Influence Overall Design or Specifications With Building Owner or Design Team



2016 Profile Study: Q 15a Version 7 Total = 326
Table is Table 205, Pg. 602

For the first time in the 2016 Profile Study, electrical contractors were also asked about their current level of collaboration with these key trades: Mechanical, HVAC, Plumbing and Systems Integrator from other trades.

- Based on these results, project collaboration is higher with mechanical and HVAC trades than with plumbing or systems integrators from other trades.

Current Level of Project Collaboration						
	Building Owner/Other Design Team Members		Mechanical	HVAC	Plumbing	Systems Integrator from Other Trades
Base: Version 7 (N=326)	%		%	%	%	%
High or Medium	74		55	52	38	34
High	39		20[5]	20	16[6]	12[7]
Medium	35		35	32	22	22
Low	8		21	22	27	25
Not Applicable	15		21	21	29	33
Don't Know/No Answer	3		4	5	6	8

As shown in the footnotes, more of the collaboration is rated "high" among firms with 100+ employees in the cases of Mechanical and Systems Integrators from Other Trades.

Table is taken from Tables 204-209

[5] 39% among firms with 100+ employees
[6] 33% among firms with 100+ employees
[7] 29% among firms with 100+ employees

Building Stage That Electrical Contracting Firm Gets Involved in Project Collaboration

In the 2016 Profile Study, for the first time, electrical contractors were asked at what stage their firm typically gets involved in Project Collaboration. Of those who gave a definitive answer (rather than "it depends") Pre-Construction and Construction were tied at about one-quarter each. 13% say that they get involved in the Project Design stage. Only 1% say that they get involved in Procurement.

- Firms with 10+ employees cited two stages --Project Design and Procurement -- more often compared to their smaller counterparts. In contrast, firms with 1-9 employees cited the Construction stage more often than their larger counterparts.

Stage the Firm Typically Gets Involved in Project Collaboration			
		Number of Employees	
Base: Version 7 (N=326)	Total	1-9	10+
	(326)	(247)	(77)
	%	%	%
Project Design	13	11	**<19**
Pre-Construction	24		
Procurement	1		**<5**
Construction	23	**25>**	**17**
It depends	35		

Q15c

Table 203

Across the total sample, 16% say that they now get involved *earlier* in the design collaboration; 58% report *no change* and 5% say that they now get involved *later* in the process, unchanged compared with the 2014 Profile Study findings.

- In this wave, there is no difference by number of employees. This is in contrast to the findings from 2014 where companies with 10+ employees were more likely than smaller firms to report getting involved *earlier* while electrical contracting firms with 1- 9 employees.

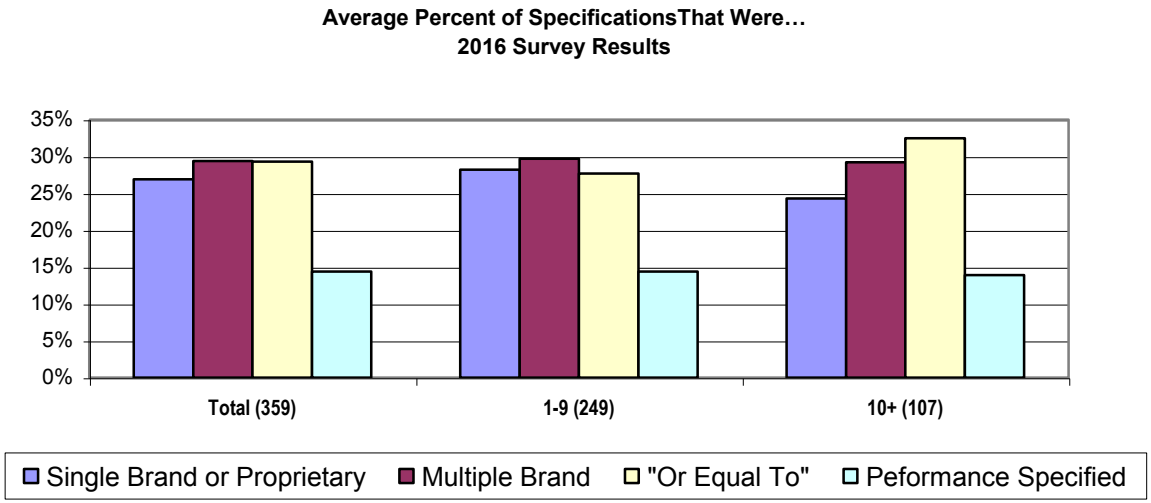
Rather, as shown below, firms that work in CII (but not primarily) and/or firms that work on a DB/DA basis (but not primarily) are more likely to report getting involved earlier now than was the case 3- 5 years ago. Version 7 Q15b (N= 326)

Current Level of Project Collaboration Compared with 3 – 5 Years Ago					
	Total	Any CII (297)	No CII (29*)	Any DB/DA (221)	No DB/DA (88)
Earlier	15.5%	16.7%	3.7%	19.3%	7.7%
No Change	58.2%	No Difference			
Later in Process	5.0%				
Not Applicable	17.9%				

Brand Specification Options

Respondents were shown a list of four options and were asked what percent of the specifications that their company receives fall into each category. On average, a "single" brand is specified about one-quarter of the time. In all other cases, other factors -- multiple brands, "or equal to" or performance specified – come into play.

- In contrast to earlier waves, there is no statistically significant difference between firms with 1-9 and 10+ employees in terms of brand specification options.
    - However, Single/Proprietary jumped significantly among firms with 10+ employees from 16% to 24%. No other brand specification option, by itself, changed significantly to account for this change. [Not shown]

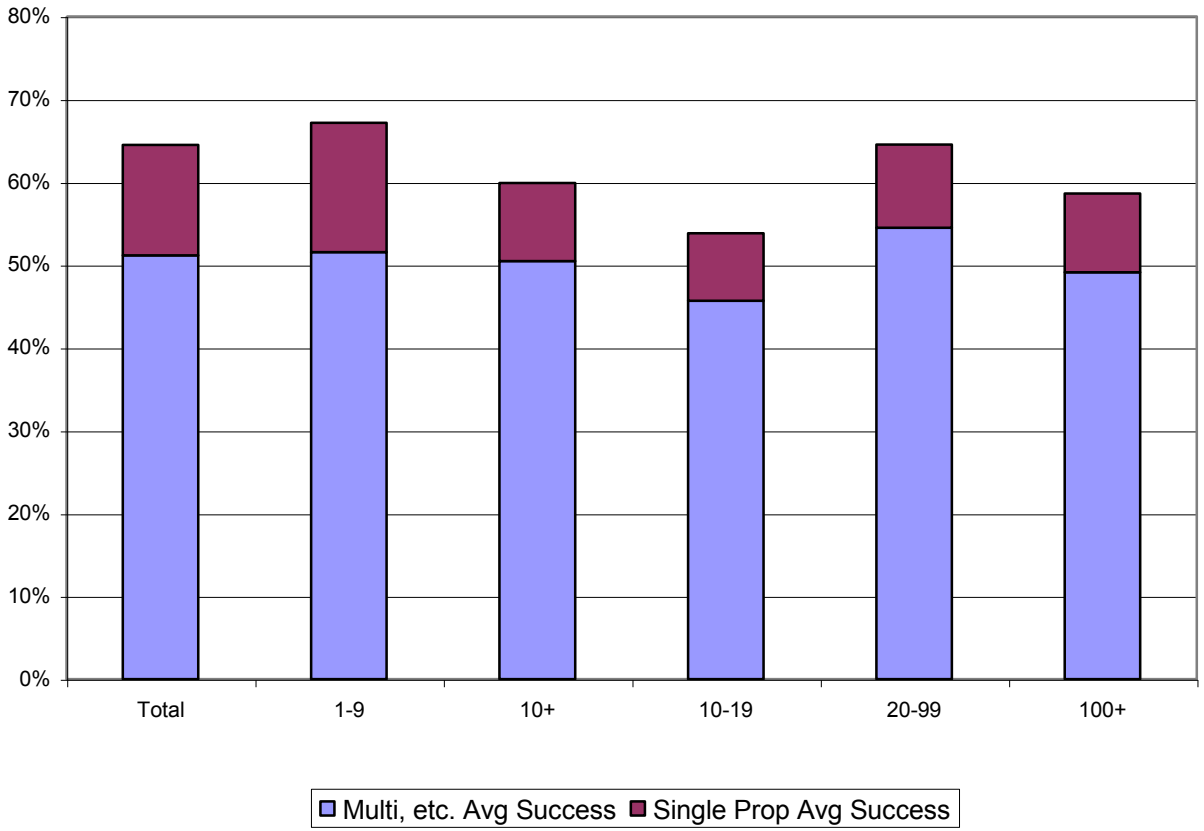


Version 6 Q14 N=359

Table is Table 176

Respondents were then asked how much discretion they have in making a brand substitution. Overall, contractors are able to make brand substitutions about two-thirds of the time.

Average Extent of Electrical Contractor Influence In Brand Selection
2016 Profile Survey



"Where a 'single or proprietary' specification is indicated, what percentage of the time are you or someone in your firm able to successfully make a substitution?"

"Where 'multiple or equal or performance' specification is indicated, what percentage of the time do you or someone in your firm make the brand decision for installation?"
N=359
TABLES 176, 178, 184

Main Reasons for Original Brand Selection and Substitution

Original Brand Selection: Among the total sample, Availability and Price trump all other attributes as a top-3 reason for original brand selection. Note that as a first choice, Availability completely overshadows all of the other attributes. (This is a verbatim repeat of the 2014 Profile Study findings.)

Compatibility with Existing Systems, which was first asked in 2014, had resonance with 32% of electrical contractors. It is now comparable with Ease of Installation and Prior Experience and fractionally higher than Durability or Manufacturer Reputation.

Made in America and Specific Features were each chosen by about 2 in 10 electrical contractors as a top-3 reason for original brand selection. Manufacturer Support and Training and Energy Efficiency were chosen by between 10% and 15% of electrical contractors. Word of Mouth and Availability of Real Time Mobile Information were each chosen by fewer than 10% of electrical contractors as their reason for original brand selection.

Once again, it is somewhat surprising that Energy Efficiency does not play a larger role as a top-3 reason for original brand selection.

- One hypothesis is that energy efficiency takes place long after the project has been specified and installed and there is no mechanism for the electrical contractor to be tied to the energy savings.

- Another hypothesis is that energy efficiency is so integral to electrical products that it is not seen as a separate feature.

Top 3 Reasons for Original Brand Selection
Base: 2016 Version 6 Total (N= 359)

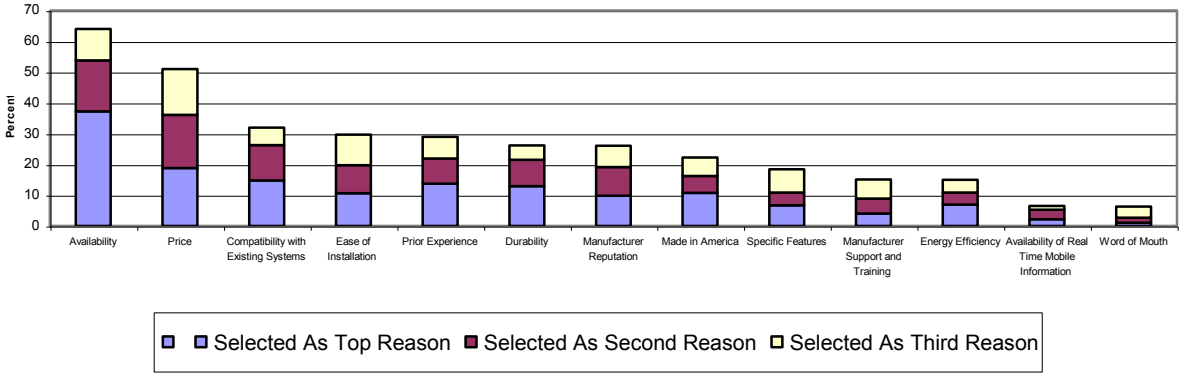
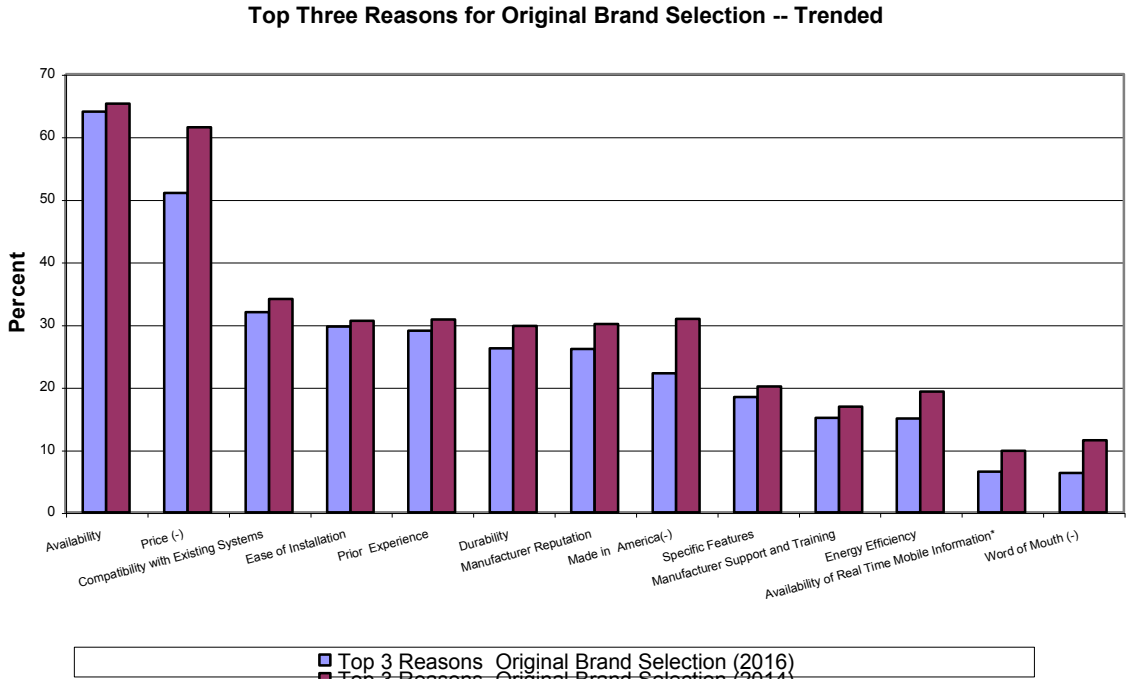


Table is Table 185-187, 189

Top 3 Reasons for Original Brand Selection – Trended

In 2016, compared with 2014, Availability continues to be top-3 reason for original brand selection as does Price. However, the relative importance of Availability remains unchanged while Price declined significantly between 2014 and 2016.

- In addition to Price, Made in America and Word of Mouth dropped significantly. In contrast, none of the reasons was cited by significantly more electrical contractors in 2016 than in 2014.



(-) Indicates a significant decline vs. 2014 (+) Indicates a significant increase vs. 2014

Brand Substitution: The top-3 reasons for brand substitution mirror that of original brand selection. Among the total sample, Availability and Price trump all other attributes as a top-3 reason for original brand selection. Note that as a first and top-3 choice, Availability completely overshadows all of the other attributes.

Compatibility with Existing Systems, which was first asked in 2014, had resonance with 37% of electrical contractors. Prior Experience trails by about ten points. Ease of Installation, Manufacturer Reputation, Made in America and Durability were each chosen by about 20% of electrical contractors on a top-3 reason basis and together they form a third tier of top reasons for brand substitution.

Specific Features, Energy Efficiency and Manufacturer Support and Training, chosen by about 15% each, form the next tier. Word of Mouth and Availability of Real Time Mobile Information are mentioned least often as a top-3 reason for brand substitution.

Once again, it is somewhat surprising that Energy Efficiency does not play a larger role as a top-3 reason for brand substitution.

Top Three Reasons for Brand Substitution
Base: 2016 Version 6 Total (N= 359)

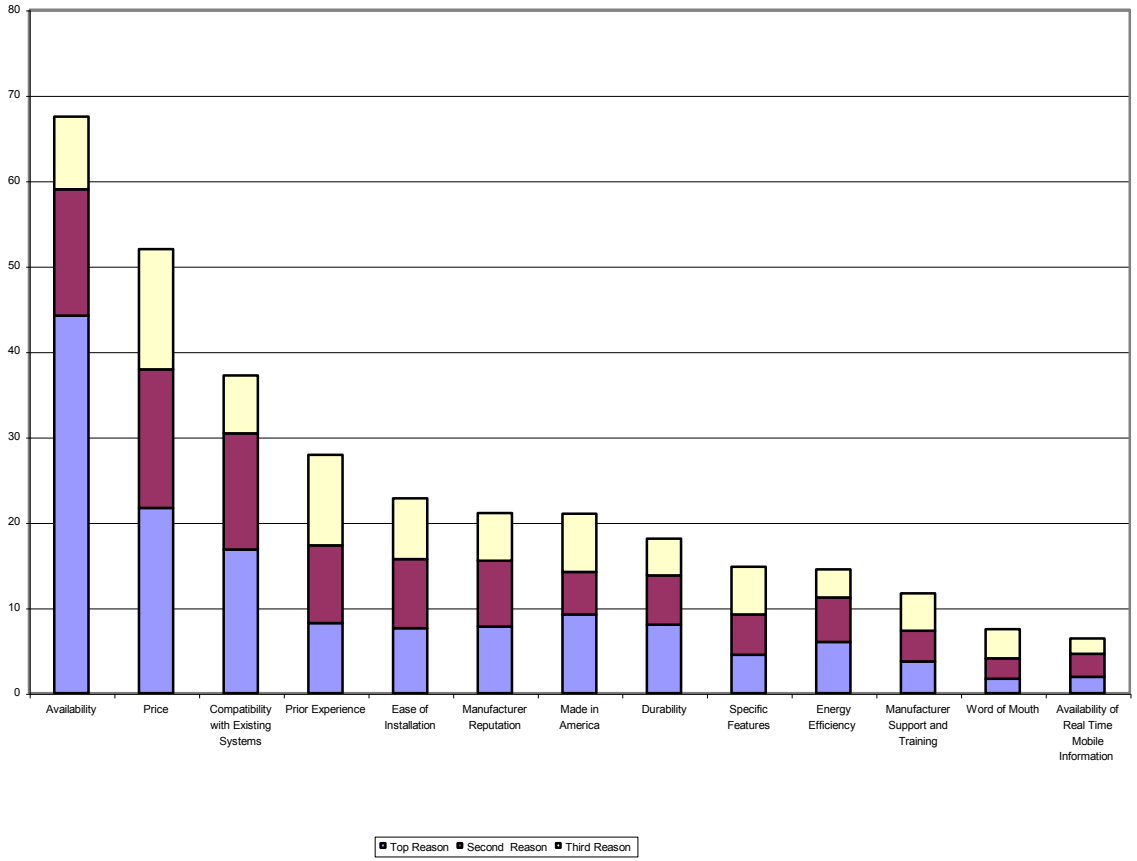


Table is Table 179-181, 183

Top 3 Reasons for Brand Substitution – Trended

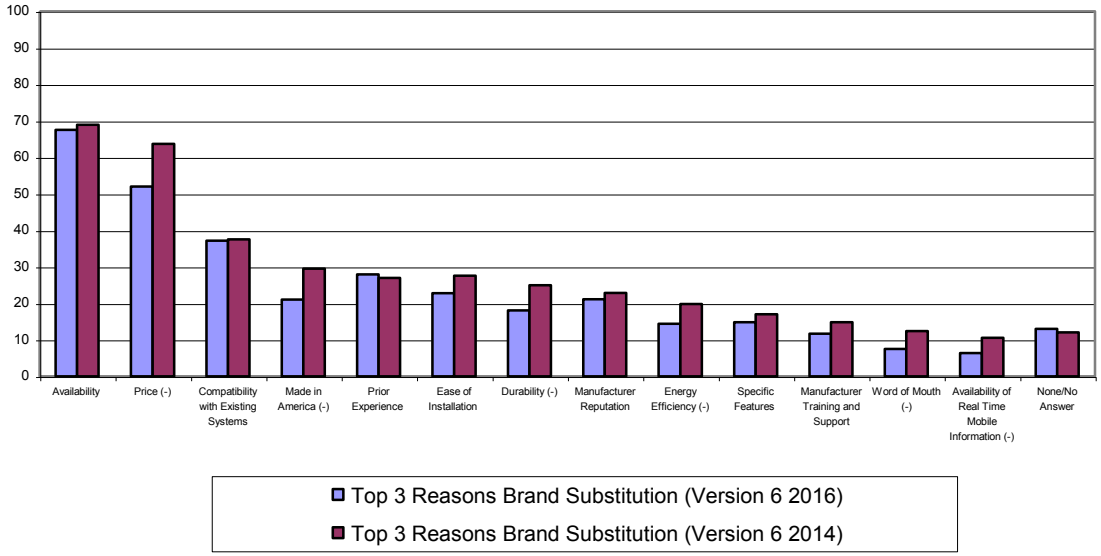
In 2016, compared with 2014, Availability continues to be top-3 reason for original brand selection, as does Price. However, the relative importance of Availability remained statistically unchanged at 68%, while Price declined to 52% from 64%. With the exception of 2012, when it was 44%, Price historically has been in the 63% to 66% range. It will be interesting to see if Price remains below its historical level in subsequent Profile Studies.

Compatibility with Existing Systems, which was first asked in 2014, had resonance with 37% of electrical contractors as a top-3 reason for brand substitution (unchanged vs. two years earlier). It is now mentioned more often as a top-3 reason for brand substitution than all of the remaining attributes.

In addition to Price, Made in America, Durability, Energy Efficiency, Word of Mouth and Availability of Real Time Mobile Information all posted significant declines versus two years earlier. In 2016, none of the attributes posted a significant increase compared with 2014.

- One possible explanation for the decline in Energy Efficiency as a reason for brand substitution is that it is "assumed" to already "be in there" and/or that there is a perception that brands do not differ on this attribute.

Top 3 Reasons for Brand Substitution --Trended
Version 6 Total (2016) Vs. Version 6 Total (2014)



2016 Base: Version 6 Total (N= 359); 2014 Base: Version 6 total (N =375)
(-) Indicates a significant decline vs. 2014
(+) Indicates a significant increase vs. 2014

Table is Table 183

Comparison of Main Reasons for Original Brand Selection Vs. Substitution

Regardless of whether the context is original brand selection or brand substitution, Availability and Price emerge as substantially more important than any of the other attributes as the reason for originally selecting a brand and for brand substitution. Compatibility with Existing Systems, which was first introduced in 2014, is now higher than or comparable to Ease of Installation, Prior Experience, Durability, Manufacturer Reputation and Made in America.

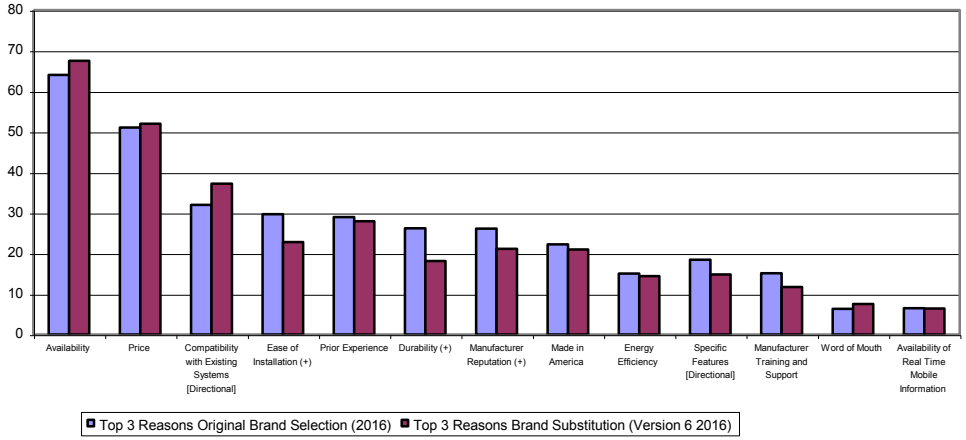
- There are only three statistically significant differences shown on the next page. Ease of Installation, Durability and Manufacturer Reputation each assume higher importance in the original specification --when time considerations may play less of a factor.

    - Compatibility with Existing Systems is strongly directionally higher in the case of brand substitution while Specific Features is strongly directionally higher in the case of original brand selection.

Top 3 Reasons for Originally Selecting a Brand Versus Making a Substitution

2016 Profile Study

(Base: Version 6 Total N=359)



(+) Indicates that reason is significantly higher than corresponding bar at the 90% level of confidence
(Directional) Indicates that the reason is strongly directionally different than the corresponding bar (but is not at the 90% level of confidence)

Brand Choice: Main Reasons for Original Brand Selection /Substitution

Of the 13 reasons for original brand selection/brand substitution (on a combined basis), those in small companies are more likely than their larger counterparts to mention each of the following seven attributes: Ease of Installation, Durability, Made in America, Energy Efficiency, Word of Mouth and Availability of Real Time Mobile Information. As mentioned in previous ELECTRICAL CONTRACTOR research reports, we see these attributes as offering ***reassurance.***

- This finding suggests that manufacturers and marketers communicate a message of reassurance and support particularly in product lines that are sold to small electrical contractors. In addition, Made in America appears to be important to the smaller contactor. Energy efficiency benefits should also be communicated in this market.

In contrast, Price is the only area that is more important to larger firms (10+ employees) than to their smaller counterparts (1-9 employees). This was also the case in the 2014 Profile Study.

There is no difference by larger vs. smaller companies in the case of these six attributes: Availability, Compatibility with Existing Systems, Prior Experience, Manufacturer Reputation, Specific Features or Manufacturer Support/Training.

- Compatibility with Existing Systems is far more important to firms with 5-9 employees (58% top-3 vs. 45% among the total sample, not shown), which is undoubtedly related to the types of work that they perform.

Top 3 Reasons for Originally Selecting a Brand or Making a Substitution
By Company Size
All Differences Shown Below Are Statistically Significant
2016 Profile Study

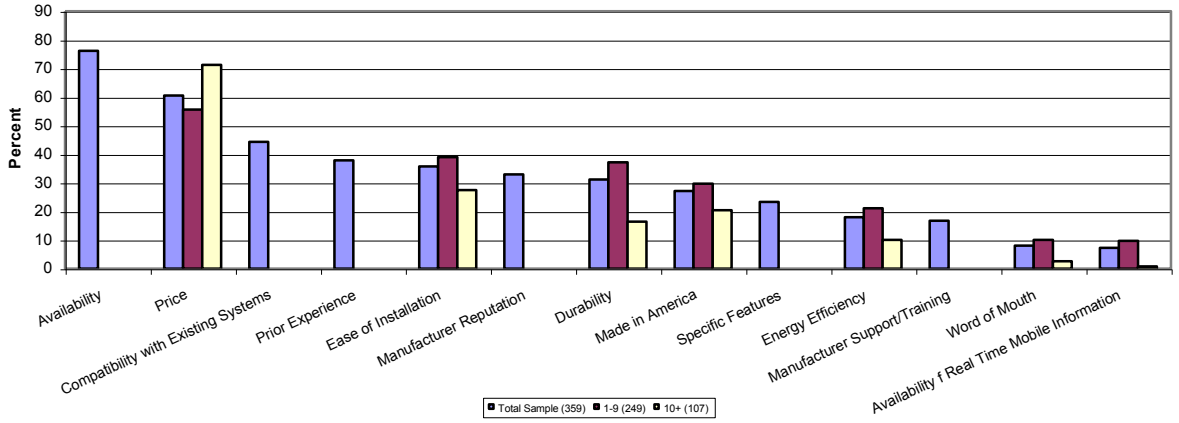


Table is Table 190

Brand Choice: Main Reasons for Original Brand Selection /Substitution – By Age

- Respondents who are aged 65+ are more likely than those who are aged 35-54 to cite just one attribute: Word of Mouth. (In 2014, this list also included Prior Experience, Manufacturer Reputation and Made in America as a main reason for brand selection.)
- Prior Experience and Ease of Installation is more likely to be mentioned by those aged 55-64 than by electrical contractors who are younger.
- Price is more likely to be mentioned by electrical contractors aged 35-54 compared to those who are aged 55-64. Made in America is less important to electrical contractors aged 35-54 than to those who are 55 or older.

Main Reasons for Original Brand Selection/Substitution -- By Respondent Age 2016 Profile Study (Only Statistically Significant Differences Are Shown)				
		Respondent Age		
		35-54	**55-64**	**65+**
	(359)	(99)	(151)	(91)
	%	%	%	%
Availability	76			
Price	61	**70>**	*55*	
Compatibility with Existing Systems	44			
Prior Experience	38	*29*	**<43**	
Ease of Installation	36	*28*	**<42**	
Manufacturer Reputation	33			
Durability	31			
Made in America	27	**21**	*<29*	
Specific Features	23			
Energy Efficiency	18			
Manufacturer Support/Training	17			
Word of Mouth	8	*5*		**<13**
Availability of Real Time Mobile	7			

On this table, results by subgroup are compared to the total. Where a subgroup is greater than the total, the percentage is **bolded**; where it is smaller it is in *italics*. Empty cells indicate that there is no difference between that subgroup and the total.

▲*TRAINING and TOPICS OF INTEREST*

Will Take/Have Taken Training and What Was Studied

More than seven in ten electrical contractors say that they, or someone in their firm, has taken training in the past 12 months or plans to take training in the next 12 months to improve or broaden skills or for certification. This training could be in the form of on-line, correspondence or classroom training. There is a statistically significant difference between the percentages that took training (70%) vs. those who plan to take training (78%). However, there is no change in the percent taking training or planning to take training versus two years ago.

As was true in 2014, the most common subject of training (past and future) was NEC changes (71%). Other interesting subjects for training included:

- Lighting (58%), particularly lighting controls and systems (44%)
- Grounding and Bonding (49%)
- Automation and controls (43%). Interest in this has, however, decreased since 2014 (when it was 52%); this is particularly true for:
    - Commercial automation systems (17%, vs. 25% in 2014)
    - Fire/Life Safety systems (23%, vs. 30%)
    - Security systems (13%, vs. 20%)
- Safety (42%)
- Green/Sustainable (40%), particularly alternative energy system (22%).
- Electrical Testing and Maintenance (34%)
- Cabling (33%)
- Design/Build; at 25%, this is the only category in which interest has risen since 2014 (19%)

Courses Taken or Will Take

		2016	2014
		%	%
Have Taken Training in Past 12 Months		70	76
Will Take Training in Next 12 Months		78	74
Courses Taken or Will Take			
Base		(282)	(414)
		%	%
MENTIONED ANY		98	97
NEC Changes		71	67
LIGHTING (Net)		58	58
	Controls/Systems	44	50
	Lamp Technology, incl. LED	39	33
	Drivers/Ballasts	30	35
	Lighting Design	26	31
Grounding/Bonding		49	50
AUTOMATION/CONTROLS (Net)		43	**<52**
	Home Automation Systems	23	20
	Commercial Automation Systems	17	**<25**
	Fire/Life Safety Systems	23	**<30**
	Security Systems	13	**<20**
Safety (Electrical/Personal/On-site/Jobsite		42	47
GREEN/SUSTAINABLE (Net)		40	39
	Alternative Energy Systems	22	24
	Electric Vehicle Charging Stations	14	13
	LEED Certification	12	12
	Energy Use Regulations	11	12
	Community Solar	10	NA
	Energy Storage	9	8
	Green/Sustainable Building/Energy Audits	8	10
Electrical Testing and Maintenance		34	NA

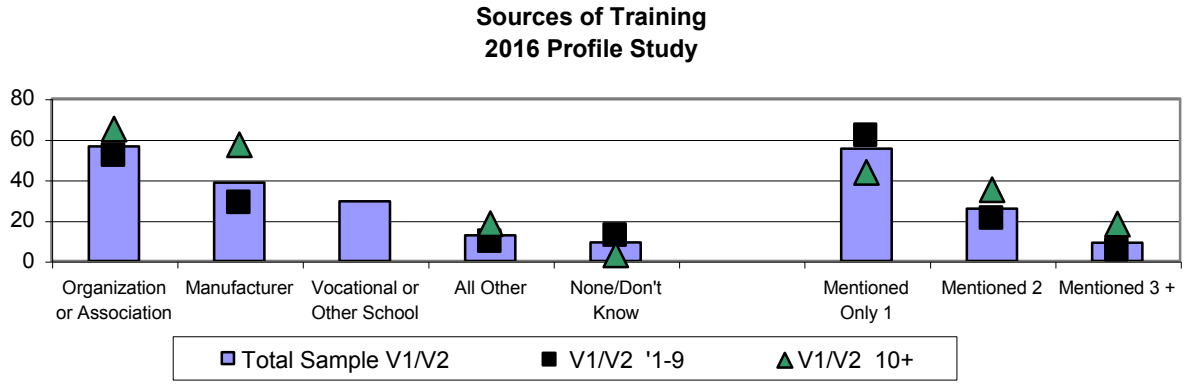
Courses Taken or Will Take , Continued

		2016	2014
Base		(282)	(414)
		%	%
CABLING (Net)		33	37
	Power	24	24
	Data and Telecom: Cable, Conduit, etc.	19	23
	Data and Telecom: Testing	16	18
Design/Build		**25>**	19
Electrical System Design or BIM		22	18
Developing New Business Opportunities		21	17
Estimating/Financial Management		19	21
Power Quality		19	21
Increasing Productivity		17	20
How to Use New Software		15	NA
Sound and Video/VDV (Commercial)		11	13
Systems Integration		11	**<21**
Sound and Video/VDV (Residential)		11	12
Pre-Fab/Off-site Building		10	NA
Renovation/MACS/Maintenance		9	**<17**
Line Work		8	8
Collaborative Building (Including IPD)		5	NA
Mentioned 1		9	12
Mentioned 2		**11>**	7
Mentioned 3 or more		78	78
Mentioned 6 or more		50	49

Sources of Training

Organizations/Associations are among the most frequently mentioned sources of training.

- Not surprisingly, electrical contractors in small firms (1-9 employees) are more likely to only mention one training source compared with those in larger firms.

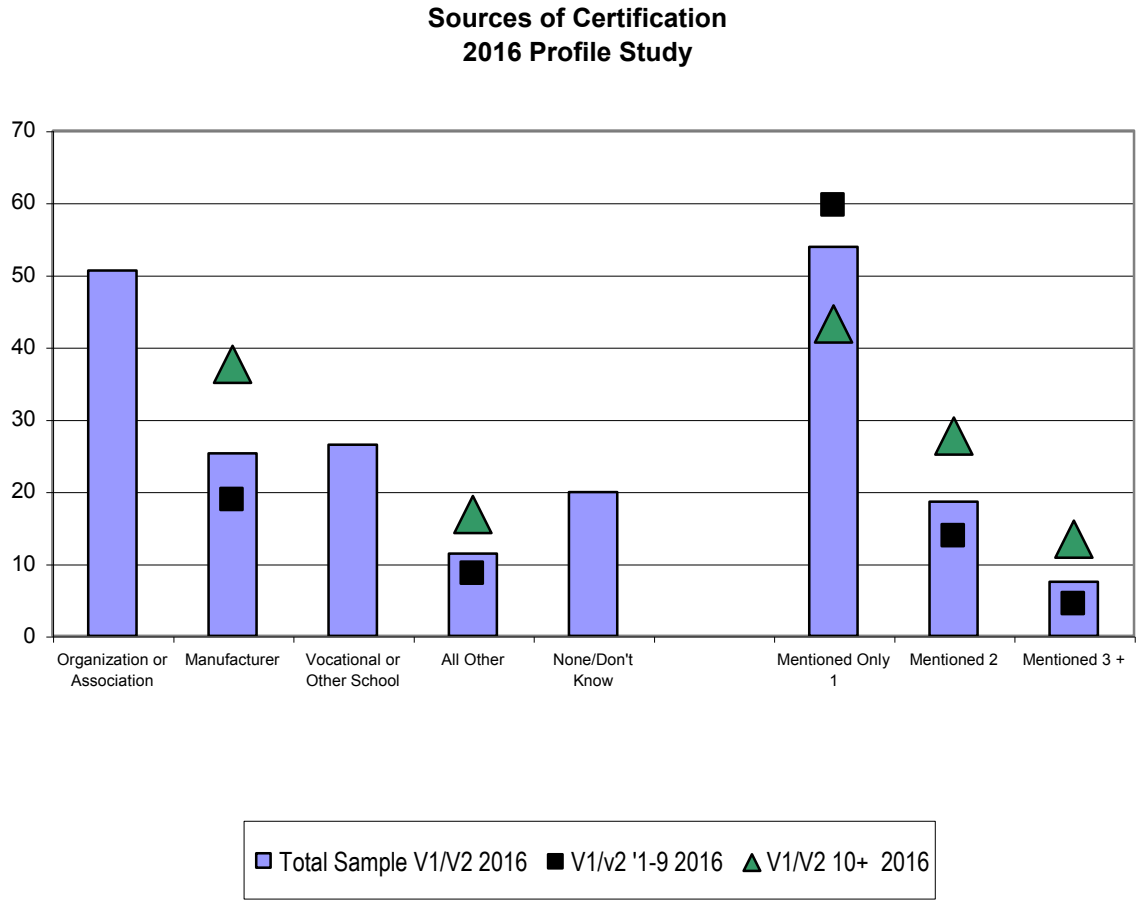


Version 1/Version 2 Sample = 282

Sources of Certification

8 in 10 who have or who will take training named a source for the Certification. Organizations/Associations are among the most frequently mentioned sources of certification. Not surprisingly, electrical contractors in small firms (1-9 employees) are more likely to only mention one certification source compared with those in larger firms.

Version 1/Version 2 (Sources of Certification; Sample = 282)



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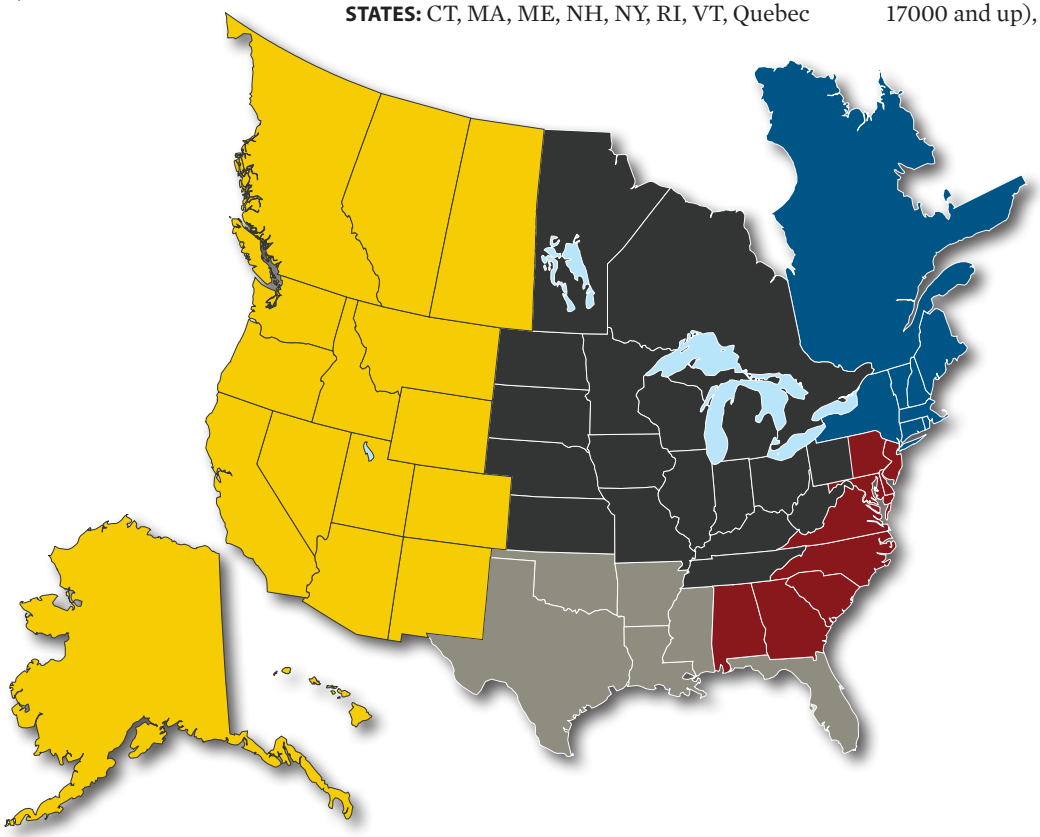

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