



**2014 Survey of
Residential Electric Customer Interest
in Value-Added Products and Services**

August 2014

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Executive Summary

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Executive Summary



- At the request of the New York State Energy Research and Development Authority, the New York State Department of Public Service, and the New York State Smart Grid Consortium, Abt SRBI conducted a telephone survey in New York State.
 - In total, 700 interviews were completed between July 23 and August 10, 2014, using a dual-frame, random-digit dial landline and cell phone design. Of the interviews, 490 were completed with landline users and 210 with cell phone users.
 - Results were weighted for telephone status, geography, and demographic characteristics. Details about response weighting are provided in the Appendix.
- Respondents indicated that the most valued quality of electric service is reliability (94%), followed by rapid service restoration after an outage (88%) and relatively low cost (76%).
- With respect to their electric bill and usage,
 - 48% of respondents say they understand the components of their electric bill;
 - 45% indicated that they understand electricity pricing;
 - 53% characterize themselves as knowledgeable about the amount of electricity used by various household appliances; and
 - 69% believe it is important to reduce carbon emissions.
- Some respondents would be willing to pay slightly more for electricity if:
 - They could be assured that power would be maintained during most or all extreme weather events (45%).
 - Electricity were generated from sources other than fossil fuels (46%).

Executive Summary (cont.)



- Only 23% of respondents believe that they are adequately involved in discussions about electric power, and 41% would like to be more involved.
- 66% of respondents say they would be interested in having daily or hourly information about electricity costs to help manage their usage.
 - Among these respondents, 86% would prefer information on a monthly basis and 83% as they use electricity.
 - 40% of these respondents would prefer to receive information about their electricity usage on their monthly bill, 34% online, and 37% on multiple devices.
- 71% of respondents are aware that they have an option to purchase electricity from a non-utility provider and 15% of all respondents actually do so.
- In terms of satisfaction with their utility or non-utility supplier:
 - Overall, 70% of respondents are satisfied with their electric utility, including 31% who are very satisfied. Satisfaction with specific aspects of utility service ranges from 31% for having alternatives to obtain electricity from different sources to 83% for reliability.
 - Overall, 63% of respondents who use a non-utility provider are satisfied with the service they receive. Satisfaction with specific aspects of the service provided by non-utility suppliers ranges from 44 to 47%.
- When asked about their interest in a variety of electricity-related products and services, respondents' being "very interested" ranges from 19% for the ability to pre-purchase electricity to 35% for receiving credits for usage reduction at key times.

Methodology



Methodology



- The objectives of the survey were to collect information about:
 - Awareness of electricity billing and pricing issues;
 - The value of specific attributes of energy service;
 - Customer choice and perceptions of utility performance;
 - Interest in community discussions about electric power delivery;
 - Interest in the use of electricity-related new products and services; and
 - Demographic and housing characteristics.
- A dual frame landline and cell-phone random digital (RDD) survey was conducted. Data from the landline and cell phone interviews were combined based on responses to several telephone status questions included in the survey.
- The survey was conducted between July 23 and August 10, 2014, with an average length of 14.3 minutes for landline interviews and 15.1 minutes for cell phone interviews. The cooperation rate was 35.4% for landline interviews and 45.7% for cell phone interviews.
- The data were weighted by telephone status, geography and household characteristics from the American Community Survey, as detailed in the Appendix.
- The margin of error for the survey was plus or minus 3.7% at the 95% confidence level.

Methodology (cont.)



- Interviewing quotas were established by geography and telephone status (landline and cell phone), as follows:

Geography	Total Number of Interviews	Number of Landline Interviews	Number of Cell Phone Interviews
New York City (the Five Boroughs)	200	140	60
Long Island (Nassau and Suffolk Counties)	200	140	60
Mid-Hudson (Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, and Westchester Counties)	100	70	30
Upstate (the remainder of New York)	200	140	60
Total	700	490	210

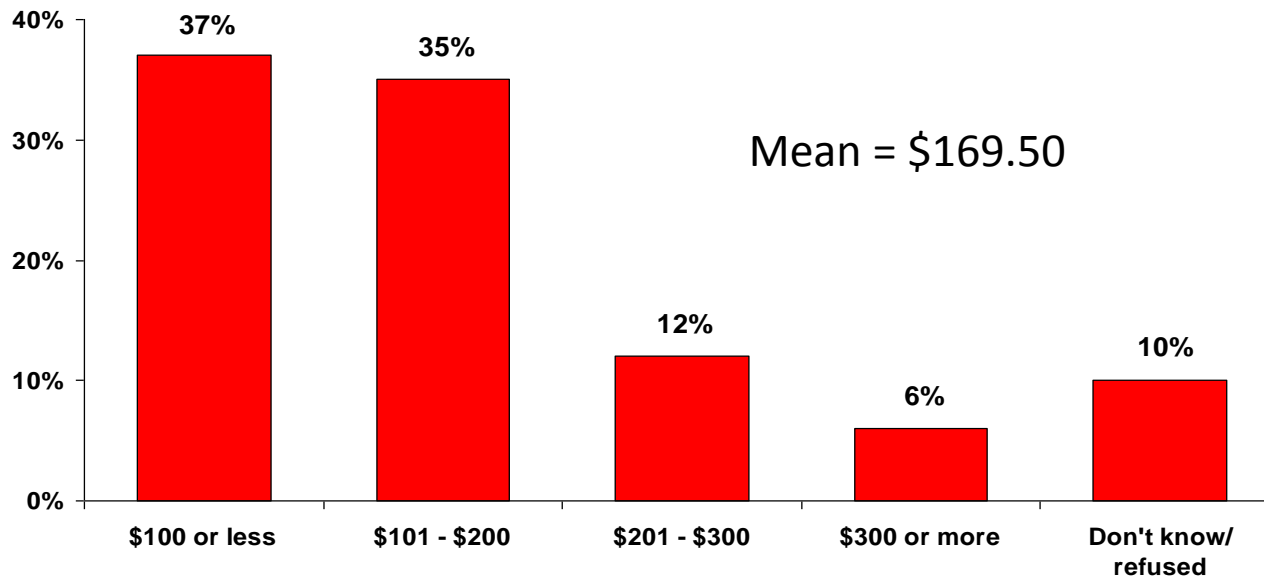
Electricity Awareness



On average, respondents said that they spend \$169.50 monthly on their electric bill.



- As would be expected, there are differences in the average monthly electric bill by housing structure type: the average bill is \$181 in single-family homes, \$152 in multi-family homes, and \$104 in manufactured homes. However, the differences are not statistically significant.
- There is a positive association between the monthly electric bill amount and the number of occupants in the home: the average monthly electric bill is \$130 in homes with two occupants, compared with \$238 in homes with five or more occupants, a statistically-significant difference.
- By geographic area, the monthly average bill ranges from \$148 Upstate (non-Mid-Hudson counties) to \$207 on Long Island, although the differences are not statistically significant.
- Compared with respondents in other age groups, those age 65 and over have the lowest average monthly electric bill (\$142).

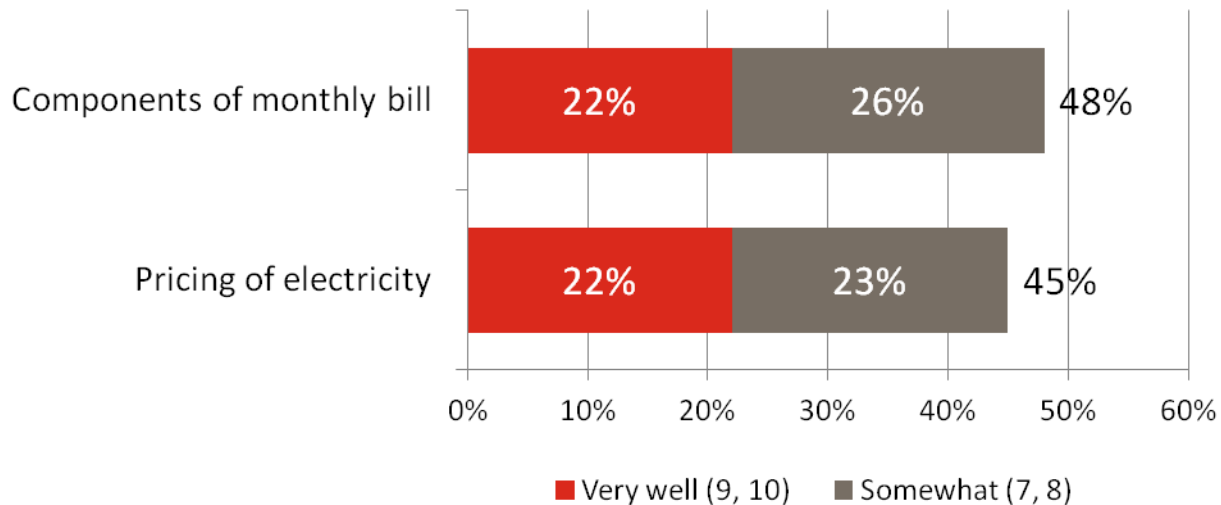


Q1. About how much does your household normally spend each month on electricity? (n = 700)

Forty-eight percent of respondents say they understand the components of their electric bill, while 45% indicate that they understand electricity pricing (a rating of 7 to 10 on a 10-point scale).



- There is a positive association between respondent age and understanding of both the components of the electric bill and the pricing of electricity.
- Among the respondents who are more likely to say they understand the components of their electric bill and the pricing of electricity are those who are very satisfied with their electric utility and who are aware that they can purchase electricity from a non-utility provider. Those respondents who say they understand the components of their electric bill are also less interested in having information about their energy usage than other respondents.
- Long Island respondents are significantly less likely than those in New York City and Upstate to say that they understand the components of their electric bill, but there is no significant difference by geography in understanding of the pricing of electricity.



Q2. On a scale of 0 to 10, where 0 is “not very well” and 10 is “very well,” how well do you feel you understand:

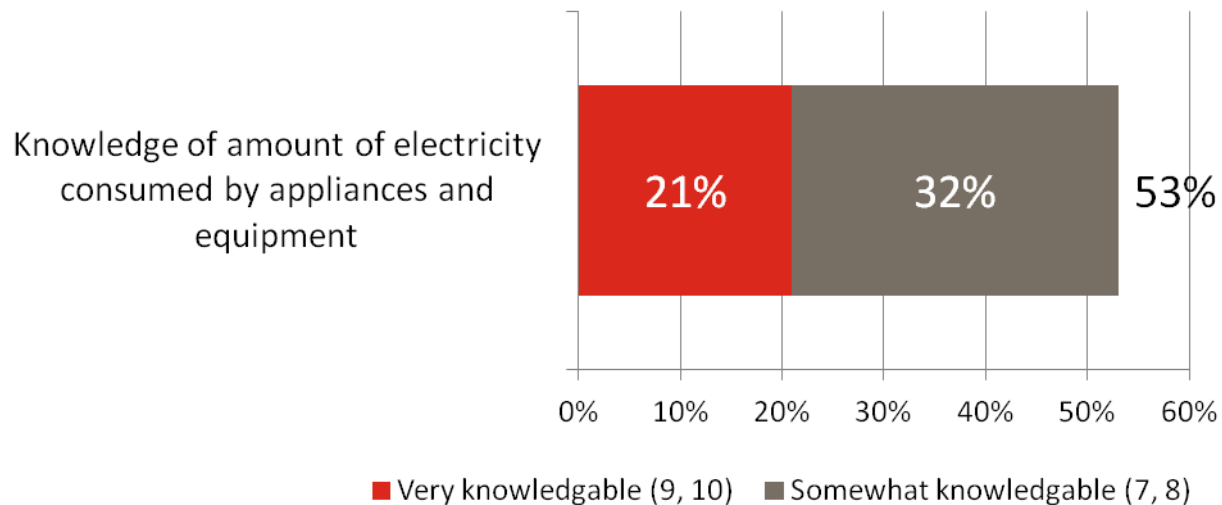
The components of the monthly electricity bill you receive? (n = 700)

The pricing of the electricity you consume? (n = 700)

Only 21% of respondents characterize themselves as very knowledgeable about the amount of electricity consumed by various appliances and equipment used in their home. Thirty-two percent are somewhat knowledgeable, for a total of 53%.



- Respondents who say they are very knowledgeable about the amount of electricity consumed by various appliances are also more likely than other respondents to be very satisfied with their electric utility and to be aware that they can purchase electricity from a non-utility supplier, but also to be disinterested in information about their electric usage.
- Often in similar survey questions about the amount of electricity consumed by various appliances, men say they are more knowledgeable than women and seniors indicate that they are more knowledgeable than younger adults, but there were not statistically-significant differences between these subgroups in the survey.



Q3. On a scale of 0 to 10, where 0 is “not very knowledgeable” and 10 is “very knowledgeable,” how knowledgeable are you about the amount of electricity consumed by various appliances and equipment in your home? (n = 700)

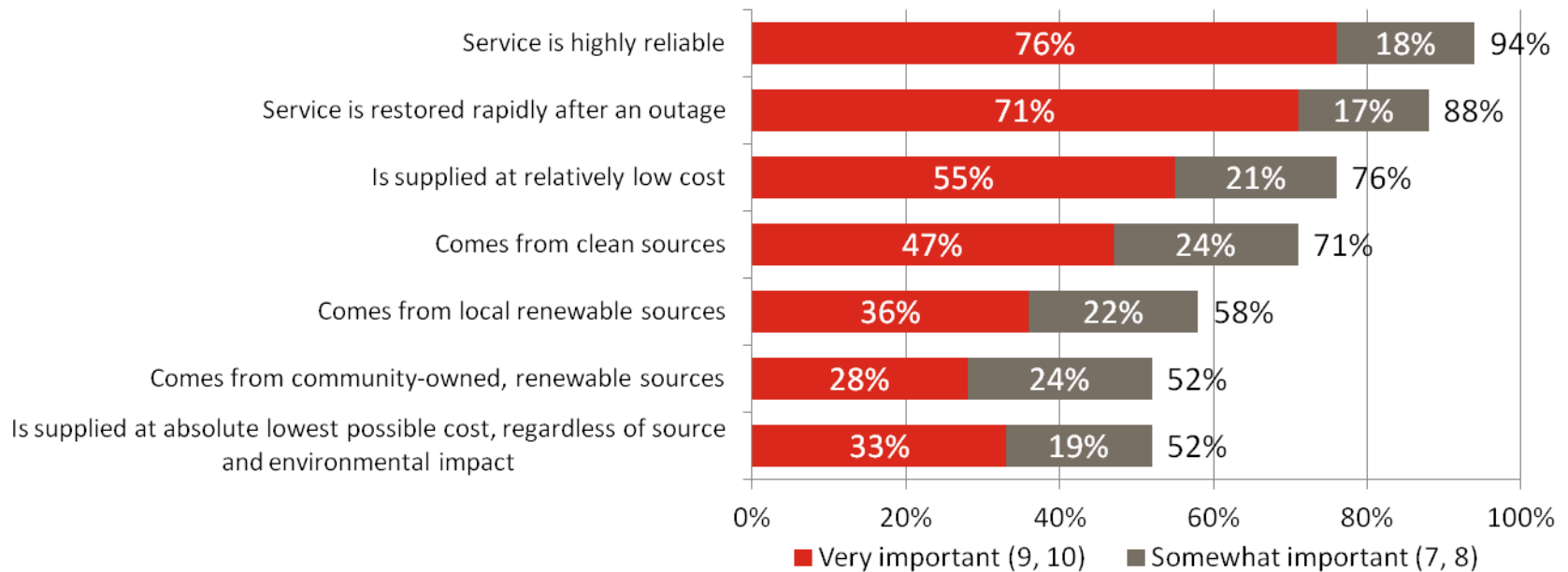
Value of
Energy Services



The most valued quality of electric service is reliability (94%), followed by rapid service restoration in the event of an outage (88%) and relatively low cost (76%).



- Less-valued aspects of electric service are the use of clean energy sources (71%), generation from locally-sited renewable sources (58%), generation from community owned, renewable sources (52%), and being supplied at the lowest possible cost (52%). In Abt SRBI's experience, reliability, outage restoration, and cost are usually the most highly-valued service dimensions by utility customers.
- Compared to men, women place a higher value on all of the electric service dimensions except its being supplied at the lowest possible cost and rapid restoration after an outage. Respondents with incomes under \$20,000 are more likely than other respondents to value the pricing of electricity at the lowest possible cost.
- Compared with other respondents, those who are very satisfied with their electric utility more highly valued all of the qualities of electric service.

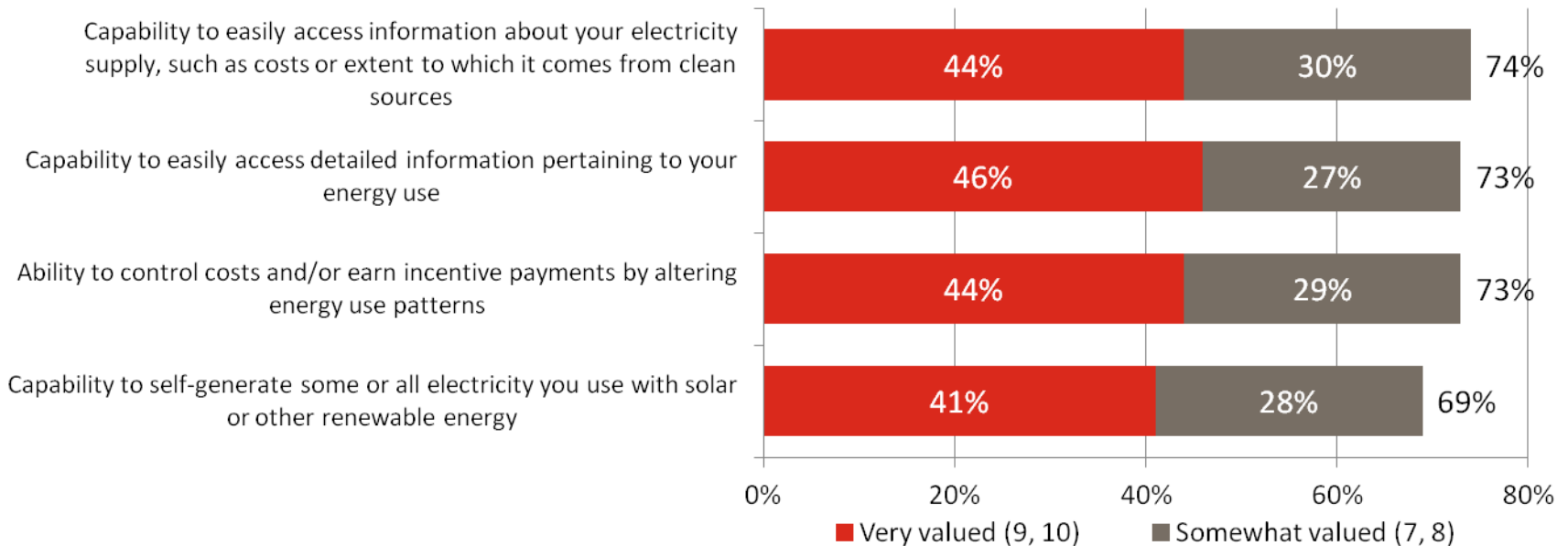


Q4. How much do you value each of the following qualities of electricity service? Please use a scale of 0 to 10, where 0 is “not at all important” and 10 is “very important” to you. (n = 700)

Approximately 70% of respondents characterized as very or somewhat valuable each of four options related to energy-use information, cost control/incentive payments, and self-generation.



- Compared with other respondents, those age 35 to 44 gave higher ratings to the value of all four energy-related services.
- Respondents who are very satisfied with their electric utility and women were more interested than other respondents in easy access both to detailed information about their usage and about electricity supply.
- In terms of geographic differences, self-generation and easy access to electricity supply information were most valued by Long Island respondents, compared with those in other areas.

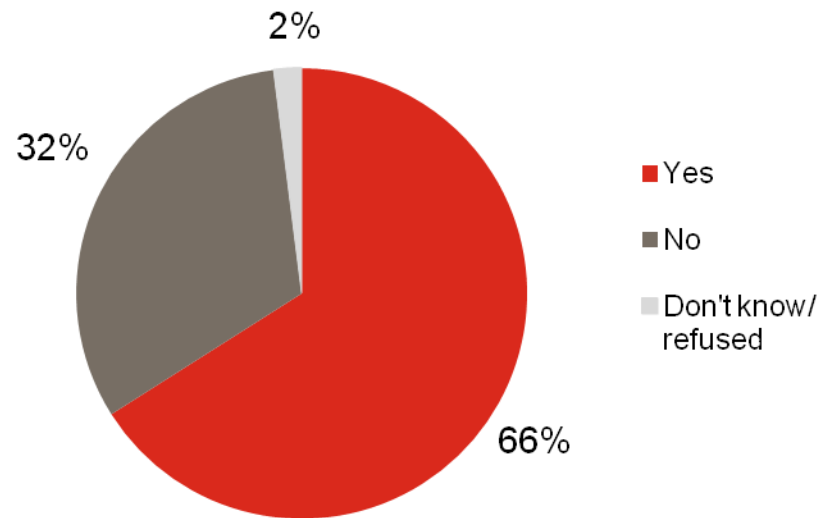


Q5. How much do you value each of the following energy-related services, using a scale of 0 to 10, where 0 is “least valued” and 10 is “most valued.” (n = 700)

Sixty-six percent of respondents say they would be interested in having daily or hourly information about electricity costs to help manage their usage.



- There is a negative association between such interest and respondent age: 76% of those under age 35 are interested in this information, compared with 57% age 65 and over.
- Single-person households are less interested in this option than respondents in larger households.
- 81% of respondents who are dissatisfied with their electric utility are interested in this information, compared with only 55% who are very satisfied.
- Also, 75% of respondents unaware that they could purchase electricity from a non-utility supplier are interested in daily or hourly electricity-usage information, compared with 64% who are aware they can purchase from a non-utility supplier.

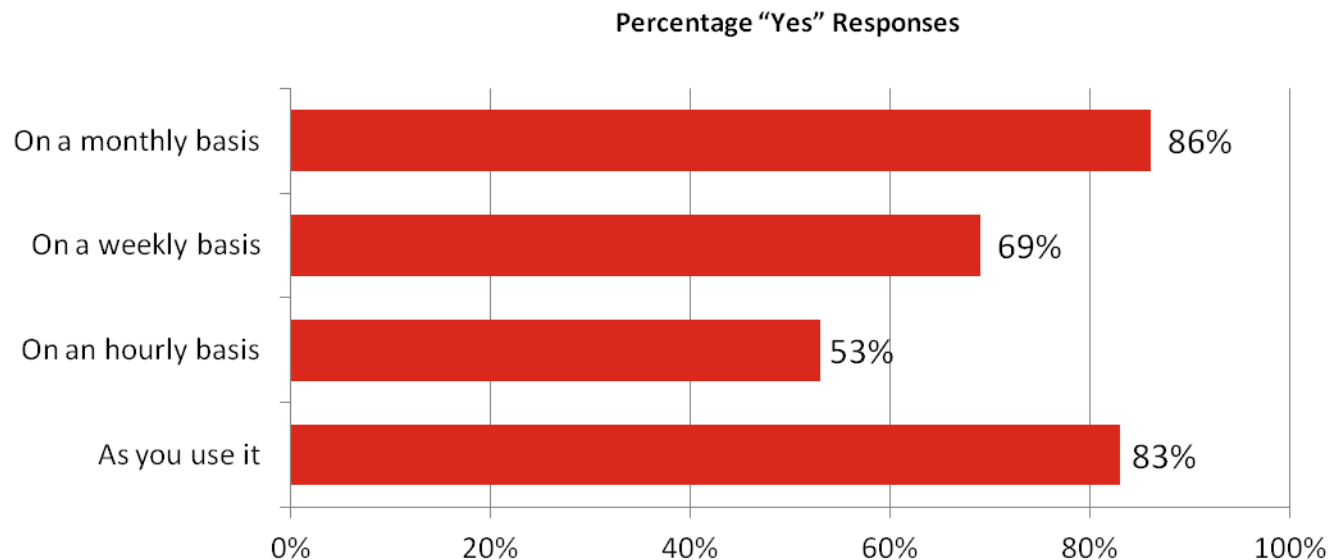


Q17. Would having information about how much you were paying on a daily or even hourly basis allow you to better manage your electricity usage? (n = 700)

Energy-use information provided on a monthly basis is of most interest (86%) to respondents, followed by real-time (“as you use it”) information (83%). Sixty-nine percent of respondents are interested in weekly information and 53% in hourly information.



- There is a positive association between interest in monthly information and respondent income and educational attainment.
- Men are more interested than women in monthly information (90%, compared with 82%).
- By geographic area, the only significant difference is that Long Island residents are more interested than other respondents in having monthly information.
- Cell-phone respondents (who tend to skew lower-income, younger, and minority) are more interested in weekly information than landline respondents (76%, compared with 63%).

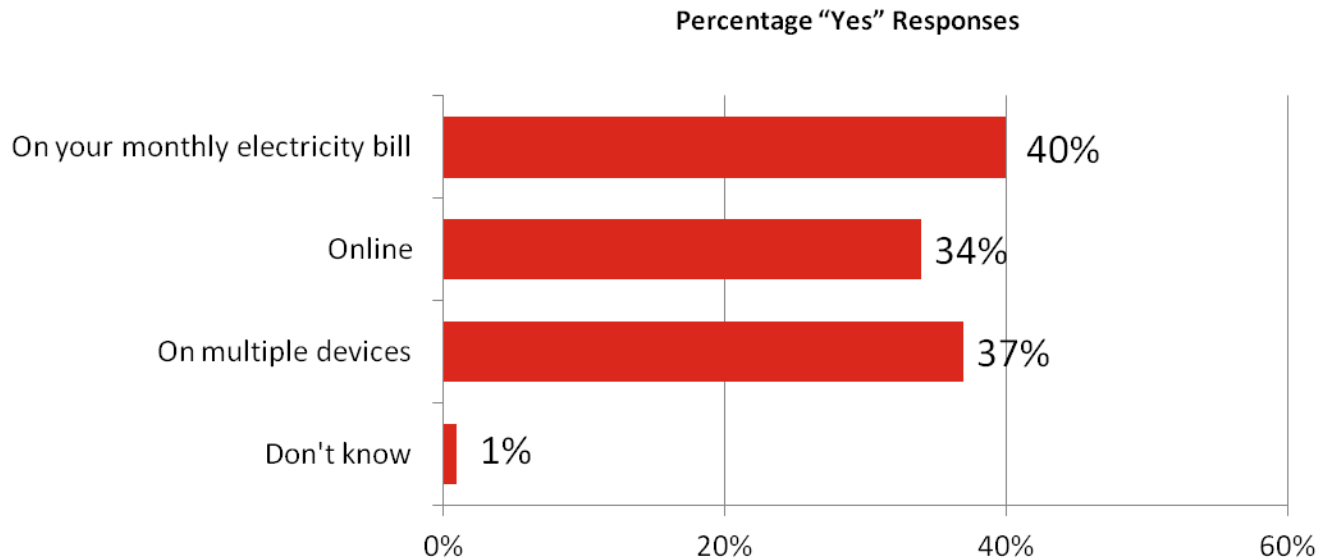


Q6. Would you be interested in having the ability to access information about your energy use ... (Respondents interested in having information about their electricity usage, n = 464)

Forty percent of respondents prefer to receive information about their electricity usage on their monthly bill, 34% online, and 37% on multiple devices.



- Respondents under 35 years of age indicate a preference for online information, while those age 55 and over prefer to receive such information on their monthly electric bill.
- Compared with men, women are more interested in receiving information on their monthly electric bill (50%, compared with 32%), while men are more interested than women in having information on multiple devices (43%, compared with 28%).

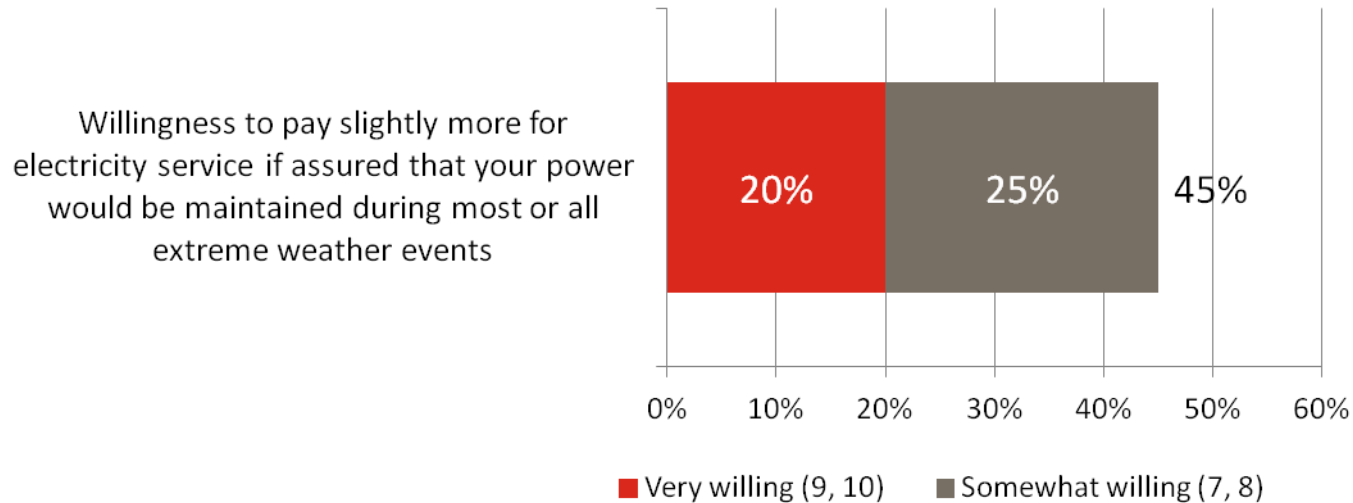


Q6a. Would you prefer to receive this information ... (Respondents interested in having information about their electricity usage, n = 400)
Multiple responses permitted

Forty-five percent of respondents are interested in paying slightly more for electricity if they could be assured that power would be maintained during most or all extreme weather events (20% who are very willing and 25% who are somewhat willing to pay more).



- There are no significant trends in the willingness to pay more for reliability among sub-segments of respondents.
- It should be noted that elsewhere in the survey (Question 11), 83% of respondents indicated that they are satisfied with the reliability of electric service from their utility provider. Also, reliability is the most valued of all the service dimensions related to the delivery of electricity (Question 4).

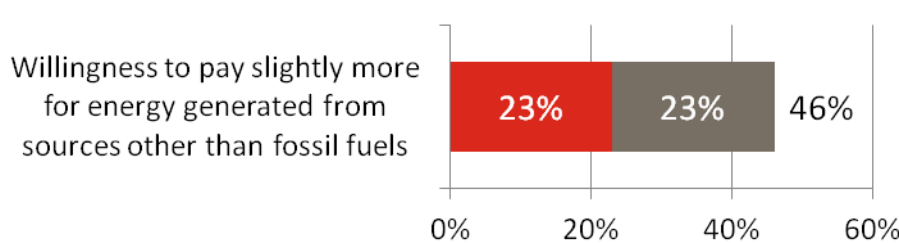


Q7. How willing would you be to pay slightly more for electricity service if you could be assured that your power would be maintained during most or all extreme weather events, using a scale of 0 to 10, where 0 is “not at all willing” and 10 is “very willing”? (n = 700)

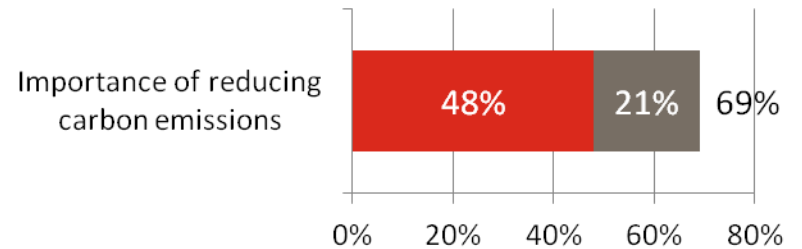
Forty-six percent of respondents are willing to pay slightly more for energy generated from sources other than fossil fuels, while 69% believe it is important to reduce carbon emissions.



- Respondents with a post-graduate degree are more willing than other respondents to say they would pay more for electricity generated from non-fossil sources.
- 56% of women believe that it is important to reduce carbon emissions, compared with 41% of men.
- By geography, New York City respondents are more likely to say that the reduction of carbon emissions is important to them, while Upstate (non-Mid-Hudson) respondents are least concerned (55% compared with 40%).



■ Very willing (9, 10) ■ Somewhat willing (7, 8)



■ Very important (9, 10) ■ Somewhat important (7, 8)

Q8. How willing would you be to pay slightly more for energy generated from renewable energy sources, using a scale of 0 to 10, where 0 is “not at all willing” and 10 is “very willing”? (n = 700)

Q9. On a scale of 0 to 10, where 0 is “not very important” and 10 is “very important,” how important is reducing carbon emissions to you? (n = 700)

Utility Performance and Customer Choice

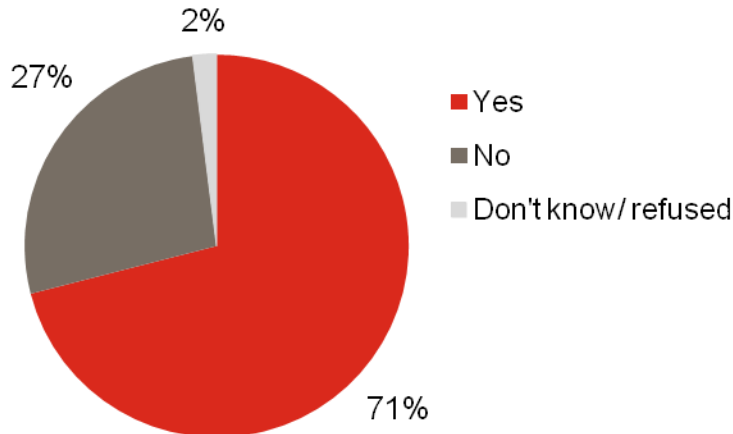


Seventy-one percent of respondents are aware that they have an option to purchase electricity from a non-utility provider and 15% of all respondents actually do so.

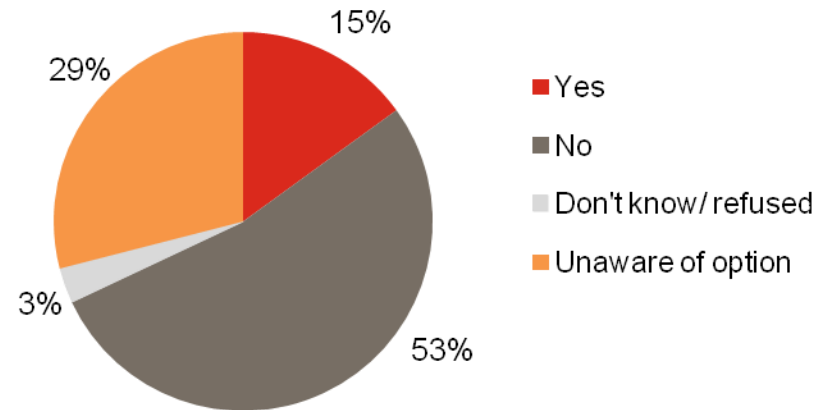


- 21% of those who are aware of their option to purchase electricity from a non-utility provider currently do so.
- By geography, awareness of the option is lowest on Long Island at 41%, compared with 84% in the Mid-Hudson area, 83% Upstate, and 68% in New York City.
- 56% of women are aware that they have the option to purchase electricity from a non-utility provider, compared with 41% of men.
- Homeowners are more aware of the option than renters (76% compared with 59%).
- Respondents in the Mid-Hudson area and New York City are more likely than those in other areas to purchase electricity from a non-utility supplier, as are those living in single-person households and who are age 45 or over.

Aware of Option to Purchase from Non-utility Supplier



Currently Purchase from Non-utility Supplier



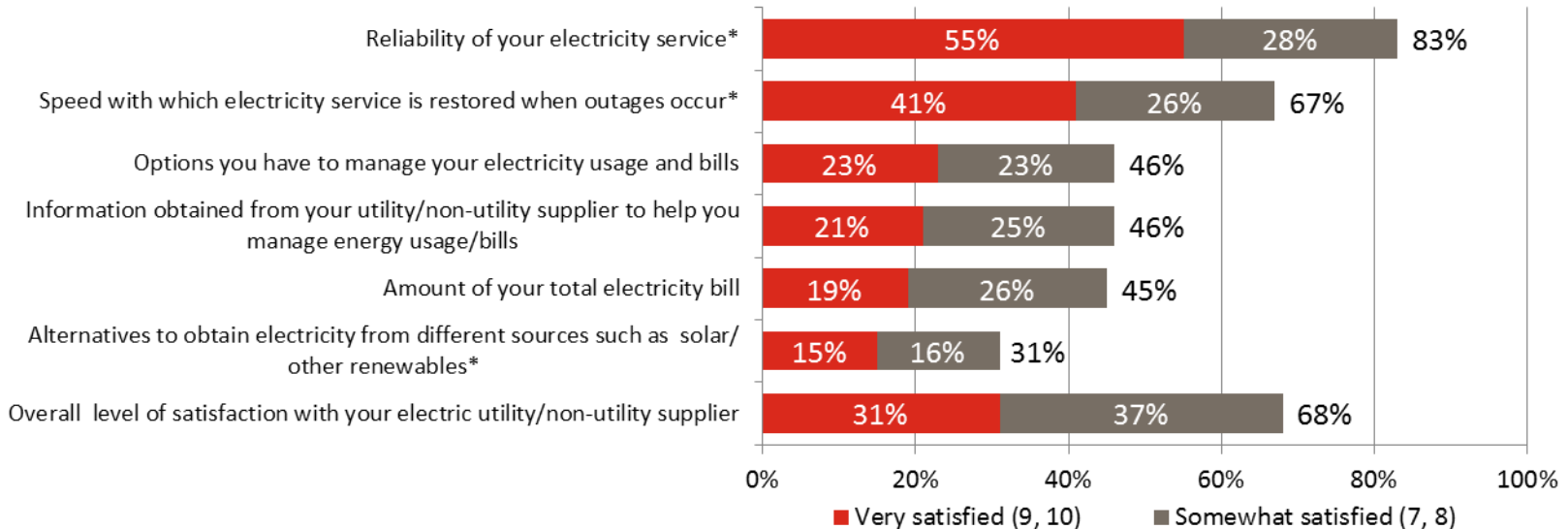
Q12. Are you aware that you have the option to purchase electricity from a non-utility supplier? (n = 700)

Q13. Do you currently purchase electricity from a non-utility provider? (n = 700)

When asked about their satisfaction with their electric utility or their non-utility supply, 68% of respondents said they are satisfied overall, including 31% who are very satisfied.



- Forty-six percent of all respondents are satisfied with their options to manage their electricity usage and bills and with the information they obtain from their utility or supplier to help them manage energy usage. Forty-five percent are satisfied with the total amount of their electric bill.
- Among the respondents served by an electric utility, 83% are satisfied with the reliability of their electric service, 67% with the speed of outage restoration, and 31% percent with supply alternatives such as renewables.
- Satisfaction ratings among respondents served by an electric utility are shown on page 23 and satisfaction ratings among those using a non-utility supplier are provided on page 24.



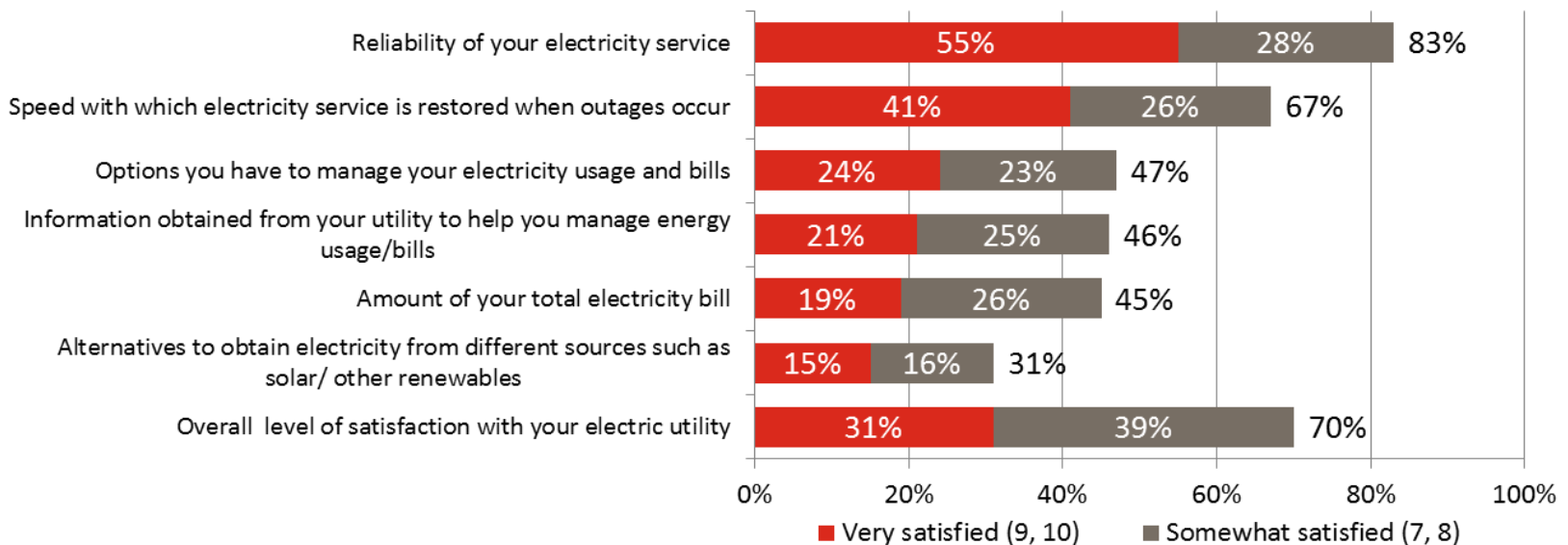
*Not asked of respondents purchasing electricity from a non-utility supplier

Q11combined. On a scale of 0 to 10, where 0 is “not very satisfied” and 10 is “very satisfied,” how satisfied are you with the following aspects of your electric utility service? (Respondents rating their electric utility, n = 700)

Satisfaction with electric utilities: overall, 70% of respondents are satisfied with their electric utility, including 31% who are very satisfied. Overall satisfaction with specific aspects of utility service ranges from 31% for having alternatives to obtain electricity from different sources to 83% for reliability.



- As is often the case with electric utilities, overall satisfaction is positively associated with respondent age: only 23% of respondents age 18 to 34 are very satisfied, compared with 42% age 65 or over.
- 36% of women are very satisfied overall with their electric utility, compared with 25% of men.
- Respondents who are satisfied overall with their electric utility are also more satisfied than other respondents with each of the individual service dimensions.

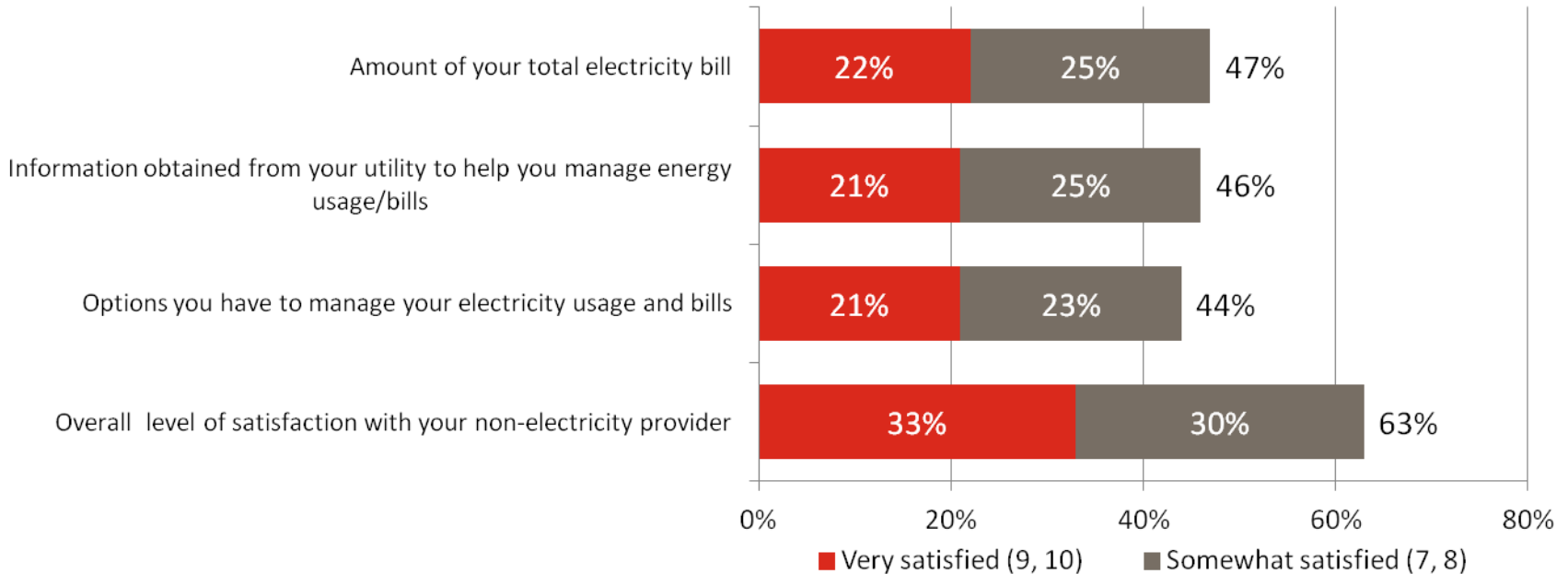


Q11. On a scale of 0 to 10, where 0 is “not very satisfied” and 10 is “very satisfied,” how satisfied are you with the following aspects of your electric utility service? (Respondents rating their electric utility, n = 594)

Satisfaction with non-utility suppliers: 63% of respondents who use a non-utility provider are satisfied with the service they receive. Satisfaction with specific aspects of the service provided by non-utility suppliers ranges from 44% to 47%.



- Respondents who use a non-utility supplier are less satisfied than those who use a utility.
- Likely because of the relatively small number of respondents who use a non-utility provider, there were no statistically-significant differences in satisfaction among customer segments.



Q14. On a scale of 0 to 10, where 0 is “not very satisfied” and 10 is “very satisfied,” how satisfied are you with the following aspects of the service you receive from your non-utility electricity provider? (Respondents who use a non-utility electricity provider, n = 106)

When asked what their electric service provider could do to improve the pricing of electricity, 22% answered “nothing” and 30% said “don’t know” 33% mentioned cost issues and 11% sourcing issues.



How electric provider could improve the way they price	Percentage
Cost (net)	33%
Reduce rates/no increase	18
Provide better information of charges	8
Reduce/eliminate delivery charges	2
Reduce overhead/corporate expenses	2
Reduce/eliminate taxes	1
Discounts/incentives	1
Fixed rate/budget billing	1
Offer more cost-saving information	1
All other cost mentions	2

How electric provider could improve the way they price	Percentage
Source (net)	11%
Use of renewables	6
Shop for best price	3
Use of natural gas/fossil fuels	1
All other source mentions	2
Miscellaneous (net)	8%
More detailed information/transparency	4
More frequent meter readings	1
Simpler/easier access	1
All other miscellaneous mentions	2
Nothing/no improvements	22%
Don't know/refused	30%

Q15. What, if anything, do you believe your electric service provider could do to improve the way they price electricity? (n = 700)

When asked what their electricity supplier could do to improve the way customers are billed for electricity, 38% said “nothing” and 27% answered “don’t know”. Sixteen percent offered suggestions about the bill itself and eight percent want improved information from their utility.



How electric provider could improve the way they bill	Percentage
Bill/statement (net)	16%
Provide usage/historical usage information	5
Simplify/easier to read/understand	5
Itemize charges	3
Online billing/payment	1
More frequent meter readings	1
All other bill/statement mentions	2
Information/communication (net)	8%
More/better/detailed information	4
App/online information	2
All other information/communication mentions	2

How electric provider could improve the way they bill	Percentage
Cost (net)	7%
Reduce rates	2
Bill actual usage/no estimates	1
Payment/billing plans	1
All other cost mentions	3
Miscellaneous (net)	4%
Service/equipment	1
Use of renewables	1
All other miscellaneous mentions	2
Nothing	38%
Don’t know/refused	27%

Q16. What, if anything, do you believe your electric service provider could do to improve the way they bill you for electricity? (n = 700)

Engagement

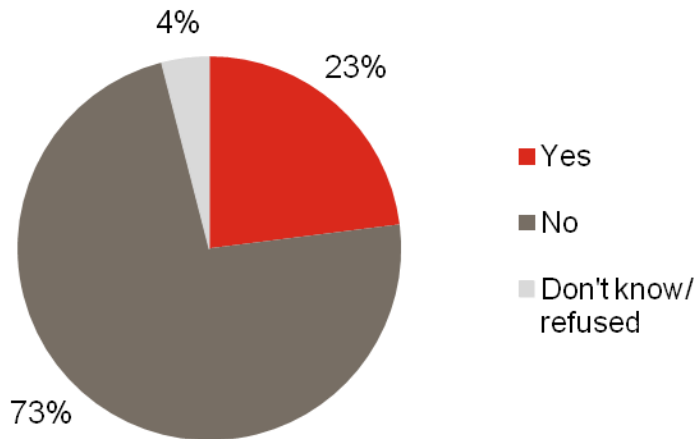


Only 23% of respondents believe that they are adequately involved in discussions about electric power, and 41% would like to be more involved.

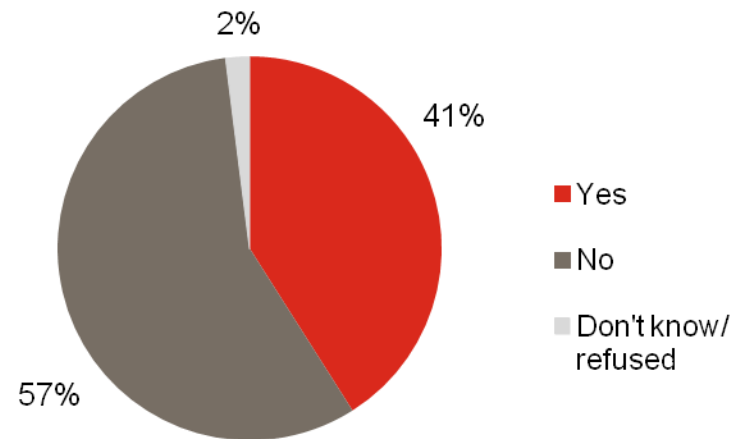


- Compared with other respondents, those who live Upstate, are very satisfied with their utility, and are aware that they can purchase electricity from a non-utility provider believe that they are adequately involved in discussions about electric power.
- Interest in becoming more involved in discussions about electric power is positively associated with respondent educational attainment, dissatisfaction with electric utility performance, lack of awareness about non-utility providers, and interest in energy usage information. Respondents on Long Island are more interested in being involved in these discussions than those who live elsewhere in the state.

Are you adequately involved in discussions about electric power?



Would you like to be more involved in discussions about electric power?



Q18. Do you believe you are adequately involved in discussions about how electric power is delivered, priced and ultimately used within your community? (n = 700)

Q19. Would you like to become more involved in discussions about how electric power is delivered, priced, and used within your community? (n = 700)

As shown in the graphs on the two following pages, being “very interested” in a variety of new products and services ranges from 19% for the ability to pre-purchase electricity to 35% for receiving credits for usage reduction at key times.



- The graphs on the following pages show the percentage of respondents who are “very interested” in each product or service. Abt SRBI’s research experience with new products and services indicates that it is the “very interested” respondents who are most likely to actually purchase or use a new product or service. Additionally, the percentage of those who are “very interested” can usually be discounted by 20% to determine the actual level of interest (for example, if 50% of respondents indicate that they are “very interested” in the product or service, the actual percentage is more likely 40% (80% of 50%).
- The percentage of respondents who already use these products is very small, ranging from 0 to 6 percent.
- Respondents who are interested in information about their energy usage evidence higher levels of interest in all of the new products and services than those who are not interested in such information.
- Interest in time-of-use pricing is positively associated with the number of occupants in the household.
- Of particular interest to renters are a credit for allowing cycling of their electric usage, a device or app to monitor real-time electric usage, and a device or app to allow for remote control of household appliances.
- There is also a negative association between interest in pre-paid electricity and respondent age: 30% of those under 35 years of age are very interested, compared with 12% age 65 and over.
- There are also some geographic differences in interest: Upstate (non-Mid-Hudson) respondents are less interested in all of the products and services than those in the other areas.

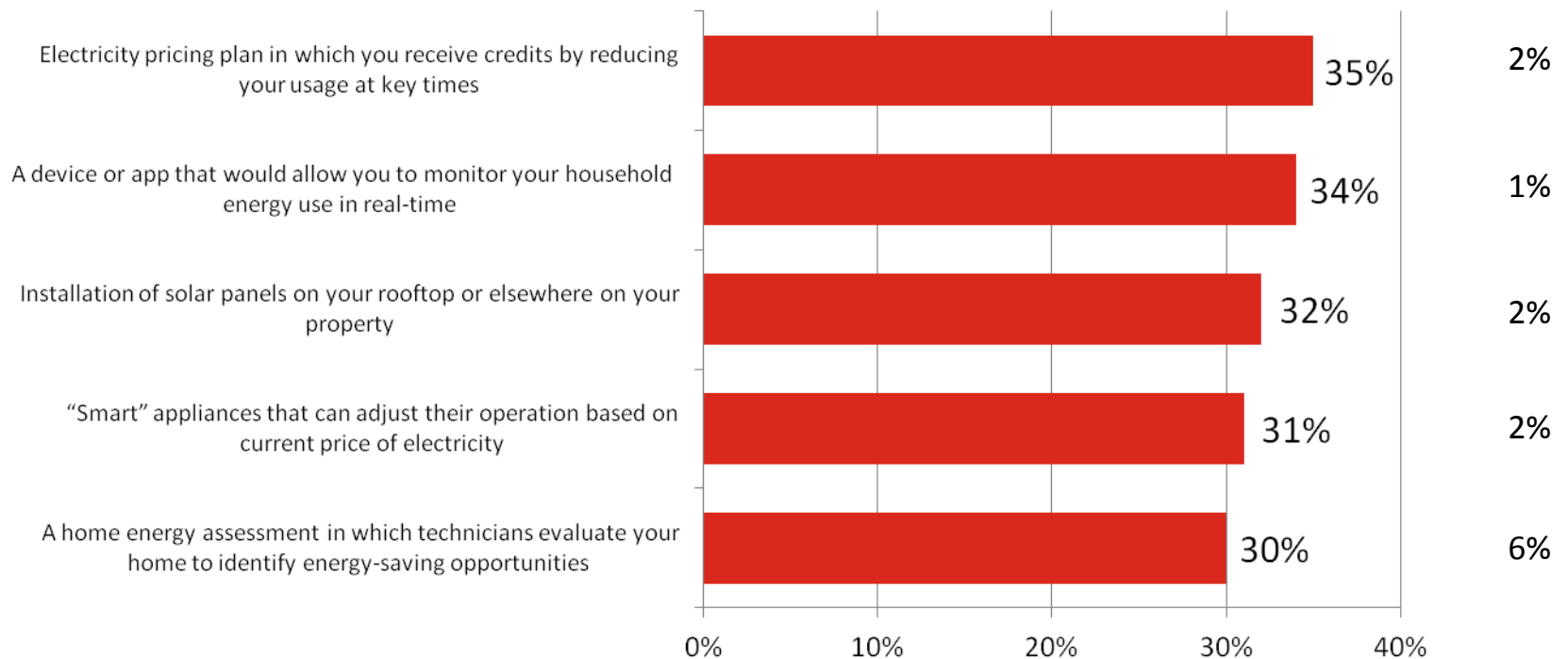
Q20. Which of the following products and services would you be interested in if it were available to you? Please rate each in terms of interest from 0 to 10, where 0 is “not very interested,” and 10 is “very interested”. (n = 700)

Interest in New Products and Services



Percent “Very interested” (9, 10)

Already use



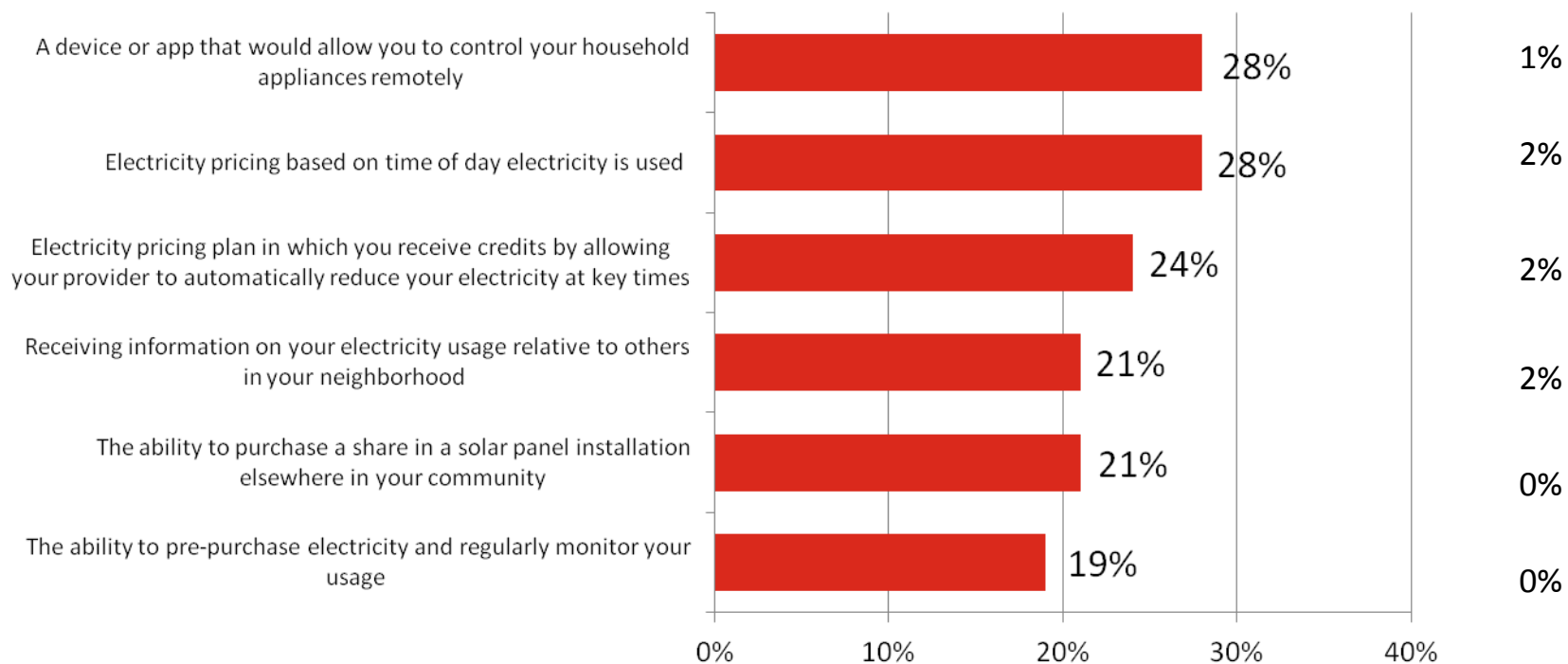
Q20. Which of the following products and services would you be interested in if it were available to you? Please rate each in terms of interest from 0 to 10, where 0 is “not very interested,” and 10 is “very interested”. (n = 700)

Interest in New Products and Services (cont.)



Percent “Very interested” (9, 10)

Already use



Q20. Which of the following products and services would you be interested in if it were available to you? Please rate each in terms of interest from 0 to 10, where 0 is “not very interested,” and 10 is “very interested”. (n = 700)

When asked about their interest in other new energy-related products or services, 51% of respondents answered “nothing” and 25% said “don’t know”. Nine percent mentioned solar products and services and 4% said wind power.



Other Products of Interest	Percentage
Solar products/services	9%
Wind power	4
Remote/wireless end-user energy control (smart home)	2
Low rate/energy efficiency/ways to save money	2
Use of natural gas/fossil fuel	2
Geothermal products/services	1
Generators/backup products	1
Real-time usage monitoring	1
Other	5
Nothing	51
Don't know	25

Q23. Is there any particular energy product or service that you wished was available that isn't available now? (n = 700)

Multiple responses permitted

Demographic and Housing Characteristics of Respondents



Demographic and Housing Characteristics of Respondents



- The demographic characteristics of respondents are provided below and on the following page.

Who is your electric utility?	Percentage
Con Edison	37%
National Grid	17
Public Service Electric & Gas (PSE&G)	13
New York State Electric and Gas (NYSEG)	12
Central Hudson	4
Orange and Rockland (O&R)	3
Rochester Gas & Electric (RG&E)	3
Other	8
Don't know/refused	3
Home ownership	Percentage
Own	73%
Rent	27

Type of residence	Percentage
Single-family detached home	56%
Single-family attached home (duplex/townhouse)	9
Building with two to five units	10
Building with five or more units	21
Mobile or manufactured home	2
Other	1
Refused	1
How many people live in your home?	Percentage
One	13%
Two	31
Three	18
Four	19
Five or more	17
Refused	2

Demographic and Housing Characteristics of Respondents (cont.)



Age	Percentage
Under 35 years old	19%
35-44 years old	12
45-54 years old	17
55-64 years old	22
65 years old or over	22
Refused	8
Which of the following best describes your education?	Percentage
High school or less	16%
Some college or post-high school training	21
College graduate	29
Graduate work or degree	32
Refused	3

Gender	Percentage
Male	53%
Female	47
Which of the categories best describes your total family income from all sources before taxes for 2013?	Percentage
Up to \$20,000	8%
\$20,000 up to \$40,000	12
\$40,000 up to \$60,000	12
\$60,000 up to \$80,000	12
\$80,000 up to \$100,000	9
\$100,000 up to \$150,000	15
\$150,000 or more	14
Don't know/refused	18

Appendix: Weighting Summary



Weighting Summary



The Survey, fielded by Abt SRBI, obtained telephone interviews with 700 adults in the state of New York who paid an electric bill for their household. The survey featured a dual-frame overlapping landline and cell phone random-digit dial (RDD) design. There were 490 telephone interviews conducted with individuals from the landline sample, and 210 interviews were obtained from the cell sample.

To properly compute the weights for survey respondents, information required for weighting was also collected from adults who were screened out because their household's electric bill was paid by someone else, such as a landlord or building manager (n=252). First and second stage weights were then computed for both respondents and screen-outs. The first stage weights account for the probability of selection of the telephone number from the sampling frame, including the fact that households in the landline sample with more than one landline number had a higher probability of selection, and also account for the overlap between the cell and landline sampling frames.

Raking population control totals are typically not subject to missing data, however, several of the corresponding survey variables contained missing values due to item nonresponse. Prior to computing the second stage weights, missing values in the weighting variables were imputed using hot deck imputation. The second stage weights then aligned the survey sample to known population benchmarks for the study's geographic area. The second stage weighting was conducted using an operation known as raking ratio estimation, or "raking." Raking is used to reduce biases from nonresponse and non-coverage in sample surveys. The raking procedure aligns sample demographics to estimated population benchmarks for home ownership, household size, household income, type of telephone device usage, and the region of New York where the household is located.

All of the population benchmarks, with the exception of telephone usage, were obtained from the 2012 American Community Survey for all adults, ages 18 and older, living in households in the state of New York. The telephone usage population estimates were constructed from the model-based estimates for the state of New York, released by the National Center for Health Statistics for the year 2012¹. These estimates were re-based on adults, ages 18 and older, living in households with a telephone in the state of New York. Since the cell phone-only adult population has increased every year since 2012, these sub-state level estimates were updated using the 2014 NCHS report² to reflect national trends.

Weighting Summary (cont.)



The final weight variable (WEIGHT) contains valid weight values only for respondents who completed the entire survey and is scaled to sum to the total number of completed interviews (n=700). A summary of the weights is reported in Table 1 below. Table 1 also shows the survey's design effect of 1.45. The design effect (Deff) is the ratio of the variance derived from a survey sample design to the variance that would be obtained from a simple random sample. We estimate the design effect (Deff) based on the study sample weights as the ratio of the average of the squared weights to the average of the weights. The formula for that estimation is:

$$\text{Deff} = [(\sum w_i^2)/n] / [(\sum w_i)/n]$$

where n equals your sample size. When using weights that are scaled to the sample size (as was done with these data), this formula gets simplified to just the ratio of the sum of the squared weights to the sum of the weights:

$$\text{Deff} = \sum w_i^2 / \sum w_i$$

Weighting has a statistical impact on the resulting sample size in that the weighted sample, in effect, is reduced. Although the weights will sum to the nominal sample size of 700, in statistical tests where weighted data are used, those tests need to use what is called the effective sample size for variance calculations³. The effective sample size (or effective base) is calculated as n divided by the design effect. Thus, the sample size of 700 has a statistical effective sample size of 482 (i.e., 700/1.45).

Weight Variable	Number of cases (n)	Mean weight	Minimum weight	Maximum weight	Standard Deviation	Design effect	Effective n
WEIGHT	700	1.000	0.139	4.740	0.672	1.45	482

The use of these weights in statistical analyses ensures that the demographic characteristics of survey respondents closely approximate the demographic characteristics of the study population. As such, they produce a representative estimation of findings generalizable to the study population.

¹ Blumberg SJ, Ganesh N, Luke JV, Gonzales G. Wireless substitution: State-level estimates from the National Health Interview Survey, 2012. National health statistics reports; no 70. Hyattsville, MD: National Center for Health Statistics. 2013.

² Blumberg SJ, Luke JV. Wireless substitution: Early release of estimates from the National Health Interview Survey, July–December 2013. National Center for Health Statistics. July 2014. Available from: <http://www.cdc.gov/nchs/nhis.htm>.

³ For generalized and approximate values of the standard error (se) for a given proportion (p) that incorporate the Deff, the following formula can be used: $se(p) = z[\text{Deff}(pq/n)]^{1/2}$, where z = the normalized confidence level (e.g., for 2-tailed 95% confidence, $z_{.975} = 1.96$), p is your study proportion of interest, $q = (1 - p)$, and n is the sample size. However, variance calculations that take into account complex sample designs may also be used with available statistical packages such as SAS, SPSS or STATA.